

**AN EXPLORATION OF GRADE 10 RURAL MATHEMATICS  
TEACHERS' UNDERSTANDING AND PRACTICES OF THE  
NATIONAL CURRICULUM STATEMENT (NCS) CURRICULUM**

**By**

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## ABSTRACT

The aim of this research project was to explore Grade 10 Mathematics teachers understanding and practices in implementing the NCS in their rural schools. The research further explored perceptions teachers have about the curriculum. The research was conducted in four rural schools under Ugu District the Lower South Coast Region of KwaZulu–Natal which were randomly selected based on the rural location of the schools. Four teachers one from each school were selected on condition that they had taught Grade 10 Mathematics for more than two years from 2006. The data was collected from questionnaires, observations and interviews. The study was focused on the understanding and teaching practices that teachers have as they go about implementing Grade 10 Mathematics curriculum in their schools.

The findings of the study indicate that generally the teachers felt the content of the curriculum was appropriate for their Grade 10 learners. However it was also found that not only one teacher made an attempt to mediate in context. In terms of assessment all the teachers supported the traditional methods of assessment, and had a superficial understanding of assessment. None of the teachers used lesson plans while teaching. In terms of support none of the teachers received unsolicited help from their HODs or school management. In terms of classroom teaching, none of the lessons that were observed included feedback or consolidation of previous work. The lessons of the teachers were also very poorly resourced.

The recommendations of this study are that teachers need to familiarise themselves with the current policy documents and to make more effective use of their teaching time Furthermore the school management teams also need guidance on how to provide teachers with support that can help them improve their teaching.

## PREFACE

The work described in this thesis was carried out in the School of Science, Mathematics and Technology Education, University of KwaZulu-Natal, from *April 2009* to *December 2011* under the supervision of Dr Sarah Bansilal (Supervisor).

The ethical clearance was granted for this project by the University of KwaZulu-Natal Research Office. The Ethics Clearance Approval number is **HSS/0134/09M**

This study represents original work by the author and has not otherwise been submitted in any form for any degree or diploma to any tertiary institution. Where use has been made of the work of others, it is duly acknowledged in the text.

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**ABBREVIATIONS AND ACRONYMS**

ACE	Advanced Certificate in Education
ASs	Assessment Standards
CAPS	Curriculum Assessment Policy Statements
CASS	Continuous Assessment
DoE	Department of Education
FET	Further Education and Training
HOD	Head of Department
LOs	Learning Outcomes
LTSM	Learner Teacher Support Material
ML	Mathematical Literacy
NCS	National Curriculum Statements
OBE	Outcomes Based Education
SGB	School Governing Body
SMT	School Management Team



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## **CHAPTER 1**

### **INTRODUCTION AND BACKGROUND**

Since 1994, there have been many curriculum changes in South Africa. The new government in the democratic dispensation wanted to eradicate the imbalances of the Apartheid government. Nowhere has the dramatic changes in policies been felt more than in education. Since 1994, we have experienced three curriculum waves. First, in 1998 Outcomes Based Education (OBE) was introduced as a philosophy of education in school and Curriculum 2005 (C2005) as the curriculum vehicle. Four years later, C2005 was reviewed and National Curriculum Statements (NCS) was introduced in 2006 as the second curriculum. Currently (2011) a new curriculum called Curriculum and Assessment Policy Statements (CAPS) is being drafted and will be introduced in 2012.

This study is based on the NCS, which was introduced for the first time in Grade 10 in 2006. The curriculum was introduced as a policy statement representing teaching and learning in the Further Education and Training (FET) band. The development of the curriculum was guided by the principles stipulated in the constitution of South Africa. One of the principles is to “give expression to what we South Africans regard as knowledge, skills and values worth learning” (DoE, 2003, p. vii). The philosophy and guiding principles of the policy required changes in the existing teaching practices of teachers that were used for many years. The supply of well trained and innovative teachers was necessary for the successful implementation of the NCS curriculum.

Furthermore, the transformed Mathematics curriculum in the FET band required teachers to interpret official NCS policy documents and to re-contextualise them in ways that are meaningful and productive in their context (Parker, 2006). In view of the above, teachers are expected to design learning programmes relevant to their learners, but which are in line with the NCS policy document. This means that teaching must be such that expected learning outcomes and assessment standards are to be achieved by the learner at the end of learning process.

The previous curriculum was criticised for failing to respond to the new and diverse knowledge which can help equip learners with skills in dealing with social, economic and cultural challenges they face in their daily lives. This was seen to be the case because of the way in which subjects were defined as specific bodies of knowledge, with emphasis on content knowledge. The knowledge acquired from one subject was hardly linked to the knowledge acquired from another subject. The emphasis on content knowledge resulted in rote learning, where the teacher is regarded as the only source of knowledge while learners are regarded as empty vessels waiting to be filled with information, typically taken directly from textbook. Such an approach resulted in the passive acceptance of information by learners without sufficient questioning.

The transformed Mathematics curriculum lends itself to the establishment of new roles that Mathematics teachers are required to fulfil. Such roles include “the teacher being an interpreter and designer of learning programmes and materials; a leader; administrator and manager; a scholar; researcher and lifelong learner; citizen and member of the community; learning area specialist; and assessor” (DoE, 2003, p. 5).

The importance of the Mathematics curriculum cannot be over-emphasised. The current Mathematics was introduced with the perception that it would help learners use it as a tool in solving problems related to modern society (DoE, 2003). Such perceptions are linked to the great demand in South Africa to compete on a global level. For this reason it is hoped that the current Mathematics curriculum will put South African Mathematics education on the level of that of highly competitive countries. Furthermore there is a perception that the current Mathematics curriculum can enable the majority of learners to enter extended fields of mathematical sciences and the various career paths that this would facilitate.

Mathematics for the FET band is regarded as a gateway for learners to pursue careers related to economics, management and social sciences (DoE, 2003). Solving mathematical problems is also viewed as the way of enabling learners to understand the world with its different challenge which impact on their lives. It is therefore important that schools offering Mathematics in FET band be well resourced with sufficiently qualified teachers.

In order for learners to make sense of the current Mathematics, teachers are expected to establish proper connections between Mathematics as a discipline and the application of Mathematics in the real world context (DoE, 2003). For this reason it is necessary for Mathematics teachers to teach Mathematics that is built on the basis of everyday life experiences of learners. With this in mind, teachers have to make use of policy documents to guide them to teach in a meaningful way. The NCS policy document provides some guidelines as to how learners could be supported in the journey of learning by clearly specifying Learning Outcomes (LO's) and Assessment Standards (AS's) that need to be demonstrated by the learner for each topic. The teacher is expected to make mathematics more meaningful to learners in order to help the learners since many of the learners have developed the so-called phobia towards Mathematics (DoE, 2003). Some of the strategies teachers are expected to use in developing interest of Mathematics to learners are to:

Provide access to Mathematics by taking into account the interest of all learners; provide learners with Mathematics examples involving a variety of cultures and societal practices as learners come from different cultural backgrounds; and understand the wide range of barriers encountered by many learners in their classrooms like language of instruction. (DoE, 2003, p. 62)

The above teaching strategies require Mathematics teachers to sharpen their teaching and assessment skills for the successful implementation of the Mathematics curriculum, especially in Grade 10. Such skills relate to *design and planning of learning programme; making use of available teaching resources; lesson preparation which involves learners; involvement of learners in lesson; and assessing learners in accordance to assessment guidelines policy for FET band*. According to Du Plessis, P., Conley and Du Plessis, E. D. (2007) curriculum planning involves thinking and planning what one wants learners to learn and the path learners must follow in order to achieve the expected learning outcomes. It is necessary for teachers to be familiar with

the contents of policy documents and must be in a position to interpret the NCS policy documents in ways that will enable learners to be exposed to carefully selected Mathematics experiences, to develop skilled and knowledgeable citizens who can contribute to their communities.

### 1.1 RATIONALE FOR THE STUDY

The introduction of NCS in Grade 10 for the first time in 2006 was viewed as a long awaited milestone by the education community in giving meaning to education. The current Mathematics curriculum was inspired and informed by curriculum developments that have taken place in many other countries. One of its main aims was to try to close the achievement gap between the rich and poor as the transformed curriculum was hoped to reduce inequality in Mathematics achievement. Workshops were conducted prior to the implementation of the curriculum with the view of preparing Grade 10 teachers for the successful implementation of the curriculum. Schools and teachers were provided with NCS policy documents in preparation for the current curriculum. In the workshops teachers were also provided with hand-outs, to supplement the official policy documents. Some of the hand-outs assisted in the unpacking of the contents of the official policy documents. The Department of Education promised that by 2006, all schools would be ready for the implementation of the curriculum for the first time in Grade 10.

As a Mathematics teacher working in rural schools for almost eighteen years, I have developed an interest in exploring teachers' teaching practices and understanding of the current Mathematics curriculum. During the implementation year (2006) of the curriculum, the school I work in had problems linked to the curriculum some of which were already there prior to 2006. Some of the problems included a shortage of qualified teachers to teach Mathematics, redeployment of teachers and books were not delivered timeously. There was also a shortage of classrooms, no electricity in the school and learners found themselves without learning materials. Some of the above problems existed prior to the introduction of the current curriculum. These problems are linked to the historic disparities which existed as a result of Apartheid policies.

When the curriculum was in place, it was assumed that all schools offering the curriculum were ready to implement it. The evidence for this is that there was no monitoring done by the department officials at the schools, except that exemplar question papers were sent to schools towards the end of the year in 2006. The problems and challenges met by schools and Mathematics teachers in implementing the curriculum, particularly in Grade 10 were not attended to. However the support for Mathematics teachers continued to be enjoyed by grade 12 teachers, particularly in urban areas. As a researcher based in a rural school, I attest to the fact that rural schools are still marginalised in terms of teacher support, accessing resources and the upgrading of school buildings and human resources. The Department of Education also does not solicit views from rural teachers about the current curriculum in Grade 10. It is crucial that research needs to be done in this field in order to explore teachers' understanding and practices of NCS Grade 10 Mathematics, particularly in rural schools.

## 1.2 FOCUS OF THE STUDY

Although the current Mathematics has been in place in Grade 10 for more than four years, it is important to conduct research in this field with the aim of determining teachers' understanding and practices in implementing Grade 10 Mathematics curriculum, particularly in rural schools. The previous section has outlined some of the demands placed on teachers with respect to content, practice and their roles. This study was conducted in four high schools, located in rural areas in the Ugu District on the KwaZulu-Natal South Coast. While the four schools have electricity, they have poor building infrastructures, poor roads leading to the schools and surrounded by an impoverished rural community lacking in resources. The study was set to explore teaching practices for the Grade 10 Mathematics curriculum. Furthermore, teachers' perceptions about the curriculum form an important part of the study.

### 1.3 RESEARCH QUESTIONS

To accomplish the purpose of the study three critical questions were developed in guiding the study. The questions are as follows:

1. What are teachers' perceptions about the National Curriculum Statement (NCS) policy?
2. What is the nature of teachers' classroom practice?
3. What are some challenges faced by the teachers in trying to implement the NCS?

### 1.4 ORGANISATION OF THE REPORT

The report is divided into five chapters which are divided into several sections and subsections. The following is a short description of what is contained in each chapter.

**CHAPTER 1:** This chapter introduces the study and gives a brief background of the study. The purpose and rationale for the study are given. Finally, it provides research questions and brief descriptions of the chapters contained in this study report.

**CHAPTER 2:** This chapter contains the review of the literature related to current Mathematics curriculum in the FET band. Issues related to teachers' teaching practices of Mathematics in Grade 10 are discussed. The chapter also gives reasons for curriculum transformation, the meaning of teaching and learning of Mathematics, roles and responsibilities of teachers, understanding and use of assessment and some challenges that teachers face in implementing the curriculum. The theory framing this study is also discussed in this chapter.

**CHAPTER 3:** This chapter discusses the methods, procedures, tools used, selection of sites and the process of collecting data. Justification for the method and tools used is also given. The last section of the chapter presents some challenges encountered and the limitations of the study.

**CHAPTER 4:** This chapter presents the results as they emerged from the data collected. Teachers' perceptions, nature of teachers' classroom practice and challenges

drawn from their observations and interviews are also presented. The results are presented as case studies.

**CHAPTER 5:** This chapter gives the synthesis of the findings. The introduction for this chapter gives a brief description of the current Mathematics curriculum and some roles teachers are expected to fulfil as mathematicians. The critical questions that guided this study are answers based on the findings and support from literature. The last section presents recommendations to teachers, schools and the Department of Education, and some concluding remarks of the research study.



## **CHAPTER 2**

### **LITERATURE REVIEW**

The transformed curriculum in the FET band has brought about further changes in the ways in which both learners and teachers are viewed. The teacher change in the context of reform is based on the assumption that teachers are critical in the successful implementation of curriculum transformation and in achieving the visions of better learning for more learners (Brodie, 2010). This change has put more demand on teachers requiring them to coordinate a range of new practices and to think about their current practices in new ways.

The study is focused on teachers teaching Mathematics Grade 10 in rural schools. According to Brodie (2010) there is evidence that the implementation of curriculum reform is not widespread, and that poorer learners are less likely to experience the reformed curricula and pedagogy. Some of the negative contributing factors include poor socio-economic backgrounds, unavailability of qualified and innovative teachers and inaccessibility to resources.

The purpose of this chapter is to present issues in the literature relating understanding and teaching practices teachers use when teaching Mathematics in the FET band in rural schools. In order to understand teachers' practices, the literature reviewing the need for curriculum change within South African context is pertinent to this study. It is also necessary to review literature about ways of teaching Mathematics in the context of Outcomes-Based approach. The new roles and responsibilities of teachers will be discussed as outlined in Norms and Standards and NCS policy document. Furthermore understanding and appropriate use of various assessment strategies is an essential aspect of the NCS Assessment Policy Guidelines, and this aspect will be briefly examined. Thereafter literature highlighting some challenges and successes in implementing the current Mathematics curriculum in the FET band will be presented. The constructivist theory, under which the study is framed, is included in the final part of this chapter. The concepts of contextualisation and understanding are explained in order to gain more meaning on the theory of constructivism under which the study is framed.

## 2.1. THE NEED FOR CURRICULUM TRANSFORMATION

Educational change was viewed as one of the tools that were going to bring about change in the educational imbalances that took place during the Apartheid era (DoE, 2003; Van der Horst & McDonald, 1997). In order to heal the existing division, the transformed curriculum is informed by the principles upheld within the constitution of the Republic of South Africa. Some of the principles informing the National Curriculum Statement (NCS) are social transformation and Outcomes-based Education.

The principle of social transformation in the NCS is “aimed at ensuring that the educational imbalances of the past are redressed and equal educational opportunities are provided for all sections of our population” (DOE, 2003, p. 2). It is therefore important for Mathematics teachers to acquire new knowledge and skills for effective teaching. In doing this it is important to consider the social and cultural background in which learners have grown up, because it plays a major role in the formation of new concepts, by bringing new insight, particularly in Mathematics (Nieman & Monyai, 2006 ; Du Plessis et al., 2007). This shows that while content knowledge is important, it is not enough if content cannot be applied in real world situations.

The curriculum that South Africa introduced in schools was internationally benchmarked, requiring knowledge and skills to actively participate and contribute to a democratic society. In a democratic country it is important to have a curriculum that reflects the values of a democratic society and OBE was introduced as a driver of social transformation (Dubazana, 2007). It is for this reason that Van der Horst and McDonald (1997) comment that the NCS is people-centred and success-oriented, in the sense of making learning relevant and meaningful to learners’ needs. In order to have a curriculum that promotes the values of a democratic society, it is important to have a curriculum that can respond to new and diverse knowledge by enabling South African learners to adapt and be successful in the work force after school, and to contribute positively to their societies.

In the FET band, the NCS curriculum is based on the philosophical principles of OBE. Such principles include LOs and ASs. Learning Outcomes describe the knowledge, skills and values that learners are expected to demonstrate at the end of each Grade, while assessment standards describe the level at which learners must

demonstrate their achievement of learning outcomes (Du Plessis et al., 2007). The LOs and ASs particularly in Mathematics for the FET band require teachers to think about new ways of teaching and designing learning programmes that will “promote intellectual, social, emotional, spiritual and physical needs of learners” (DoE, 2003, p. 7). It is important to note that this require teachers to change their pedagogical assumptions about teaching methods, classroom management and assessment practices (Weber, 2008). Such an approach placed a great demand on teachers to move away from a position of being a knowledge provider, to constructing meaning and knowledge along with learners. This means that in an OBE approach, teaching and learning are viewed as forming an interaction between teacher and learners where both parties come with information and ideas (Tsilog, 2006). Such an approach is aimed at promoting the type of teaching and learning that relies on communication, grounded on shared understanding. The mission of change in an Outcomes-Based teaching approach require teachers to “focus on the learner’s needs; acknowledge human diversity; move to participatory democratic decision making in education; emphasise accountability; and allow all learners to achieve their full potential” (Van der Horst & McDonald, 1997, p. 6). It is therefore important for teachers to review their own understanding of teaching and learning in order to accommodate an OBE teaching approach.

## **2.2. TEACHING AND LEARNING NCS MATHEMATICS IN THE CONTEXT OF OUTCOMES-BASED APPROACH**

Since the South African Curriculum has been internationally benchmarked, it is imperative for the study to review literature that will help us understand the shortcomings of the old Mathematics curriculum, as opposed to the transformed Mathematics curriculum in the FET band. The NCS policy document spells out the reason for changing the Mathematics curriculum in the FET band. One of the main reasons was that the old Mathematics curriculum “failed to equip learners with social, economic and cultural challenges learners faced in their daily lives” (DoE, 2003, p. 4). It was necessary to have a Mathematics curriculum that would respond to social, economic and global needs. It is for this reason that the NCS Mathematics curriculum in the FET band was developed with the purpose of establishing a proper connection of Mathematics as a discipline to real world contexts. Such a connection of Mathematics to real world contexts afford teachers the opportunity of making it more accessible, enjoyable and inspiring to learners (Brodie, 2010). The NCS for Mathematics was

developed with a perception that, “Being mathematically literate implies an awareness of the manner in which mathematics is used to format society” (DoE, 2003, p. 62). This means that learners should be engaged to mathematics problems that will provide them with an “important basis for acquiring a wide range of personal skills for future use” (Brodie, 2010, p. 44). This means that teaching should be such that learners are exposed to mathematics in a variety of ways.

Mathematics curriculum innovation was inspired and informed by the adopted Outcomes-Based Education with an emphasis on teaching and learning Mathematics that will develop deep and interconnected understandings of mathematical concepts, procedures and principles (Audet & Jordan, 2005). The reformed Mathematics curriculum further discourages the traditional learning approach of simple memorising formulas and the application of procedures. This suggests that teachers are required to coordinate a range of new practices and to think about their current practices in new ways that will engage learners in the process of meaningful learning of Mathematics (Brodie, 2006). It is important for teachers to understand the new teaching approaches that are informed by the current Mathematics curriculum in the FET band. The reason why Mathematics teachers are expected to be fully informed about current changes in the curriculum is because the methods of the teachers remain the main determining factor for the successful implementation of the curriculum.

In the South African context, teaching mathematics in an Outcomes-Based approach shed light upon new issues such as teachers’ poor conceptual knowledge of Mathematics (Malinga, 2005). While Clark and Linder (2006) state that the curriculum fails to identify and engage teachers as key agents of change by ignoring the uniqueness of the South African educational setting. Some schools in South Africa have poor physical infra-structures like classrooms, electricity and water. The current curriculum was introduced but very little was done to improve the quality of teaching, unlike the situation in China where many Mathematics teachers were inspired to develop the new methods of instruction in line with the new curriculum (Malone, Burkhardt & Keitel, 1989). China is not the only country where teachers’ commitment to curriculum reform was observed; in Turkey Mathematics teachers were given courses which provided the necessary background in the technological, social, cultural and historical aspects of the country (Isiksal, Koc, Bulut, Atay-Turhan, 2007). Linder and Clark (2006) point out

that the successful implementation of NCS Mathematics in the FET band is still doubtful since South African educational change is perceived as “independent of social context in which it is formulated, and the context at which is to be implemented” (p. 6). Such comments shed light on the importance of involving teachers at grass root level during curriculum reform.

In South Africa there is still a gap between schools that were previously disadvantaged and those that benefited from the old system of education. Some teachers have still not received training or attended workshops pertaining to the current curriculum. Brodie (2010) points out that one of the challenges regarding equitable curriculum transformation is the distribution of curriculum ideas, which tends to be found in well-resourced schools and countries. Thus in some schools, particularly rural schools, teachers are expected to work with the reformed curriculum but they interpret the curriculum with an old mind set of teaching.

A starting point for the implementation of a reform curriculum is to make sure teachers understand how and why the curriculum has changed. The successful implementation of the Mathematics curriculum in the FET band clearly demands significant changes in both the pedagogy and professional practices of teachers in the classroom as opposed to the old curriculum which was very prescriptive with little opportunity for teacher initiative (Weber, 2008; Clark & Linder, 2006). It is necessary for the teachers to understand how to enhance meaningful learning among learners in a diverse country like South Africa. According to Du Plessis et al. (2007) teaching can be seen “as a process of helping learners to learn” (p. 2). In order to help learners in the journey of learning, the teacher needs to understand and use appropriate teaching strategies that will help learners to learn with understanding.

The NCS in Mathematics has brought about changes in learning methods which require learners to “reflect and be able to explain what they have learned to convince others” (Audet & Jordan, 2005, p. 141). In order to develop reflective skills for learners as opposed to promoting the acquisition of content knowledge for its own sake, teaching should be such that there is a connection between Mathematics as a discipline and the application of Mathematics in real world context (Maree & Fraser, 2004). This suggests that the successful implementation of the Mathematics curriculum is dependent on the

way teachers mediate teaching. According to Du Plessis et al. (2007), reflective learning involves using cognitive powers such as reasoning and analysing, making sense of things learners do and referencing the world around them. This resonates with what is stated in the NCS Mathematics guidelines, which encourages the development of mathematical processes and skills that will unlock the power of Mathematics (DoE, 2003).

In order for Mathematics teachers to be able to deliver the type of Mathematics that is meaningful to learners, Audet and Jordan (2005) point out that learning should grow out of what interests the learners, rather than what interests the teacher. While learning is expected to be of what interests learners, teachers should be cautioned that the main object of teaching is always aimed at acquiring certain knowledge, skills and attitude that will make learners appreciate the value of Mathematics in solving real world problems (Du Plessis et al., 2007). Such a shift requires teachers to change their pedagogical approach. Clark and Linder (2006) assert that the implications of any change necessitate reconsideration of teaching methods and strategies of assessment and evaluation. The change in pedagogic practices should be aimed at developing learners' minds in such a way that they gain substantial insight into ideals of life.

The changing conditions of the economy and technology have influenced how people in general think about the content of education. Learners need to be provided with equitable opportunities to master mathematical skills essential for society's increasing technological and economic demands (Taylor & Richard, 1997). It is for this reason that teachers are expected to acquire necessary teaching strategies that will enable learners to uncover new learning, and apply new understanding (Gagnon & Collary, 2006). Mathematics is one of the important subjects in the curriculum that can bring about the growth in economy in South Africa (DoE, 2003). It is therefore important to have mathematical-literate citizens "who would provide a sustainable pool from which expertise can be nurtured" (Malinga, 2005, p. 36). It is for this reason that various stakeholders in society exert more demand on school Mathematics (DoE, 2003). Teachers are then required to empower learners with necessary tools to face the needs of the global world. The 'meaning of teaching' that teachers need to understand, is influenced by the willingness of teachers themselves to take on the responsibilities and

challenges of curriculum change, updating themselves with current changes taking place in an education system.

It is important for Mathematics teachers to know what roles to play in the implementation of the Mathematics curriculum because of the concern that teachers do not shift from their teaching practises even after intensive pre-service or in-service courses (Brodie, 2010). According to Gagnon and Collary (2006) reform in education can only take place if teachers can change their classroom practices. This shows that the actual change in curriculum can be observed if decisions about change are first negotiated with classroom teachers, instead of starting changes on paper by office-based educational managers. It is widely held that teachers have been left out of the process in South Africa as NCS policy documents were sent to some schools via principals without any due explanation of how teachers should prepare themselves for NCS.

### 2.3 ROLES AND RESPONSIBILITIES OF TEACHERS

According to Brodie (2010) and the DoE (2003), the roles and responsibilities of teachers are explicitly stated in the Norms and Standards policy document. The roles articulated in this policy document resonates with that of the NCS, demanding a significant change from teachers in relation to their orientation to knowledge and learning, and in their conception of what it means to teach (Parker, 2006). Some of the responsibilities outlined in the NCS policy document are as follows. Teachers should:

Endeavour to win learners in Mathematics; comply with the assessment standards of the subject; not to formalise Mathematics into abstract prematurely but first taking care to develop understanding and process skills; and look at examples of Mathematics in the variety of cultures and societal practices. (DoE, p. 62)

Even before the implementation of the NCS in the FET band in 2006, teachers were already required to infuse OBE methodology in every day teaching and from 2003 were expected to use an identifiable Outcomes-Based approach (DoE, 2002). The shift in teachers' roles was necessary because the traditional role for teachers failed to advocate learner-centeredness, socio-constructivism and a discussion-based approach. Traditionally, teachers' role was that of a person who "communicates information usually from the textbook and to establish whether learners are able to respond and reproduce information that remains unchanged in tests and examinations" (Nieman &

Monyai, 2006, p. 6). Such roles encourage passive and rote learning in the classroom. Thus it became necessary for teachers to move away from *transmission* modes of teaching towards the more *mediated* constructivist models of teaching (Clark & Linder, 2006). This means that teachers are expected to have a sound knowledge of Mathematics in order to organise materials and activities that will be meaningful to learners. The mediated constructivist teaching approach in Mathematics further requires teachers to be able to discover and understand the process learners use to solve problems. For the constructivist model of teaching, teachers are required to perform the following tasks:

Interpret and design learning programmes and materials; understand and interpret already existing learning programmes; design his/her own learning programmes; sequence and pace learning in a way that shows sensitivity to the needs of Mathematics and to those of the learners and as an assessor. (Du Plessis et al., 2007, p. 4)

This perception requires teachers to have acquired necessary skills and training that will equip learners with the needs and demands of an ever-changing world. For the constructivist teaching approach, it is necessary for teachers to provide a rich variety of activities that will permit learners to act directly and in different ways upon the physical world. This demands that teachers to move from being a *dispenser* of information to becoming a *facilitator*. In practical terms, a facilitator is expected to make information meaningful and relevant to learners by engaging them in activities that will change their mental state (Nieman & Monyai, 2006). This means that the teacher should facilitate the process of knowledge construction by organising learning activities that will reflect “learning that will occur optimally and an ideal of lifelong learning that will be promoted; learning that occurs in a realistic context and learning that will make learners find the sense and meaning of learning” (Maree & Fraser, 2004, p. 246). This means that both Mathematics teachers and learners should be actively involved during the teaching and learning process, where the teacher is expected to:

Give support and guidance by attending to Mathematics in what learners are saying and doing; assessing mathematical validity of learners’ ideas; listening for the sense in learners’ Mathematics thinking even when there is no logic and identify conceptual issues learners are working on. (Brodie, 2010, p. 76)



The change introduced by the current curriculum introduced a learner-centred teaching approach which encouraged learner participation in ways that might allow them to participate and make sense of Mathematics in a way that will transform their mathematical ideas (Brodie, 2010). A learner centred teaching approach Brodie (2006), Isiksal et al. (2007), and Yashau, Mji & Wessels (2005) put forward is an approach reflecting support of learners in developing mathematical reasoning, encouraging learners to perceive the teacher as someone who is there to help them make sense of Mathematics and creating context which help learners develop meaning in Mathematics. Such an approach requires teachers to have variety of skills and sound knowledge of mathematics content.

According to Gagnon and Collary (2006) the acquired skills and content knowledge is not enough for the successful implementation of NCS Mathematics in the FET band but “lies in how teachers are doing their learning; constructing their own knowledge; and by making their own meaning about teaching” (p. 46). This highlights the importance for teachers of taking responsibility for their own personal development, instead of conceiving their development as the responsibility of the government.

#### 2. 4. **UNDERSTANDING AND USE OF ASSESSMENT**

The NCS describes the kind of learner envisaged and it is through assessment processes that the education system can measure its ability to produce the type of educational product envisaged (Mthembu, 2008). It is important for teachers to understand the meaning and use of assessment. According to Du Plessis et al. (2007), assessment is the “process of identifying, gathering and interpreting information about learners’ achievement as measured against agreed outcomes for a particular phase of learning” (p. 67). Such a definition shows that there is a need for teachers to move away from the traditional methods of evaluation, which focused on testing and examination only, to the form of assessment that will allow teachers to evaluate the quality and quantity of learning in determining the level of achievement for learning outcomes particularly in Mathematics for Grade 10. The understanding and use of assessment is important to teachers for the successful implementation of appropriate assessment strategies.

It is important to note that the assessment practices that are encouraged through NCS are continuous, planned and integrated processes of gathering information about the performance of learners (Du Plessis et al., 2007). The present assessment practices should be used to “develop learners’ knowledge, skills, and values; assess learners’ strengths and weaknesses; provide additional support to learners; re-visit or revise certain sections of the curriculum; and motivate and encourage learners” (DoE, 2005b, p. 1).

An understanding of the present assessment practices is necessary for teachers in order to effectively use their own professional judgement in deciding assessment strategies and tasks that will benefit learners. In order for teachers to effectively measure the performance of learners, assessment should be conducted following four steps in a chronological order. Such an order includes, “(a) to assist learners in generating and collecting evidence of achievement, (b) evaluating the evidence against outcome, (c) recording the findings of evaluation, and (d) using the information to develop and improve the process of learning” (Du Plessis et al., 2007, p. 67). This is in contrast with the traditional form of evaluation which focused on testing with single straight forward answers. The main focus was on evaluating whether learners could produce on paper what the teacher had taught them. The current form of assessment does not occur at a particular time, but is continuous and forms an integral part of the teaching and learning process.

While it is important to understand the purpose and use of current assessment practices, the choice of what assessment strategies to use is subject to and depends on the teacher’s professional judgement (Du Plessis, et al., 2007). It is therefore necessary for teachers to know what is it that they want learners to learn and why they want them to learn. One of the design features for the current Mathematics curriculum in the FET phase is to prepare learners to be citizens and workers of the future. Therefore it is important to place more emphasis in on-going assessment as a way of improving teaching and learning (Van der Horst & McDonald, 1997). An assessment should therefore provide multiple measures of information about students’ learning strategies, knowledge and abilities in order for the teacher to be able to understand students’ needs and be able to provide opportunities to develop students’ mathematical abilities that is in line with current curriculum design.

When planning for assessment, it is important for the teacher to take into account policies and principles of constructivism (Du Plessis, et al., 2007). The reason is that a more holistic approach to education has taken place, mainly as a result of the theory of constructivism (Gagnon & Collary, 2006). This theory was accepted as the basis of teaching, learning and assessment of Mathematics in South Africa. This shows how important it is for Mathematics teachers in the FET band to understand the content of the assessment policy document and be able to implement assessment strategies accordingly. It should be noted that the current assessment practices of Mathematics in the FET band is focused on collecting reliable information and evidence by undertaking various methods and instruments towards evaluating learners' performance (DoE, 2005b). These shared insights show how important it is for teachers to know in advance what is it that they want their learners to learn and why they want them to learn in relation to desirable assessment standards. The valuable methods teachers can use in collecting information and evidence about the performance of learners are assessment strategies that will show an improvement in learning by:

Providing a multidimensional picture of what learners know and can do; respect learners' diversity in ways of understanding; and suggest actions teachers can take to improve educational development of learners and quality of their educational programmes. (Van der Horst & McDonald, 1997, p. 168)

Teachers are then required to have better understanding and procedures to follow in constructing assessment and criteria for judgement that will improve learning. This suggests that there should be a shift towards the type of assessment that informs teachers what comes next or where to go.

## **2.5. CHALLENGES AND SUCCESSES IN IMPLEMENTING THE CURRENT MATHEMATICS CURRICULUM FOR THE FET BAND**

The success of curriculum implementation depends on multiple factors, including teachers' mathematical content knowledge and the ability to teach Mathematics, as well as some contextual factors under which teacher's work such as support from school, availability of resources, nature and culture of the school and geographical situation of the area at which the school is built. The literature has already reviewed the reason for Mathematics curriculum reform, roles and responsibilities of Mathematics teachers in curriculum implementation, the nature and aim of the present curriculum, and the use and understanding of assessment practices. It is important for

this study to identify and discuss some challenges and successes Mathematics teachers have in implementing the curriculum.

### 2.5.1 **Teachers' knowledge of Mathematics**

Although Mathematics is offered in most schools, the majority of teachers lack pedagogical knowledge and subject content knowledge due to the fact that they are not professionally qualified to teach Mathematics particularly in rural schools (Malinga, 2005). This has resulted in many learners struggling with and failing in Mathematics in rural schools. By pedagogical knowledge, Leiken and Levay-Waynberg (2007) refer to an understanding of students' knowledge and their attitude to fitting their learning tasks to the students' learning abilities and styles in teaching Mathematics. They further explain that subject knowledge including knowledge of mathematical connections and their implementation for solving mathematical problems in different ways. What appears to be important about these two terms is that they are mutually contingent. Therefore it is necessary for Mathematics teachers to have a broad and deep understanding of the current changes in the Mathematics curriculum for the FET band, because without this, teachers may not be able to use multiple solutions for one mathematical problem in the classroom.

While discussing teachers' ability and understanding in teaching Mathematics in the FET band, it is important to mention that knowledge of topics, concepts and procedures is central to an understanding of Mathematics that will enable them to facilitate significant improvement in Mathematics (Malinga, 2005). According to Leiken and Levay-Waynberg (2007), research in Mathematics education has shown that deep and connected teacher content knowledge is a necessary condition for teaching that develops mathematical connections in learners' minds. This shows that teachers' mathematical knowledge does have an influence in determining the type of mathematical tasks teachers assign to their learners as well as the perception teachers have of the learning process.

The perception developed regarding teachers' ability in implementation of the curriculum is that they are able to select tasks that require a higher level of cognitive demand but that at implementation, the cognitive demands of the tasks decline (Brodie, Jina and Modau, 2009). Some of the contributing factors can be linked to the "poor

level of preparation of teachers, lack of availability of professional development and inappropriate resources and other instructional materials” (Tatto, 1999, p. 28). The above challenges can be linked to what teachers perceive as reality, the values deemed important and the level of knowledge that the teacher possesses. It must also be mentioned that in South Africa, curriculum reform has been accompanied by widespread political and social changes that have impacted negatively on education, like closing down of teacher education training colleges, promotion and redeployment of qualified teachers without replacement of suitable qualified teachers. These factors can further hinder learners’ willingness and ability to explore challenging problems in Mathematics.

#### 2.5.2 **Contextual factors impacting negatively in the implementation of the Mathematics curriculum**

Factors such as resources, large classes, the geographical area in which the school is situated and support for teachers are major barriers in developing new ways of teaching. These factors contribute to lower educational participation, especially in rural areas. The reform proposes to address a wide range of problems affecting quality education, like encouraging families and communities to take part in improving the quality of education and supporting teachers working in different contexts, as well as providing in-service training for teachers especially in rural schools (Tatto, 1999). It seems that very little reform has taken place in most of the schools in rural areas.

#### 2.5.3 **Limited educational resources**

One of the ways of improving the quality of education is by supplying instructional materials and upgrading of school buildings (Johnson, 1995). This suggests that there is a need for teachers to have a means of accessing and utilising a variety of resources if the school is unable to provide this to teachers. According to Dubazana (2007), teaching resources are important for the current practised Mathematics curriculum in an FET band, for the reason that the curriculum is based on the philosophy of constructivism, which lends itself to the availability and use of quality teaching-learning resources to enable both teachers and learners to take part in knowledge construction. It appears that some rural schools are still challenged in accessing teaching resources.

In South Africa and in many other countries, resources in most schools are severely limited, adding to difficulties in transforming education (Brodie, 2010). He further provides national data, showing that 67% of operational schools do not have computers for teaching and learning, and 80% do not have libraries. It is sad to mention that, although education has been transformed in South Africa for more than a decade, it seems that the existing gap between rich and poor is likely to be exacerbated. According to Yashau et al. (2005), research has shown that the benefit of using technology such as computers is immeasurable and incomparable, as opposed to a more traditional approach. In other words, technology helps in enriching and improving conditions in which learners learn and teachers teach. Van Etten and Smit (2005) further suggest that an effective use of modern technology can assist teachers in developing creative learning situations that take into account individual learning differences. Learners' learning experiences can also be enriched and technology provides learners with more self-reliant roles in their own education. While resources can be important, they are not the only challenge for teachers working towards meaningful learning.

#### 2.5.4 **Lack of teacher support**

Support and the socio-economic factors under which teachers work also affect curriculum implementation. On the side of support, Mbhele (2008) points out that the quality of education in rural schools is diminishing due to poor management and poor support that Mathematics teachers receive. Under the democratic government, the governance of a school is vested in the hands of a School Governing Body (SGB) and School Management Team (SMT). The two structures perform different roles in the same school. The SGB deals with non-professional matters while the SMT's role is to deal with professional matters including curriculum management. It is necessary for SMT members to have a better understanding of issues involving current curriculum in the FET band. Mbhele (2008) further stresses the importance of good management of the curriculum noting that for any change to be effectively implemented, it needs to be properly managed. This shows the importance of having qualified and innovative management staff for successful implementation of the curriculum. A good innovative management staff, is one which can give necessary support particularly when it comes to relevant teacher training.

### 2.5.5 **Poor socio-economic background**

Johnson and Monk (2000) assert that teachers working in economically disadvantaged places are constrained by somewhat different sets of circumstances. Some of the circumstances include:

Rural children may be less interested in attending school because of long distances they have to travel to school; many rural households are mainly dependent on their children for help at busy times of the agricultural year like working in the field; parents in rural areas often have lower levels of education and may attach lower value to education; rural parents are less educated and so have less ability in providing support for their children; the majority of homes in rural areas lack facilities to meet the needs of children to learn; and rural children can hardly see their role models in their area, their role models can be people suffering the same condition similar to those that they live in. (Mulkeen, 2005, p. 5)

Such conditions make teachers reluctant to work in rural schools. Some even prefer not to work, waiting for posts in urban or locations to be made available. In rural schools it takes time to fill a vacant post and if filled, it is likely to be either a new or unqualified teacher or qualified teacher with no Mathematics training. Some of the reasons that make Mathematics teachers reluctant to teach in rural schools is because rural schools offer fewer opportunities, especially for professional development. Urban and township teachers enjoy more benefits including staying with their families, good food, good clothing, easy access to modern technological facilities, as well as ease in networking.

### 2.5.6 **Geographical location of the school**

It is important to mention the negative impact of the area in which the school is situated. Rural areas can be classified into three categories. There are rural areas where there are no access roads leading to schools, no water, no electricity and few members of the community in the area. The second type of rural area is that with roads leading to schools but these roads are in a poor condition, where the school has electricity, but no other amenities. The last one is the rural area with basic facilities like electricity, water, good gravel roads and decent houses have been developed. In some rural schools it is difficult to get a qualified teacher, let alone a qualified Mathematics teacher, because of the poor living conditions in the area. In such schools the working conditions are poor because of the small enrolment in the school, poor and insufficient classrooms, and teachers with heavy workloads.

These areas suffer poor public transport which also affects teachers' and learners' punctuality at school. Teachers may arrive late at school. During rainy days there is poor attendance of both learners and teachers because of difficult transport access and also the poor conditions that schools themselves are in. The rate of absenteeism is higher among teachers and learners in these areas. Female teachers may feel unsafe and are expected to put up with unhealthy living conditions. Such problems are likely to affect the teaching and learning in rural areas to the extent that the quality of education offered at a school is compromised (e.g., by having different grades in the same class or teaching both Mathematics and Mathematical Literacy in the same grade).

## 2. 6. CONCLUSION

The literature reviewed in this chapter regarding the current NCS Mathematics in the FET requires many changes in teaching styles, selection of tasks and assessment. The reviewed literature further shed light on the need for curriculum transformation, teaching and learning in the context of outcomes base approach, roles and responsibilities of teachers in the context of NCS curriculum, understanding and use of appropriate assessment strategies as stipulated in the NCS policy document and lastly some challenges impacting negatively in the implementation of the current curriculum in FET band including teachers' mathematical content knowledge, limited educational resources, lack of teacher support and poor socio-economic background. It is important to mention that the reviewed literature indicated that the implementation of the curriculum is influenced by various contextual factors including the geographical location of some schools in their rural areas.

Below is the discussion of the theory through which the study is framed. The discussion of the theory is important for this study. Orton (1992) states that knowing teaching and learning theory means being able to understand how people come to internalise new information or perform new operations. It is therefore necessary for teachers to understand the theory informing their classroom practices.



## 2. 7. THEORETICAL FRAMEWORK

The study seeks to explore the NCS Mathematics practices in Grade 10 with reference to rural schools. The NCS curriculum documents marks a shift to a problem-centred or constructivist approach to the teaching and learning of Mathematics. According to Nieman and Monyani (2006), some of the assumptions underlying constructivism are that, “Knowledge is constructed from experience; learning is a personal interpretation of the world; learning is an active process in which meaning is developed on the basis of experience; learning should take place in a realistic setting with testing to be integrated with the task, not as a separate activity” (p. 7).

In order for the teacher to help learners construct knowledge that is meaningful and useful in their own lives, Orton (1992) suggests that teachers need to provide appropriate scaffolding which allows learners to progress. Orton further argues that this “requires great skills to provide the best scaffolding for each pupil” (p. 169). This shows that the constructivist-driven curricula demands great change in the focus of teaching. Some of the changes advocated by Orton are that:

The teacher must make information meaningful and relevant to learners; the teacher must create opportunities for students to discover and apply ideas themselves; the teacher must encourage learners to become aware of new strategies for learning; testing should be integrated into the task learners are performing. (p. 178)

From the constructivist perspective, the success of teaching and learning succeeds or fails by the teachers’ ingenuity in creating a climate that is conducive to active participative learning (Jacobs, Vakalisa & Gawe, 2004). Then the question about what teachers can bring into the classroom to create conducive learning environment need to be asked. Questions also need to be asked about the strategies teachers need to use, since understanding of content and skills are pertinent in giving meaning to what really takes place between the teacher and learners in the classroom situation.

One of the things the study intends to investigate are teaching strategies that the teacher displays during the teaching-learning process. The analysis of constructivism in terms of the manner in which knowledge is constructed by the learners leads to a focus about the teaching strategies that will help learners make sense of what is being learned (Nieman & Monyai, 2006 ; Du Plessis et al., 2007). Theories about teaching and learning are important for this study because the implementation of the curriculum

depends entirely on the teacher's personal theoretical framework regarding what the NCS means to her/him. The NCS curriculum is quite specific about the kind of constructivist teacher that is needed. It visualises a teacher who is "qualified and competent; mediator of learning; interpreter and designer of Learning Programmes and materials; an assessor; and Subject specialist" (DoE, 2003, p. 5).

The above shows the importance of examining the learning theory implicit for teachers in their classroom practice. Regarding the learning of Mathematics, there are two key principles of the NCS upon which I would like to elaborate. These are contextualisation of Mathematics and critical thinking.

The acquisition of mathematical knowledge Bertrand (1995) put forward, is one which "cannot be separated from its pedagogical, cultural and social context" (p. 123). This suggests that any form of learning without integration of context, goes against the primary mission of education, which is to provide students with knowledge that is useful in real life. According to the DoE (2003), the NCS Mathematics curriculum context, where possible, should relate to human needs like human rights, HIV/AIDs, indigenous knowledge, economics and environmental issues, to mention a few examples. One of the reasons for the Mathematics curriculum change in the FET band was to provide learners of Mathematics with the necessary skills and knowledge for using Mathematics in the cultural and social practices of their own communities. Therefore, the NCS Mathematics in an FET band is used as a tool in developing a:

Sense of appreciation the value of Mathematics in developing a responsible citizen; creativity and logical reasoning about problems in physical and social world; sense that Mathematics is a human activity practiced by all cultures; and perception that competency in Mathematics does contribute to personal, social, scientific and economic development. (DoE, 2005a, p. 10)

This concept of contextualising content sheds light on recognising knowledge as a fundamental product of social and cultural activities (Bertrand, 1995). It is therefore important for Mathematics teachers to make an informed decision in adopting teaching styles that will make learners make sense of the world around them. This principle of contextualisation then leads on to question the influence of the classroom in outcomes-based teaching by regarding it as an environment which removes the learner from the outside world (Nieman & Monyai, 2006). It is therefore the responsibility of the teacher

to construct and develop learning programmes or activities that will relate to quotidian problems. This gives rise to the question, what teaching strategies should teachers apply and how should knowledge be communicated to learners so that the acquired mathematical knowledge can be meaningfully applied in a real-world context? One of the teaching strategies advocated by Brooner (1992) for the acquisition of mathematical knowledge that can be meaningfully applied in the real world is by placing learners in an environment where they can investigate, discover and understand through their own efforts. This means that learners should be exposed to an environment where they can acquire mathematical knowledge through interaction with their environment, instead of relying on the teacher. As stated in the policy documents, “Mathematics is important for the personal development of any learner” (DoE, 2003, p. 11). It means that the curriculum should be used to facilitate the personal growth of each learner because every learner has different experiences. This can be achieved by exposing learners to as many relevant real-life experiences as possible.

One of the requirements of the NCS Mathematics curriculum in the FET band, Jacobs et al. (2004) put forward is to develop critical thinking abilities. They further suggest that learners need to be encouraged to think at a higher level, which includes the ability to “justify their decision, make sound decisions and judgements, and reflect in their thinking” (Jacobs et al., 2004, p. 48). In order to achieve these skills and knowledge, learning must be such that it meets learners’ needs and interests. In order to develop a sufficient variety of values and skills, the main task of the teacher is to encourage critical thinking with regard to engaging learners in the type of Mathematics tasks that will enable them to “use mathematical skills to identify, pose and solve problems creatively and critically” ((DoE, 2003 , p. 9). This stipulation implies that the teacher should critically reflect on the following:

The extent to which the objective of the learning experiences has been achieved and deciding an adaptation where required; reflecting on how teaching in different context in South Africa affects teaching strategies and proposing adaptations; on the ways barriers to learning can be overcome; and on the degree to which issues around HIV/AIDs have been integrated into learning. (Du Plessis et al., 2007, p. 13)

For critical reflection in this study, Davis, Maher and Noddings (1990) refer to the type of teaching that will present thought-provoking learning in each learner, and that will make each learner try to reconcile new learning with his or her existing knowledge. The final section of this framework is devoted to a discussion about understanding. The study is an exploration of teachers' understanding and practices of NCS Mathematics in a Grade 10 rural school. It therefore necessitates the explanation of understanding and practices with regard to the implementation of Mathematics in the FET band.

There are different ways in which the word understanding can be interpreted, depending on context. The Oxford Dictionary defines understanding as a *power to know what something means or how it works or why it exists*. For the sake of this study, the term "understanding" will refer to a level of knowing which enables a teacher to apply knowledge in a classroom situation. According to Malinga (2005), knowledge of topics, concepts and procedures by the teacher is central to knowing Mathematics that will facilitate significant improvement in learners' achievement in Mathematics. The NCS curriculum designers have created a perception that a competent teacher means a teacher with high level of Mathematics knowledge. The teacher has to impart mathematical knowledge to learners that will help them make sense of the society they live in (Marie & Fraser, 2004). It is for this reason that understanding of content and skills are pertinent in giving meaning to what really takes place between the teacher and learners in the classroom situation.

## **CHAPTER 3**

### **RESEARCH DESIGN AND METHODOLOGY**

The study focuses on exploring Grade 10 Mathematics teachers' understanding and practices of the NCS in rural schools. It is important to point out at this stage that the current Mathematics curriculum offered in the FET band describes some of the particular performances and practices which were new to teachers. Such performances and practices describe the nature of mathematical knowledge as acquired and assessed by teachers from learners regardless of the environment in which teaching and learning is taking place (Parker, 1994). It is necessary to design research methodology that will reveal teachers' understanding and practices with regard to Grade 10 NCS Mathematics in their rural schools.

This chapter presents the research methodology of the study. Secondly, the context of the study, together with piloting of the research instrument and gaining access to the four research sites is discussed. Thirdly, the chapter examines the process through which data was collected and analysis of each data collection instrument that was used to explore Grade 10 Mathematics teachers' understanding and practices of the NCS in their rural schools. Furthermore the concept of narrative analysis is discussed and finally, issues of rigor, reliability, trustworthiness, validity and ethics, as well as the limitations of the study are presented..

#### **3.1 RESEARCH METHODOLOGY**

The method of educational research employed in this project may be considered qualitative, as I studied four cases bound within a particular system. Four Grade 10 Mathematics teachers from rural schools were provided with a questionnaire. They were then observed and interviewed with the purpose of understanding their teaching practices in implementing the current Mathematics curriculum.

According to Kobus (2007), qualitative research can be described as “an attempt to collect rich descriptive data with the aim of developing an understanding of what is being observed or studied” (p. 51). In this study data was collected by means of questionnaires, interviews and observation of teachers interacting with their environment. In a qualitative study, the focus is on how individuals understand the

world and construct meaning out of their experiences. The study was focused on teachers' understanding and teaching strategies of Mathematics of the NCS for Grade 10 in their rural schools. Qualitative research has features linked to this study. Such features include:

Understanding of the phenomena from the participants' perspectives not from the researcher; the researcher is the primary instrument for data collection and analysis; usually involves fieldwork; primarily employs an inductive research strategy; the product of qualitative study is richly descriptive. (Merriam, 1998, pp. 6-8)

The above features resonate with the focus of the study. The study unfolded as follows:

- *As a researcher, understanding of teachers' current teaching strategies was identified as important in this study.*
- *In understanding teachers' teaching strategies, data collection was developed from the participant.*
- *Data was collected from the sites where participants were working;*
- *The focus in data collection was not on the outcomes, but on the understanding of participants' perceptions, understanding and teaching methods in implementing the Grade 10 Mathematics curriculum.*
- *Finally, a story was developed from each participant's understanding and teaching methods used in implementing Mathematics for NCS.*

According to Henning (2004), a qualitative case study is employed "to gain an in depth understanding of the situation and meaning for those involved" (p. 41). It was necessary to use multiple methods in capturing data for each participant bounded within a particular context, such as rural schools in the UGu District. Kobus (2007) further defines a case study as the means of "gaining greater insight and understanding of the dynamics of a specific situation" (p. 75). Using different data collection methods was necessary for this study in gaining deeper understanding of how Grade 10 Mathematics teachers respond to the current curriculum because it has been in place for more than four years. Furthermore the study was interested in investigating and reporting the complex dynamics of events teachers engaged in when implementing their Grade 10 Mathematics curriculum in their rural schools.

### 3.2 CONTEXT OF THE STUDY

The study was conducted in the Southern reaches of KwaZulu-Natal, in the Ugu District in the Lower South Coast Region. The majority of schools served under this district are in rural areas and have poor teaching resources and physical structures. The Community members in the surrounding area are poverty stricken. The poorest school is in a deep rural area with few facilities. There is a gravel road in poor condition which was specially constructed to transport mobile classrooms to the school. Few members of the community live in the area, there is no access to clean water and the school is the only building with electricity. It is important to mention that while the three schools belong to the same ward, the schools are not within walking distance. This made it difficult to reach more than one school in one day.

Although the four schools are in rural areas, they all have electricity, are fenced and have at least one photo copying machine. According to departmental classification they are all quintile one schools because of the poor socio-economic condition of the community in which the school is. The quintile one school is the '*no-fee*' school. These schools receive money from Government and donations only. Three of these schools have insufficient classrooms leading to overcrowded classes. In fact in one of these schools, it was found that there were more than one hundred learners in one class. The four schools do not have deputy principals because of the small number of learners. However the schools do have Mathematics department heads (HODs).

### 3.3 PILOTING THE RESEARCH INSTRUMENTS

Piloting was conducted in the researcher's current school. This school was not involved in the study and the results were not included. This was done prior to the actual data collection. The pre-test of the instruments was necessary to correct and to modify the research instruments. It was also important to determine how the design could be improved and to identify flaws in the measuring instrument (Cohen, Manion and Morisson, 2000). Furthermore, ambiguity in the phrasing of words in questions required cross-checking. Improvements were made from the input of the respondent.

It was important to pilot instruments in determining whether research tools were able to answer the research questions or not. Some of the advantages of conducting a pilot study helped in “developing meaningful methods of categorising and recording data, determining whether more substantial investigation of the same phenomenon is warranted and gaining experience in developing better approaches to the target group.” (Black & Champion, 1976, p. 114)

Analysing responses from a questionnaire, from observation and from interview was undertaken which resulted in correcting and rephrasing of some of the questions included in the research instruments. This helped in adjusting other questions from the observation schedule. For example, questions involving the learning environment were added and questions involving the physical environment of the school were removed. The reason for the removal of this topic was that observation was taking place inside the classroom with a teacher and the learners in the class. That helped in increasing the reliability, credibility, validity and practicability of the study (Cohen, Morisson, L. and Morisson, K., 2011). After considering all the weaknesses of the instruments revealed during piloting, they were modified and made ready for the utilisation in the target group.

#### **3.4 SELECTION OF PARTICIPANTS**

I decided to conduct the study from four different rural schools offering Mathematics in Grade 10. The criterion was that teachers must have taught Grade 10 Mathematics for more than two years from 2006. Neither qualification nor gender was taken into account for selection. However, one participant for this study did not have a teacher’s qualification, while the other three participants were qualified. Only one participant was qualified to teach Mathematics in FET band and other two teachers were specially requested to teach Mathematics, because of their Mathematics background from the years of their schooling.

The main motivation behind this study was to explore these teachers’ understanding and practices in implementing current curriculum in Grade 10. The participants were selected on the basis of their experiences with the phenomena being studied and their willingness to be interviewed and observed in their classrooms whilst teaching (McMillan & Wergin, 2002).



The selection of schools was influenced by the acceptance received from both principals and participants. At the beginning, the initial four schools sampled had to be changed for a number of reasons. The first participant took maternity leave after the completion of the questionnaire and withdrew from the study while the second participant could not be reached because of the geographical position of the school. At the time the study was conducted, cars could not cross two rivers leading to the school because the rains had wiped away the two access bridges. Teachers of the school had to drive a long distance before reaching the school and classes were then cancelled. The third teacher was teaching Mathematics for the first time in the school and the fourth teacher tried to evade the planned lesson observations. Four new schools were then re-selected for the study. It is important to mention that the change of research site did not bear significant negative impact on the validity and reliability of data, given the fact that the unit of analysis was still the Mathematics teacher teaching in a rural school.

### **3.5 GAINING ACCESS TO THE FOUR RESEARCH SITES**

In order to obtain access and acceptance it was necessary to obtain permission from the school principals as well as participants. This was done by writing a letter requesting consent accompanied by a letter from the University authorising the researcher to conduct research study in schools selected. This was the first step taken before gaining access to the site. The consent letter appears in Appendix E and the letter from the University in Appendix F.

The letter of consent was sent personally to the principals of the schools. The reason was to present myself to the principal and to give clarity for the study. There was also no other means of accessing the school principals except by visiting in person. This method also helped in speeding up the process of gaining access from the prospective gatekeepers.

After gaining access from the principals, Grade 10 Mathematics teachers were asked for permission via their HODs and the benefits for participating in the study were highlighted. The consent letters for participants briefly explained the purpose and nature of the study. Participants were also assured that the research was for academic purposes and that all information would be treated as confidential. This was further confirmed by the informed consent letter.

### 3.6 DATA COLLECTION PROCESS

This is a qualitative case study. It necessitates a number of approaches in the collection and analysis of data. The data collection process entailed three phases. Data was collected using a questionnaire, observation and interview respectively. It was important for the researcher to do considerable preparation and planning for the data collection process because data was collected from persons immersed in the setting of their everyday lives. The table below provides a description of time frames, tasks and activities involved during the data collection process.

PHASE	TASK	ACTIVITY
1	Submission and collection of questionnaires	Analysing and categorizing answers into themes
2	Planning and conducting lesson observations	Analysing and coding observation into themes using observation schedule
3	Planning and conducting interviews	Transcribing and coding data into themes

The process took almost six months because of some challenges, one of which was the delayed return of completed questionnaires from participants. In one instance, a participant lost two questionnaires that were given on different dates. Phase two and three had the same challenges where some participants could not be found at the school on the appointed dates, for various reasons. In one instance, the researcher could not reach the school of one participant for observation because it was raining, and the car got stuck on a muddy road. After having read and analysed teachers' responses from the questionnaires, observing and collecting information from teachers' lessons, I identified areas that needed further probing and clarity during interviews. This was the last phase

of the data collection informed by the findings from both response from questionnaires and lesson observations.

### 3.7 DATA COLLECTION AND ANALYSIS

This is a qualitative case study exploring the understanding and practices of Grade 10 Mathematics teachers teaching Mathematics in their rural schools. In order to acquire an in-depth understanding, various methods of data collection were used. Methods included the questionnaire, observation and interview (Cohen et al., 2011). Whilst the study involved exploring teachers' teaching practices in their classes, Burton (2005); Robson (2002) and Kobus (2007) clearly state that employing many types of data collection methods increases and provides the credibility, reliability and validity of the case. It further allows the researcher to study important aspects without collecting a large sample from a national frame (Burton, 2005). With that in mind, multiple data collection instruments used in this cross-case provided the researcher with the opportunity to investigate, explore and report the real life situation in order to unpack the interactions, events and other factors unique to each case study.

#### 3.7.1 Questionnaire

A questionnaire was necessary in this study to determine teachers' experiences teaching the NCS Mathematics Grade 10, background information about the support teachers get, teaching materials available for the teachers in their schools, and teachers' general perceptions about the current Mathematics curriculum for Grade 10.

The questionnaire consisted of closed and open-ended questions and it appears in Appendix A. Closed questions were used to gather only straightforward information about each teacher while open-ended questions were necessary for explanations by participant. Furthermore Gorand (2001), and Cohen, Manion and Morisson (2007) recommend mixing the type of questions used for accessing teacher's views regarding aspects pertaining to current Mathematics curriculum for the FET band.

After receiving permission from teachers, the questionnaires were hand delivered to each participant but not on the same day because of the distance that separate each school. The questionnaires were hand-delivered to elaborate further on the purpose of the study to participants, establish good working relationships and to discuss possible dates for the collection of the completed questionnaires and the next phase of data collection. Hand delivering questionnaires to participants is also recommended by Bell (2005), as it can result in better working human relations and can minimise problems of low-response rates. It is important to mention that questionnaires were left with participants and each participant gave me a date on which the completed questionnaire could be collected. The collection of questionnaires from all four participants was delayed for a few months because of some challenges mentioned earlier that were encountered during the collection process. After collection was completed and responses were read, the categorisation of some of the responses into themes and the analysis was done. The analysis of the responses to the questionnaires helped me to identify areas on which to focus in the next phase.

### 3.7.2 **Observation**

It was important to observe teachers teaching in order to gain a deeper insight and understanding of their practices. This constituted a non-participant observation undertaken for this study and its schedule appears in Appendix B. A non-participating observation for this study refers to the “systematic process of recording the behavioural patterns of participants, without necessarily questioning or communicating with them” (Kobus, 2007, p. 84). I observed teachers teaching without interfering in what was taking place in the classroom. This method was chosen with the purpose of helping the research to “be more unbiased and objective, to watch various teachers and to obtain good comparisons, and to note and appreciate incidents that the teacher may miss” (Walker, 1985, p. 149). It was important for me to observe teachers’ teaching strategies, because this could differ from what they said.

There were many challenges in organising the observations. Teachers often changed the dates for various reasons. The first participant indicated he had a test on the same date of the observation, so she changed the date. On the new date the participant contacted me on the way to her school to say she was not at school and a third date was set. For the third appointment the teacher was doing revision but was observed nonetheless, for fear of further setbacks. The other two participants kept their first dates of appointments but changed the times of observation because of internal arrangements in their schools. In all cases, the observation took almost an hour except for one which lasted forty five minutes. The three teachers did not object to their lessons being tape-recorded.

In the case of the second participant, he made numerous excuses to avoid being observed. Among the excuses the teacher made was that although he would like to participate fully in the study, he did not want to create a sense of disappointment. He cited the fact that the learners he worked with were very unruly, and was afraid they would cause offence. Finally he agreed to be observed on condition that I should not record his lesson which I accepted. The hour long presentation was recorded in hand writing.

During the observation of the four teachers, I sat at the back of the class in order to minimise distraction. Sitting at the back of the class also helped me to observe the learning environment in which teaching was taking place. Furthermore, I had an opportunity to record non-verbal behaviour and to discover things that the participant might not be free to talk about during the interview (Cohen et al., 2007).

For reasons of transparency the observation schedule was given to participants prior to the lesson observations. This was done to give participants an opportunity to make comments about what would be observed during their teaching. This was also to reduce any fears or tensions teachers might have of being observed. It was crucial for me to capture information in a live situation. I therefore recorded the lessons while making notes of incidents that were not covered in the research instrument, for example, teachers' facial expressions when receiving an incorrect answer given by a learner.

All participants were observed for one lesson only because it was realised that though they agreed to be observed, they were not comfortable about being observed while teaching. This was gathered from their comments after observation such as *“it reminds me of being observed when I was still a student.”* Two of the participants were busy applying for posts at other schools, while one was applying for a transfer. The unqualified teacher, his contract was going to be terminated at the end of the year. I also did not want to impinge any further on their time because of their busy schedules.

### 3.7.3 **Interview**

Semi-structured interviews were necessary for this study as a supplement for both questionnaire and observation. The interview schedule appears in appendix A, while interview transcripts are in appendix C. It was necessary for probing, follow up and clarification of the information found in the questionnaire and observation about each participant. A face-to-face interview was vital in capturing a detailed, comprehensive picture of teachers' perceptions about the NCS policy and some challenges they faced in implementing the curriculum in their rural schools. It was also important to discuss what was observed during their lesson presentations which could lead on to further meaningful information about their teaching practices.

All interviews were tape-recorded with the aim of having more time to reflect upon participant responses. According to Bell (2005), and Campbell, McNamara and Gilroy (2004), a tape-recorded interview gives a researcher an opportunity to check the wording of any statement the researcher might wish to quote and note particular comments which are of particular interest. The above helped me as a researcher to elicit useful insight into what informed participants' teaching practices.

For this study, the interview was perceived as a “two person conversation initiated by the interviewer for the specific purpose of obtaining research-relevant information and focused by the researcher on content specified by the research objective of systematic description, prediction or explanation” (Cohen et al., 2007, p. 351). It was necessary that participants were asked to explain the things that were observed during their lesson presentations.

The time taken for each participant varied because of the emergence of different probing questions that arose from each interview. The time spent for each interview is given below:

<b>PARTICIPANTS</b>	<b>TIME IN MINUTES</b>
Mrs MAYENDE	48 minutes
Mr SHOBA	53 minutes
Miss YONELA	42 minutes
Miss DLOMO	37 minutes

The time spent with each participant was important in listening to each participant expressing his or her views and expertise in managing the current Mathematics curriculum in Grade 10. Teachers' enthusiasm and desires to express their views about the successes and challenges in implementing the NCS was demonstrated by continuing to express their views, even after the interview session has ended.

All interviews for the three teachers were conducted during their break and at lunch time, except for the other one whose interview was not recorded, was interviewed after school hours. I could not arrange to see the three teachers after school hours because they did not stay in the community at which their schools are located. There were no problems about being interviewed during their break times; instead they showed interest in being interviewed. One of the reasons I felt participants enjoyed being interviewed was that they were given freedom to answer in the language they felt comfortable with and mixing their mother tongue with English.

For each interview, responses were listened to, transcribed, analysed and coded with the aim of re-phrasing any questions not properly answered for the next interview. It took almost a week to transcribe and code each interview. The whole process of the interviews took almost a week. As a researcher, I was aware of some limitations that could possibly occur in using tape-recorded semi-structured interviews as a data collection method. The researcher was aware that data could lead to subjectivity and possible biases. I was also aware that participants could be reluctant to give personal information when being recorded. To mitigate such limitations, an explanation was

given to each participant about the purpose of interviewing and the importance of being honest in the responses the participant gives.

#### 3.7.4 **Narrative analysis**

Thereafter, the data from the questionnaires, observations and interviews was used to draw up a case study of each teacher. The process followed was narrative analysis (Polkinghorne, 1995). Here the elements were configured to create a story with outcomes. Thereafter, I engaged in a cross-case analytic process. One reason for the choice of the cross-case analysis is that it offered me an opportunity to compare cases and to generalise across several representations of the phenomenon. Furthermore Green, Camill and Erlmore (2006) pointed out that a cross-case allows an interpretation based on evidence from several cases and leads itself to establishing the range of generalisation of the findings about the wider population to which a particular case study belongs.

The cross-case study also provided me with an opportunity to study the teachers' teaching practices in their natural settings and the physical environment in which they work. This necessitated the design of the research questions that would "seek to understand participants' experiences with the central phenomenon" (Green teal., 2006, p. 257). Such experiences are linked to teachers' understanding and teaching practices in line with the needs of the present Mathematics curriculum in Grade 10.

### 3.8 **RIGOR FOR THE STUDY**

For triangulation purposes in social studies where human behaviour is of concern, three different methods of data collection were used in this instance. According to McMillan and Wergin (2002) triangulation is a practice that enhances the credibility of a study. They further referred to credibility as the "extent to which data analysis and results are accurate and trustworthy" (p. 56). Data collection techniques applied in this study includes questionnaires, observations and interviews. The three methods applied provided a measure of confidence in the analysis of data by verifying the consistency of teachers' answers and in clarifying some issues regarding the study.



Data was analysed using relevant literature with the aim of determining the appropriateness of the responses from three different data collection instruments. Examples of literature used included the NCS policy document (General) and the NCS policy document (Mathematics) and the Assessment Guidelines policy document. These documents are currently used by teachers in the FET band. By making use of these three data collection techniques, together with national policy documents, a deeper understanding was gained in the analysis of the complex problem of curriculum implementation and human interaction in the classroom.

### **3.9 ETHICAL CONSIDERATION**

The autonomy of the participant was explained through the use of the informed consent letter. The consent letter explicitly outlines to the participant that participation in the study was voluntary. They were free to withdraw from the study at any time without any negative consequences. The participants were assured that their identity was confidential and their real names would not be used in the study. Each participant was requested to sign the letter without being forced or influenced to participate in the research. The consent letter was also signed by the school principal, explaining the purpose of the study. Necessary procedures were also followed with regard to securing ethical clearance to the project.

### **3.10 LIMITATION OF THE STUDY**

The research conducted from four schools had some limitations. Firstly, the schools were far away from each other, which resulted in a delay in data collection. Secondly, teachers did not have much time to spend with me based on the number of classes they taught per day. Teachers were observed once in their teaching practice. The researcher initially wanted to observe each teacher teaching five times but was forced by logistical constraints of the rural school to make only one observation of each teacher in their respective environments. Much time was spent negotiating dates and times for observation because some teachers felt uncomfortable to be observed. Teachers' lesson presentations were tape recorded with the aim of listening to what was said by teachers during teaching. Background noises made by learners in some lesson presentations made it difficult to listen to the teacher's voice. That suggested that some of the important words from the teacher when teaching were not properly captured. It was also difficult to handle open - ended questions from the questionnaire. The study was also

limited to only four Grade 10 Mathematics teachers, teaching in rural schools under the same cohort. For this reason the research study could not be generalised in a broader context - due to the small sample size bound within a specific context.

## CHAPTER 4

### RESULTS

In this chapter we present the results of the study. The results are presented as four case studies of the participants, Mrs Mayende; Mr Shoba; Miss Yonela; and Miss Dlomo. The story of each teacher is presented under the headings of Biography, perceptions (curriculum, lesson planning, teaching resources and support, assessment) and a description of one lesson of the Mathematics curriculum. A summary of the results about the participant is presented at the end of each case.

#### 4.1 CASE STUDY ONE: MRS MAYENDE

##### 4.1.1 Mrs Mayende's Biography

Mrs Mayende is a qualified Mathematics teacher with a Bachelor of Education degree majoring in Mathematics and accounting. At present she is teaching only Mathematics in both the GET and FET bands. Mrs Mayende has developed a strong interest in teaching Mathematics over Accounting. Her interest in Mathematics has made her develop herself in Mathematics by doing the Advanced Certificate in Education (ACE) as a part time student even though the programme did not allow her to accrue a further qualification. Mrs Mayende started teaching Mathematics in Grade 10 in a high school situated deep in a rural area. In 2007 Mrs Mayende moved to another high school which was close to the one in which she had started. Since 2008, the Mathematics Grade 12 pass rate has been below 13% in her school.

##### 4.1.2 Mrs Mayende's Perceptions of the Mathematics Curriculum

When Mrs Mayende was asked during the interview about contextualising the content of Grade 10 Mathematics, she admitted that she had not tried giving learners examples of that kind. She also mentioned that she did not know about that trend in Mathematics teaching. The following comments ensued (where R stands for researcher and T stands for teacher):

R: The new Mathematics curriculum emphasises contextualising the content. How do you feel about that?

T: I have never tried that.

R: Did you know about that?

T: I did not know that.

It is also important to mention that although the teacher had received the NCS policy documents, she indicated in the questionnaire that she found the teaching of some topics of Grade 10 Mathematics challenging. Mrs Mayende did not specify which topics she found challenging in the questionnaire, however during the interview she revealed further details:

R: What challenges or successes have you found in teaching new Grade 10 Mathematics topics?

T: Yes there are topics which are challenging to me like linear programming, transformation, areas and volumes, but I am good in number patterns even though they are new topics.

The above comment reveals that Mrs Mayende still needed support in terms of understanding the above topics. When Mrs Mayende was further asked about the actions she had taken in understanding these topics, her response was thus:

R: How have you tried improving your understanding of these topics?

T: I have registered for ACE with the hope of learning these new topics.

This shows Mrs Mayende did have concerns about not being able to teach all topics for Grade 10 Mathematics comfortably. While Mrs Mayende was concerned about her teaching, her comments reveal that she did not expect much support from her school or subject advisor, so she chose to enrol for a university programme.

#### 4.1.2 **Mrs Mayende's Perceptions of Lesson Planning**

When Mrs Mayende was asked about the use and necessity of lesson planning, her response was as follows:

R: How do you feel about the necessity of using a lesson plan when teaching?

T: It is helpful but when you are teaching there is no need for that. I do not use it when I am teaching I just plan and then I know what I have planned.

R: Do you mean there is no need of lesson plan when going to the classroom?

T: Yes, I leave it in the staff-room.

The above comments reveal that Mrs Mayende placed little value on the lesson plan. It appears that Mrs Mayende did not believe in writing down her expected plans for particular Mathematics lessons. As she stated, *“I just plan, and then I know what I have planned”* showing that she did not use written plans during her lesson delivery. When Mrs Mayende was further questioned about preparation with regard to the use of worksheets and learners’ activities, her response revealed that she still believed in using textbooks as her only teaching resource and did not see any problem with using the textbook only:

R: Where do you get activities for the learners?

T: From the textbook Classroom Mathematics.

R: Can you tell me why you are giving learners activities from the textbook?

T: Classroom Mathematics is the only book learners have.

R: What challenges or successes do you have in using worksheets?

T: I have tried but it wastes time.

R: Why?

T: For example it needs you to refer to some books.

You need to go to number of books.

The above comments showed that Mrs Mayende found it a waste of time to compile her own worksheets or to read different books. When asked in the questionnaire of how often she used the materials she received from training workshops in her classes, she revealed that she photocopied materials for her own use instead of using it for teaching.

#### 4.1.3 **Mrs Mayende’s Perceptions of Teaching Resources and Support**

In the questionnaire it was revealed that Mrs Mayende did receive the Mathematics NCS policy documents and other materials. Mrs Mayende’s response from the questionnaire has reference (where Q stands for question and A for answer):

Q: Do you have the following policy documents:

**NCS Mathematics curriculum statement?**

A: Yes.

**Mathematics assessment guidelines?**

A: Yes.

Q: Did you receive any materials or hand-outs which you are currently using for teaching?

A: Yes.

Q: Explain how often you have used these materials?

A: I have made photocopies.

Mrs Mayende's response revealed that she had access to photocopying facilities, although she did not specify what she did with these copies. When Mrs Mayende was probed during the interview about materials she used when preparing for the lesson, her response was as follows:

R: When preparing for lesson what materials or resources you use?

T: I use NCS documents, where I find learning outcomes and assessment standards, the work schedule where I will find topic, textbook the example of topic, chalkboard and duster.

R: What document do you use as a guide for lesson preparation?

T: Yes there is a guide, NCS document.

The above comment revealed that the teacher had received basic Mathematics materials necessary for teaching, such as textbooks and the NCS documents. However it will be shown in the next section that during lesson observations the teacher did not show any evidence of lesson preparation, which could be seen as one way of using the NCS documents. When the teacher was probed about the support she received from the school, her response was as follows with regard to the HOD:

R: How often do you meet with your HOD discussing Mathematics issues?

T: All the time when I got a problem.

R: Does the HOD write down the minutes of your meeting?

T: We do not write them down.

R: Do you get any support from your HOD which is helpful in managing Grade 10 Mathematics?

T: Yes, I do like team-teaching.

The above response reveals that there were no formal meetings held by the HOD with the teacher. The arrangement seemed to be that should she experience a problem, then only would she approach the HOD. She also mentioned team-teaching as an area of support, without providing details of what she meant. Although the teacher had a perception that she got support from the HOD there was no clear support strategy in place, nor was there a planned programme of monitoring teachers' progress and their problems. This was revealed from her response regarding worksheets, when she said that the HOD had not helped her in developing and using worksheets. Furthermore the teacher had not received any help from HOD in making charts. This was revealed from the following response during the interview:

R: One of the things that makes classrooms a conducive environment for learning, are charts or posters on the walls. How do you feel about that?

T: I feel good but I do not know how to do them, I like them.

The HOD should be the first person the teacher would approach for help in sourcing materials that could be used. Her comment emphasised that she had not thought of approaching the HOD for such help. Furthermore, it also revealed that the HOD would not know what problems and skills teachers needed to be developed unless the teacher brought the problem to his attention. He had obviously not consulted with the teacher about how she could handle such practical issues. Furthermore it appeared that there was no plan put in place by the HOD to support and monitor teacher's work in the school because if there was, then the teacher would have referred to such a plan when questioned. If this is the case, one can state that the senior management of the school (principal) and departmental officials like subject advisors seemed to be dragging their feet in helping the HOD develop the skill of managing the Mathematics curriculum in the FET band.

It was also discovered during the interview that parents of learners doing Mathematics in Grade 10 in this school showed little interest in their children's work. The interview revealed not only less commitment from parents but also the poor living conditions that the majority of parents experienced. Such comments were based on the perception that the teacher had with regard to support from parents:

R: How do you feel about the community surrounding the school with regard to the following?

**Considering their children's education as important and why?**

T: They consider it is not important to them, because if you give a learner work like home work they do not do that. No parent questions his or her child.

**By making input in helping their children with school work?**

T: They do not have at all.

**In buying materials for their children if they are asked to do so?**

T: Some of them do like 2-quire exercise books for Mathematics, some do not.

While the above responses revealed that the school was situated in a poverty-stricken community, where some could not even afford to buy an exercise book, it also revealed a low level of school management, where the problem of learners who came to school without doing their homework remained unaddressed. The school management would seemed not to be monitoring the successes and challenges teachers have in controlling learners' homework.

#### 4.1.4 **Mrs Mayende's Perception of Assessment**

When Mrs Mayende was asked during interview about her understanding of assessment, her response was as follows:

R: What is your understanding of continuous assessment?

T: (Hesitating) ...it is good, continuous assessment it gives a picture about the performance of the learner; there are no wonders at the end of the year.

R: Can you summarise for me what you see as main purpose of assessment?

T: The main purpose is to promote the learner to the next level. Also is to determine whether learners understand learning area and topic.



The above response by Mrs Mayende revealed that her perception about assessment is to be used to determine progress to the next level. She also viewed assessment as a means of finding out whether learners understand the concept learned or not. What was also gained from Mrs Mayende's response was that assessment is perceived as an activity separated from teaching. Mrs Mayende was further probed with a question that was aimed at determining how assessment was used and her response was as follows:

- R: How do you feel about assessing learners continuously in Mathematics?  
 T: Ya, it is good, if it is something that needs practice, they have to practice all the time, it is good to assess them continuously.

Such a response revealed a very low level of understanding of continuous assessment; she saw it as regular testing, which required students to practice regularly. Her response also suggested that she saw continuous assessment as it is done by another person. Furthermore it appeared as if the teacher did not understand how assessment can be infused in teaching.

It is important to mention that among the four teachers I visited, Mrs Mayende's file was the only one I was able to access and I discovered that *there was one assessment task that was recorded in assessment grid with memorandum; all marked scripts for learners were kept in that file; the assessment task was a test which included simplification of expressions, factorisation and substitution; and the test was recorded as an investigation.* That showed that the teacher was not following the required assessment practices as stated in the assessment guidelines. When the teacher was asked during interview about this her response was as follows:

- R: What challenges or successes you have in following the required assessment programme?  
 T: I do follow [it], I do not have any problem.  
 R: There are prescribed assessment tasks that need to be done each term. How do you feel about these assessment tasks?  
 T: Something I did not know was tutorial, but once you know there is no problem.  
 R: Which assessment task you prefer most? Why?

T: Assignments, because a learner will go to another learner and learn even if he has not understood at the beginning.

What was revealed from the above response was that, while Mrs Mayende stated that she did not have any problem in following the required Grade 10 assessment programme, it was discovered from her assessment grid that test was given instead of investigation. It appeared she did not see it as a problem in giving her learners a test instead of an investigation. She stated, *“I do not have a problem”* in response to the question about whether she experienced any challenges. While Mrs Mayende recorded a test instead of investigation, she did not mention investigation as one of the tasks in which she felt challenged. What she mentioned was a tutorial which did not form part of the stipulated assessment tasks to be done in Grade 10. This suggests that the teacher did not understand the assessment tasks she was expected to do in Grade 10, or she had not read the documents. When Mrs Mayende was further probed with the question about preventing learners from copying assignments from one another, her words were, *“I have no strategy but I used to discipline them.”* It became evident that while the teacher preferred assignments, learners continued to copy work from each other, and she did not know how to handle that.

As mentioned from the above, where it was stated that learners’ written tasks were kept in one file, it was important to find out during the interview the reason behind that. Her response was revealed in the following question:

R: How do you feel about learners having assessment portfolios?

T: [It is] not right. It needs a lot of time, papers get lost if the learner did not get mark he/she does no put in the portfolio. It ends up not right.

This shows that Mrs Mayende kept learners’ assessment tasks as an alternative to the problem of losing their assessment tasks. However, learners were deprived of the privilege of managing their own files. Further than that, learners quickly forgot how they performed in their tasks because their tasks were kept by the teacher and the tasks were not available for them to learn from. Even the parents did not know how their learners were performing in their assessment tasks. Another issue revealed by her

comment was her lack of understanding of a portfolio. She had not mentioned any benefits or challenges associated with assessment.

#### 4.1.5 Description of Mrs Mayende's Lesson

Mrs Mayende's lesson was a revision of analytic geometry. The teacher used the 2006 exemplar paper for revision and the paper was the only document taken by the teacher to the class. The teacher entered into the class which was noisy. Even when she was inside the class learners continued making noise. There were 38 Grade 10 Mathematics learners seated in rows in the class. There was nothing else found in the class except learners' desks and a chalkboard. After greeting learners, the teacher introduced the lesson by saying (where T stands for teacher and L for the learner):

- T: Let us do analytic on the board. It is analytic geometry. Are you listening? In the example, exemplar 2006, question one says calculates the length of AB and AC. What are we going to calculate there? Hands up? [Pointing to one learner whose hand was up].
- L: The distance.
- T: The distance, very good. We are going to calculate the distance AB. What is the formula for the distance? Hands up? [Pointing to a student called Musa].
- L: In brackets  $X_2$  minus  $X_1$  all square plus  $Y_2$  minus  $Y_1$  all square. [That is  $(x_2-x_1)^2 + (y_2-y_1)^2$ ]. As Musa called out this answer, the teacher was leading him with the same answer].

Mrs Mayende's introduction of the lesson did show that learners had studied analytic geometry before. Her revision was verbal and the learners listened without doing any writing. It was also observed that learners were not provided with the questions, the teacher was the only one with the questions. During this introduction, only one learner had an opportunity to answer the questions while the rest were passive doing nothing. It was also observed that the teacher did say the words of encouragement when the learner gave the correct answer saying "*very good*" but in the case of the wrong answer the teacher was heard saying "*w...e...e*" which signalled to the learner that the response was not the expected one. Mrs Mayende's lesson was content-based, where learners gave one correct answer and they were not asked to justify their answers. Mrs Mayende's content teaching unfolded as follows:

- T: Calculate BC. What is our  $X_2$  and  $X_1$ ?
- L: 3.
- T: Positive 3 is?
- L:  $X_2$
- T: Gradient of BC?
- L: 2 minus 1 over 3.

It was also observed that if the learner happened to give wrong answer, the teacher did not probe the learner with another question that could help the learner answer the question. The following response from the teacher was as follows:

- T: Then substitute  $X_2, Y_2$ ?
- L: I do not know.
- T: You do not know?

While the teacher was responding to the learner who did not know the answer, some learners in the class were busy making noise. There were only a few learners participating in the lesson. When Mrs Mayende noticed that, she made remarks like, *“Only two learners I am teaching? And please do not make noise”* when the noise levels went too high. These actions showed that Mrs Mayende had a problem in involving learners in a lesson and in maintaining order in the class while teaching. Mrs Mayende also allowed learners to answer in groups (chorus answers), although during the interview she said (about learners answering in chorus), *“I feel bad about that, I even discipline them.”* These are some responses showing learners answering in groups:

- T: What is  $4/1$ ?
- Class: 4
- T: Calculate BC. What is  $X_2$  and  $X_1$ ?
- Class: 3

During the lesson observation, learners were observed having their 2-quire exercise books on their desks and some learners had calculators. This showed that learners used their exercise books for Mathematics. However, during that lesson, learners did not do any writing in their exercise books, and no homework was given to learners. The bell rang ending the period while the teacher was busy talking. The teacher ended her lesson by saying “*now the period is finished we are going to continue tomorrow with the questions*” and the teacher went out of the classroom. Although Mrs Mayende showed confidence in her teaching, she did not regard it as important to give her learners class work or homework as consolidation of what she taught. It was clear from her introduction as well that no homework had been assigned during the previous lesson.

**In summary**, Mrs Mayende was qualified to teach both Mathematics and Accounting. However she still did not feel confident enough and enrolled in an ACE programme to improve her knowledge in teaching Mathematics. She had not tried using contextualised tasks in her class. She received help from her HOD if she approached him. However, there was no regular system of meetings or joint planning of sessions. Although she said she used lesson plans, during the observations, she went in with only the examination paper that she was using for revision. Her lesson was teacher-dominated, with some opportunities for learners to provide responses to questions she posed. Learners often responded as a group, chanting the answer together even though Mrs Mayende had specifically mentioned that she did not encourage such responses. There was no evidence of variety in her assessments. She did not assign any class work or homework to the learners.

## 4.2 CASE STUDY TWO: MR SHOBA

### 4.2.1 Mr Shoba's Biography

Mr Shoba was not qualified professionally for teaching but has a N4 electrical engineering certificate that he received from a FET College. Mr Shoba got into teaching after being approached by one of the management teachers in the school to come and assist due to the shortage of Mathematics teachers in the school. At that time, there was only one teacher teaching Mathematics from Grade 8 to 12, who was also an HOD for the Department of Mathematics and Sciences. Mr Shoba was approached in the year 2006 when NCS was introduced in the FET band for the first time. One of the Mathematics classes taught by Mr Shoba was the Grade 10 class. The reason he was approached was that he was the only one known in the area who had done Mathematics up to Grade 12. The school is in a rural area, where there is poor infrastructure and no electricity or running water. The matriculation pass rate at the school is 33%.

Mr Shoba was approached to participate in the research study and showed great interest in participation. Mr Shoba was very cooperative in filling in the questionnaire and he returned it in time. However, when approached to finalise the arrangements for the lesson observation, Mr Shoba proved somewhat reluctant to be observed. After deferring the observation several times, it was explained to him that the purpose of the study was to observe the conditions under which learning and teaching take place, and not to find fault with the teacher. At this he agreed, but requested not to be tape recorded so the observation was annotated instead. The interview was conducted after school on the day of the observation. It was important to conduct the interview while most of the things observed were still fresh in my mind since I did not have the advantage of revisiting recorded material.

#### 4.2.2 **Mr Shoba's perception of the curriculum and lesson planning**

In an interview with Mr Shoba regarding lesson planning, he claimed to know about NCS curriculum documents, headings to be used in organising lesson plans and their value in teaching. Mr Shoba's response involving lesson preparation went as follows:

- R: Which document did you use as guide for lesson preparation?
- T: I use NCS document I received from the workshop and the other one the school managed to organise it for me.
- R: What headings do you find useful in organizing your lesson plan?
- T: Topic; context; learning outcomes; activities and learners' homework.
- R: How do you feel about the necessity of using a lesson plan when teaching and why?
- T: It is important to have a lesson plan; it saves time and gives you a direction of what you are expected to do.

The above comments did not, however, support what was observed during Mr Shoba's lesson presentation. During his lesson it was observed that there was no lesson plan used and that reference was only made to a textbook for content-teaching. So, although he claimed to appreciate the value of a lesson plan, it was not used. It is important to mention that while Mr Shoba was teaching Mathematics in Grade 10, he was also teaching Mathematics Literacy for the same grade. It was discovered in an informal interview that at times, he taught Mathematics Literacy (ML) after school or on weekends, because of time constraints during working hours. This was also discovered in one of his responses for the following question during an interview:

- R: What challenges or successes do you have in teaching Mathematics in this school?
- T: There are challenges in teaching both Mathematics like you want to change currencies for other country it becomes difficult to get that currency.

Such comments reveal that the teacher is confusing Mathematics with Mathematics Literacy because in Mathematics for Grade 10, there is section involving the conversion of currencies but that topic appears in ML. The introduction of Mathematics Literacy had created a perception that it should be taught only by a Mathematics teacher. The implications of this practice were serious because it meant that in this school the ML learners did not have any ML lessons during school time which is when the Mathematics learners were taught. Their ML classmates did not do anything during these hours because their teacher was teaching Mathematics to their classmates. They had to receive lessons when the teacher was available out of school hours. Mr Shoba was probed about the teaching strategies that he used, thus:

R: What strategies or methods do you use in involving learners in a lesson?

T: I make groups in doing work sometimes.

R: Why you think group work is important in learners' involvement in a lesson?

T: It helps learners to share ideas and to find common problem.

R: How often do you use it?

T: Every time I am teaching.

R: How do you encourage learners to ask questions?

T: I always ask them whether they understand before proceeding to the next part.

R: Which language do you prefer when teaching and why?

T: English because is the only language used when asking questions during examination.

R: What challenges or successes you have in using worksheets?

T: I am not using them, I normally use different textbooks.

The above comments revealed that his learners in a class were always arranged in groups in order to keep them engaged in lesson, as learners were sharing ideas in groups they asked questions when the teacher asked them to do so and Mr Shoba had not tried developing his own materials like worksheets but his teaching was more book-dependent. However the group work that Mr Shoba referred to doing "*every time*" he taught, in the interview was not seen during lesson observation. Also, the desks were arranged in four rows rather than in a group formation. Some other things Mr Shoba said that did not correspond with the class observation was the use of English as the medium of instruction and asking learners whether they understood before proceeding. During the lesson observation, Mr Shoba was observed to be struggling in teaching in



English because sometimes it was difficult to understand what he meant. Sometimes, he repeated one word for quite number of times. It appeared as if it was the first time Mr Shoba was teaching in English. He further chose to be interviewed in isiZulu. The English expression Mr Shoba was heard using repeatedly when teaching was, “*Do you follow class?*” and the class would either say, “*Yes, sir*” or remain silent. Mr Shoba would say those words and continue without allowing learners an opportunity to ask questions. There was only one occasion where a learner was heard asking the teacher a question.

#### 4.2.3 **Mr Shoba’s perceptions of teaching resources and support**

In the questionnaire Mr Shoba’s response to the question about whether he felt comfortable teaching all topics for Grade 10 Mathematics, his response was “yes”. When Mr Shoba was further probed with this question during the interview, his response was as follows:

R: What successes or challenges you have in teaching new Mathematics topics in Grade 10?

T: I did have a problem before going to the workshop but now is better and I work with my HOD.

The above response revealed that Mr Shoba did have a problem that was resolved at the workshop. When the teacher was asked what type of support he received from HOD, his response was, “*He just helps me when I have a problem.*” Such comments, though vague, showed that the teacher received help only when he approached the HOD. This meant that if he did not have a problem, the HOD did not monitor Mr Shoba’s progress or to offer any professional assistance with regard to the Mathematics curriculum management. During the interview with Mr Shoba, it was revealed that the materials he received from the workshop and the ones the school bought for him were not used, except for textbooks, set squares and calculators. It was also evident in the response from the questionnaire that there were no NCS policy documents for Mathematics. Mr Shoba’s response follows:

Q: Do you have the following policy documents:  
**NCS Mathematics curriculum statement?**

A: No

**Mathematics assessment guidelines?**

A: No

Q: Did you receive any material or hand-out you are currently using?

A: No

The above response contradicted his responses from the interview. Such contradicting responses may mean that the teacher did not consult the NCS policy documents for his teaching. Furthermore, it was revealed during the interview that Mr Shoba had never tried developing his own teaching materials, such as hand-outs, but relied on textbooks when teaching. Such information was drawn from the following response during interview:

R: What challenges or successes you have in using worksheets?

T: We do not use them we use different books.

R: Why using textbooks only?

T: It is because books are many in the school.

Mr Shoba was further asked questions involving charts and posters for Mathematics and his response was as follows:

R: One of the things that make a classroom a conducive environment for learning is charts or posters on the walls. How do you feel about that?

T: It is nice to have but I once requested from the school and they say they do not have.

What was evident from the above response is that Mr Shoba had never tried to make his own charts for Mathematics. And again, he had not received any support on how to make charts or where he could find them, showing a lack of support from the departmental HOD and school management. Mr Shoba was also probed with questions involving the support that he got from both parents and the school:

R: How do you feel about the community surrounding the school with regard to the following?

**Considering their children's education as important?**

T: I think some do consider and some do not consider their children's education as important. The reason I am saying this is because one parent comes to school to find out how her child is performing with her work. The parent did this because the child failed to show the parent the work when she was asked to do so by her mother, although there are few parents who cared about their children's education.

**By making input in helping their children with school work?**

T: What normally happen is that [in the case of those] few parents who work far from their homes,[these parents],when they are at home, they help their children.

**In buying learning materials for their children if they are asked to do so?**

T: That does not happen with many learners because the majority of them come from poor families.

The above responses revealed that learners who do not stay with their parents, their education is compromised in terms of parental support. The response further revealed the poor socio-economic status of some parents who failed to buy learning materials for their children. Mr Shoba was further probed with questions involving support he received from the school management team including the HOD and his response was as follows:

R: Do you get any support from your HOD which is helpful in managing Grade 10 Mathematics curriculums?

T: Yes I do get help when I have problem in certain part of Mathematics, I use to go to my HOD and get helped.

R: How often do you meet with your HOD to discuss Mathematics issues?

T: Twice a term, or at any time.

R: What do you mean when you say 'at any time'?

T: I mean when I need to talk to him, I do not wait until he calls a meeting.

R: Does the HOD have minutes for the meetings you have?

T: I do not know, because we often do not write down what we talk about.

Although Mr Shoba has a perception that he is being supported by his HOD, the above response showed that there was no programme used by the HOD in monitoring the teacher's work. It had become the teacher's responsibility to go to HOD when he experienced some problem and there were only formal meetings taking place twice a term between the HOD and the teacher that were set up to talk about such problems or teaching issues. The HOD seemed to rely on the problems the teacher brought to him, thus limiting his knowledge about the challenges faced by the teacher. Lastly the senior school management (principal) did not seem to be monitoring how the HOD was managing the teacher's work due to a lack of intervention in this staff dynamic.

#### 4.2.4 **Mr Shoba's perceptions of assessment**

From the questionnaire, Mr Shoba indicated that he did not received assessment policy guidelines. His previous comments revealed a lack of support and information available to him, with the exception of one workshop. Thus it is likely that Mr Shoba did not know what to assess or how to assess before going to the workshop. In addition, Mr Shoba's response to the question involving his understanding of continuous assessment revealed that he regarded assessment as an awarding of marks. That implied that Mr Shoba assessed learners only when those marks were to be recorded for CASS, and not for learning purposes. This was evident from his response during interview in which he responded thus:

R: What is your understanding of continuous assessment?

T: Continuous assessment, you mean CASS? Is to assess continuously whereby learners' marks are recorded to form CASS.

When Mr Shoba was further probed with the question regarding learners' portfolios, his response was:

R: How do you feel about learners having assessment portfolios?

T: In my opinion, I prefer using exercise books because in portfolios papers get lost.

It was clear from Mr Shoba's comments about learners' portfolios that, although he sounded like he knew what was kept in portfolios he had never tried using them in Mathematics. His reason for not using portfolios was a fairly incidental one that failed to address the methodology it implied. This made it likely that other assessment tasks such as projects, presentations, etc. that could not be done in exercise books would not have been assigned by Mr Shoba to his learners. The many other sound reasons for using various types of assessments had been lost on Mr Shoba and he had not tested them or seen them in use.

When Mr Shoba was further probed with another questions involving learners' portfolios, he responded as follows:

R: Have you ever assessed learners using paper or worksheets instead of exercise books?

T: Yes.

R: What do you do with their papers after work has been marked?

T: I use to give learners papers after marking and then I record the work, and there after I take the papers back.

The above response revealed that learners' assessment tasks were not kept by the learners as a potential revisionary reference. Mr Shoba also appeared to be depriving his learners of the chance to practice of organising and managing their own Mathematics files. Furthermore, Mr Shoba's response on material used when setting learners' assessment tasks was:

R: What materials do you use when setting learners' assessment tasks?

T: I use the learners' textbooks.

R: How do you know what to assess and how?

T: Some learners' books have exercises and revision. Also I normally assess what I have taught them.

The above response was supported by the lesson observation, where Mr Shoba was observed using only a text book for his teaching. Both his teaching and assessment seemed to be predominantly controlled by the textbook, implying that the assessment guidelines were not followed. It looked like the teacher assessed without taking into account what learners should be assessed on and what assessment standards should be assessed. It appeared as if testing was still regarded by Mr Shoba as the main instrument of assessment. The following response was referred to assessment criteria Mr Shoba uses:

R: Which assessment criteria do you prefer to use when assess in learners' work?

T: I use 'ticks'.

Mr Shoba interpreted assessment criteria simply to mean *marking*, showing that he did not understand what was meant by assessment criteria. This implied that he was not aware that there were different ways in which activities could be assessed. Based on the response from the interview and questionnaire, there is strong evidence that the assessment criteria for Grade 10 Mathematics was not followed as outlined in the assessment guidelines.

#### 4.2.5 **Description of Mr Shoba's lesson**

After learners were inside the classroom, it took more time for them to settle down. Some were busy talking, which resulted in a delay in starting the lesson. One reason for this problem was the large number of learners (60) in one classroom. The classroom had desks arranged in four rows. There was no table, chair or cupboard for the teacher. Learners appeared to be disinterested because even when the teacher asked them to keep quiet, some ignored the teacher's instruction. Mr Shoba did not have a loud voice, which might have helped in drawing the attention of his learners in the overcrowded class. Learners were not reprimanded for time wasting and the noise they made. Mr Shoba's lesson was on functions and the introduction of his lesson is with below (where T stands for teacher and L for the learner):

T: Today we are going to learn about functions. Is there anyone who can give me an example of function? [There was no response from learners and the teacher

without probing learners with another question, the teacher turned and wrote another example on the board, which is  $f(x) = (x + 1)$ ]

T: I have given you an example, so can you give yours? Hands up class?

L:  $f(x) = x + 2$

T: Is this function correct?

Class: Yes sir.

The above introduction of the lesson suggested that the teacher was teaching learners something which was not new to them. However, when looking at the response of the learners, the example was taken from that given by the teacher, differing only by the number 2. Mr Shoba did not provide any opportunities for learners' prior knowledge about functions to be identified. Mr Shoba was teaching without any form of lesson plan. The introduction given by the teacher did not give a clear indication of what he wanted learners to achieve at the end of the lesson and why it was important to know functions. There was little correlation between what was observed and what was related by the teacher in the interview. What was also observed was the noise made by the learners while the teacher was busy talking. The teacher was heard constantly asking learners to stop making noise, but in a very soft voice. There was a time when the teacher was not sure when writing the function  $h(x) = 2/x - 1$ . The teacher said if  $x = 1$  then the answer is 1. One learner raised their hand and asked the teacher:

L: Sir, if I press my calculator, divide 2 by 0 I do not get 0?

T: E...eh (sign of not sure of what to say) let me check from my calculator. I can see now you are correct it is undefined.

This revealed a poor understanding of basic Mathematics rules by the teacher. Furthermore Mr Shoba referred frequently to the textbook for guidance during the lesson. When that happened, the learners fell into a loud noise, but he did not discipline them. I did observe that learners had exercise books on their desks which were never used during the lesson. The whole lesson was about writing functions and substitution without explaining what the effects might be of changing x-values in one function. As the teacher was talking and writing on the board, some learners were observed putting their foreheads down on the desks as if they were asleep and the teacher did not take any action against them. The lesson appeared to have no sense of direction or purpose,

because when he asked question at times the teacher was heard giving the answer himself without giving learners an opportunity to think about the question. One of the questions the teacher asked was:

T: If  $x = 3$  then the function is  $f(x) = -2x + 1$ , the answer is?

T: We say  $-2(3) + 1 = -5$ . Do you follow class?

Class: Yes sir.

The teacher was often not sure what to do after asking the question. He gave numerous examples without giving learners the opportunity to answer or to do problems on their own. The teacher ended his lesson by referring learners to their textbooks for home work. This was done towards the end of a lesson without engaging learners in any form of exercise as class work. The conclusion of the lesson was as follows, “*Take out your books and open on page 36 exercise 3.2 and do the first three sums from the exercise as homework.*” The learners took their textbooks and began marking the sums they were going to do as homework. While learners were ticking sums some were observed not having books with them. It was also noticed that books were in learner’s bags. This gave the indication that they might not be using textbooks during teaching. This was also strongly corroborated by the fact that only exercise books were on learners’ desks during the lesson. Mr Shoba ended the lesson by saying “*thank you class for your cooperation, I will see you tomorrow*” and at that time it was difficult to hear him when you were at a distance away from him because of the noise learners were making while making their way out of the class.

**In summary**, Mr Shoba’s story is a frightening one. He came in without any teaching experience, and with only N4 qualification in Mathematics. Yet he was placed in a class, without being given any curriculum documents, support in developing lesson plans, teaching activities or help in preparing assessments. He was given a textbook from which he teaches his learners. His own understanding of Mathematics concepts is shallow, yet he received no support in carrying out his duties. He struggled to speak English in his lesson and displayed poor content knowledge. He had a limited repertoire of pedagogic strategies and struggled to maintain the learners’ attention. The picture he painted in the interview about his lesson was very different to the observed lesson.



### 4.3 CASE STUDY THREE: MISS YONELA

#### 4.3.1 Miss Yonela's Biography

Miss Yonela is a qualified teacher, but not to teach Mathematics in the FET band. Miss Yonela commented that she did not have much interest in Mathematics but was more interested in Physical Science. However, due to the shortage of Mathematics teaching in her school, she was forced to teach Grade 10 Mathematics. There is only one other teacher teaching Mathematics in her school, which is offered from Grades 8 to 12. Miss Yonela is also teaching Mathematic Literacy in Grade 12, because there are insufficient teachers to teach Mathematics.

Miss Yonela's school is in a rural area with bad road conditions. When it rains, teachers often do not go to school because of the poor road conditions. The school did not have sufficient classrooms, so the school was provided with mobile classrooms as additional classes. The school has an enrolment of less than 400 learners, due to the size of the community surrounding the school. Although the school is built in an impoverished area, it is installed with electricity and is well fenced. The current Grade 12 Mathematics results in the school stands at 23%.

#### 4.3.2 Miss Yonela's perceptions of the curriculum and lesson planning

According to the response from the questionnaire, Miss Yonela stated that as a result of attending the workshop, she gained a better understanding of the curriculum and developed confidence in teaching Mathematics in Grade 10. Miss Yonela further stated in the questionnaire that although she was still new, her opinion was that the Mathematics content of the current curriculum was suitable for the level of Grade 10. She was then probed during the interview to gain a deeper understanding of what she meant in the questionnaire when she responded with "*better understanding of the curriculum*" because her response did not include an explanation of what she understood. Her response involving curriculum was as follows:

R: What benefits have you received from the workshops you have attended?

T: Ya, there are benefits, we look at teacher's portfolios, issues like lesson planning were covered and content as well.

R: What challenges or successes you have in teaching new Mathematics topics?

- T: I will say [it] is the late coming which makes it difficult especially if it is the first period, it is difficult to cover the work.
- R: How do you make sure that the work not covered from previous lesson is done?
- T: (Laughs). I cover the work in the next lesson.
- R: In nowadays there is great emphasis in modelling Mathematics. Have you ever tried modelling that?
- T: Can't think of any that I give but I have seen such problems.
- R: Why you haven't tried them?
- T: I have never thought of it.
- R: What challenges or successes you have in following the required assessment programmes?
- T: When it comes to assessing project I use another assessment task.

Her above comments revealed that although Miss Yonela thought she had a better understanding of the curriculum, she seemed to lack understanding of the value of contextualising Mathematics by not providing learners with hands on activities in Mathematics in the form of projects and seeking new ways of teaching Mathematics. With regard to lesson preparation, Miss Yonela's response during interview was as follows:

- R: When preparing your lesson plan what materials or resources do you use?
- T: Oh! I use two textbooks: *Spot On* and *Mathematics Classroom*, and one study guide I got from UWU.
- R: Which document do you use as a guide for lesson preparation?
- T: There is one document from CASME.
- R: How do you feel about the necessity of using lesson plans when teaching? And why?
- T: No I do not carry lesson plans to the classroom because everything I have written is in my head at the time I go to the classroom. I know what to tackle and how.

Miss Yonela's response suggests that it is not necessary to develop lesson plans when teaching. This was confirmed during the lesson observation, when she was teaching without any visible evidence of lesson preparation. Miss Yonela, in her questionnaire, said that she had received all NCS policy documents, but did not mention using them for lesson plans. She only mentioned one guide which she got from CASME. When asked about headings she found useful in organising her lesson plan, her words were, "*LO's, Assessment standards, extended opportunities things, I will do if I find out that learners did not catch up with the lesson. Yes these are the things I can remember.*" Her casual phrases suggests that she knew what should be in the lesson plan, but had never done it and the last words which said "*yes these are things I can remember*" showed that she could not have used these headings recently. In addition it seemed as if the teacher did not understand the meaning of extended opportunities.

#### 4.3.3 **Miss Yonela's perceptions of teaching resources and support**

When Miss Yonela was asked during interview questions focusing on support she received from parents, her response was as follow:

R: How do you feel about the community surrounding the school with regard to the following?

##### **Considering their children's education as important? Why?**

T: I think they do not consider it as important. The reason I am saying that because [they] are supposed to collect their children's reports quarterly but you find that out of 315, which the enrolment of the school is, they do not come, only 10 ends up coming. It is here at school they will find out how their children perform.

##### **By making input in helping their children with school work?**

T: Some they do but some they do not.

##### **In buying calculators for their children?**

T: No they do not, only a few.

Miss Yonela's response revealed that the majority of parents had not involved themselves in the learning of their children, not even to collect their children's reports. Such a lack of support from parents placed children in a difficult situation because they could not share with their parents their daily successes and challenges, in terms of their school work. Even the learner who might have minor problems, the teacher could not discuss the problems with the parent if the parents did not turn up for meetings. Miss Yonela's response with regard to the support she received from the Mathematics HOD has reference:

- R: Do you get any support from your HOD which you regard as helpful in managing Grade 10 Mathematics?
- T: Mmm... (Frowning), I can't remember very clearly. I do not think I got any support.
- R: Was there any time you needed support but you did not get it?
- T: Not really.

This response revealed that there seemed to be very little communication between the HOD and the teacher. Her response suggested that the HOD had never called a meeting with his teacher in order to discuss mathematical issues. It also appeared as if the HOD did not check the teacher's work. This was inferred from her response when she was asked the following question:

- R: What challenges or successes you have in following the required assessment programme?
- T: When it comes to assessing projects, I use another assessment task.
- R: Is your HOD aware of that?
- T: Not at all.

It seemed as if the HOD was not aware of the problems the teacher had, the problem of giving learners a project as stated in the assessment guidelines in Grade 10. The HOD was not aware of the fact that she changed the assessments from that specified in the curriculum documents. The teacher had also not attempted to ask the HOD for assistance. Miss Yonela's response regarding teaching resources for Mathematics from the questionnaire revealed that she had received hand-outs from the workshop that she attended, but felt that they were insufficient for successful teaching

of Mathematics in Grade 10. Although Miss Yonela's response was "no" to the question asking whether she had sufficient resources for Grade 10 Mathematics, she did not specify the type of resources she was short of. Furthermore she did not explain how the shortages challenged her in teaching. When Miss Yonela was further probed with questions involving teaching resources during her interview, her response was as follows:

- R: What learning materials do you think you learners are short of which you need most?
- T: Calculators and textbooks are insufficient; it makes me write everything on the board.
- R: What Mathematics learning materials has the school provided you with which you are currently using?
- T: Only textbooks which are provided by booksellers as samples.
- R: Have you ever requested books from your school?
- T: I do not know how many times I have requested them from the school but they always say they are lacking sufficient funds to buy many books.

From the above responses it showed that one of the challenges Miss Yonela was facing in teaching Mathematics was the shortage of books and calculators.

#### 4.3.4 **Miss Yonela's perceptions of assessment**

During the interview, Miss Yonela was asked the question involving her understanding about continuous assessment. Her response was as follows:

- R: What is your understanding about continuous assessment?
- T: I record student's work and that work contributes at the end of the year towards their final mark.

Miss Yonela's understanding of continuous assessment showed that she perceived assessment as a tool for measuring learner's performance by awarding marks that would contribute to the final outcome for the learner at the end of the year. So, for Miss Yonela, the purpose of assessment was for the awarding of marks. When Miss Yonela was further probed with questions during the interview about her assessment practices when teaching, her response was as follows:

R: How do you feel about assessing learners continuously in Mathematics?

T: I think continuous assessment is useful because it promotes the attendance of learners, because learners know if I miss a test it will contribute a negative mark towards my CASS, so a CASS promotes the attendance of learners.

Here Miss Yonela saw tests and CASS as a way of improving the attendance for the learners or as a way of controlling learner absenteeism. She also spoke synonymously of tests and CASS. Also, the teacher has not said anything for learner support which was the main purpose of assessment in NCS. Nothing has been said about developing understanding, showing that she had not thought about the role of assessment in developing understanding. During the lesson observation, she taught the whole period without giving learners any task to do in the class, showing that she saw much value in providing learners time for consolidation. At the end of a lesson, she then said, *"I hope everybody understands. So copy this down as homework."* This means that a learner would only find out at home whether she / he was successful or challenged with the task. In the question involving learners' portfolios, Miss Yonela's response in the questionnaire stated that learners' assessment tasks are kept in the portfolios and that she had received assessment guidelines for Mathematics. Her interview, however, contradicted what she wrote in the questionnaire. Her response in the interview for questions involving learners' portfolios went as follows:

R: How do you feel about learners having assessment portfolios?

T: I do not see the necessity of them. I think exercise books are the main key for monitoring the work, in the exercise books they write everything.

R: Where do learners keep their papers for tests?

T: Some I keep them with me especially for examination but other tests I just give it back to them.

Such comments revealed that Miss Yonela did not see the need of keeping learners' work in the portfolios. While on learners' assessment tasks, Miss Yonela's response regarding assessment tasks for Grade 10 (stated as requisite in NCS assessment guidelines), was as follows:

R: What challenges or successes have you had in following the required assessment programme?

T: When it comes to assessing projects, I use another assessment task.

R: Why not use the assessing project?

T: I do not necessarily think there is a need for the project because at the end of the day each learner must answer the question in the final examination and get a good mark. I am not sure of [how] the project [works].

The above response revealed that Miss Yonela did not see the value of assessing learners by using projects which was different from examination. She also revealed that she was not prepared to find out how other teachers are assessing the project. This was revealed by her response during the interview to the question involving networking with other teachers.

R: What are advantages or disadvantages of teaching Grade 10 Mathematics in this school with regards to networking with other graded teachers?

T: I have never tried networking with other teachers for Grade 10 Mathematics. I have not seen any need.

Such a response was disappointing, but could be because the teacher was forced to teach Mathematics because of the shortage of teachers, her interest having been noted as being elsewhere in Physical Science. It appeared as if the teacher did not see the need for networking with other Mathematics teachers.

#### 4.3.5 A description of Miss Yonela's lesson

Miss Yonela's lesson took place in a very small room which was approximately half the size of a normal classroom. The room was observed having the falling door, two small windows on one side of the wall, one small portable board and few desks not properly arranged. Miss Yonela carried a textbook and a T-square to the classroom with her. There were only 19 learners who were doing Mathematics, making it relatively easy for her to control the class. The class was well-behaved with no noise made and all of them took their seats quietly, until the teacher introduced the lesson by first greeting them. The lesson was introduced as follows (where T stands for teacher and L for learner):

- T: Let us continue. Determine the coordinate of J. What is J for? (Pointing to one learner whose hand was not up).
- L: -3 and 2.
- T: Page 25 number 2.1. Coordinate of N (2; 3) and for J (-3; 2). What is the formula for calculating JN?
- L:  $(X_2 - X_1)^2 + (Y_2 - Y_1)^2$ .

Miss Yonela's introduction of the lesson showed that it was a continuing lesson and learners identified by the teacher gave correct answers. Miss Yonela's not checking of homework suggested that learners were not given homework from a previous lesson. While learners referred to their books, the teacher was also using her textbook. As the lesson unfolded it was observed that the lesson was content-based, with the focus on coordinate geometry. The type of questions the teacher asked learners were those questions which required learners to recall formulae and to give only one word answers, without trying to encourage them to think of why they gave that answer. An example of such questions and responses from learners were as follows:

- T: What is the value of  $X_2$ ?
- L: -3.
- T: What is  $Y_1$ ?
- L: It is -3 - 2.
- T: What is the answer here?
- L: -5.



This continued throughout the lesson. The teacher did not allow learners to discuss answers among themselves or to work on class work on their own, which would help the teacher identify those learners who did not understand. Although the teacher had a very small number of learners, not all learners were observed participating in the lesson. Only those that had the opportunity to be pointed at by the teacher participated, but others were just passive, doing nothing except when the teacher allowed answering in chorus. Such responses were observed in the following type of questions:

- T:                Negative 25 all square is the same as -5 times -5. So negative times negative is?
- Class:           Positive.
- T:                Negative all square is the same -1 times -1 which is?
- Class:           One

It should be mentioned that during interview when asked about the chorus answers by learners, her response was as follows:

- R:                How do you feel about learners responding in a group when a question is asked?
- T:                I do not like that thing, that does not give me a clear direction as to who knows 'what' and who does not know 'what'.

Although Miss Yonela's response during the interview suggested that she did not encourage chorus responses from learners, her method of questioning encouraged learners to answer as a whole class, and she did not discourage the response from the learners. One of the things that were observed in Miss Yonela's lesson was the use of textbook. Although the teacher appeared to have confidence in content teaching, her teaching did not involve practical examples where learners could see how content knowledge could be used in solving real life problems. Miss Yonela admitted during the interview that she had never tried contextualising Mathematics problems. Her teaching style was such that she did most of the talking, without giving her learners an opportunity to discuss on their own or to do exercises as class work, which would have helped them consolidate their understanding.

The teacher ended her lesson with the words, *“I think you have understood. Is there anyone with a question?”* There was no response from the learners and the teacher continued to say, *“If no questions, copy this down as homework.”* As she said that, she turned to the board and started writing homework. After learners had finished copying the homework, they were observed talking to one another and writing. The teacher stopped teaching before the end of the period. This gave learners time to interact and to write. It was also noticed that it was the last period before break and the teacher then stood in front of the door talking to another teacher, who was outside while the learners carried on talking and laughing. She was heard saying, *“I am hungry now, I need food.”* The teacher just left me with the learners without dismissing them for break.

**In summary,** Miss Yonela was teaching Mathematics because of a shortage of Mathematics teachers at her school, even though she preferred to teach Physical Science. Her HOD did not have any planned programme of monitoring and support, and she was expected to approach him with her problems if she encountered any challenges. She did not present any evidence of lesson planning and taught from a textbook. One advantage of continuous assessment was that it helped to cut down on learner absenteeism. Her lesson did not include any application exercises that could be done in class, even though there was sufficient time, but homework was assigned to the learners.

#### 4.4 CASE STUDY FOUR: MISS DLOMO

##### 4.4.1 Miss Dlomo's Biography

Although Miss Dlomo is seen as qualified, she is not qualified to teach Mathematics at a high school. Her qualification allows her to teach at primary school. The school has only one qualified Mathematics teacher who is the HOD for Mathematics. Miss Dlomo was asked to teach Mathematics in the FET band because of her Mathematics background in high school. She had taught Mathematics in Grade 8 and 9 and then moved to Grade 10 Mathematics for the past 5 years. Miss Dlomo's school is in a rural area, which has a supply of electricity and purified water. The road leading to school is not tarred but one can travel even on a rainy day without any problem. The school is still new and classrooms are still in a good condition. The school has an enrolment of less than 400 learners which is why it does not have a deputy principal. Miss Dlomo travelled daily to the school. She stays in a small town not very far from the school. The school has access to public transport like taxis. The school pass rate is 24% for Grade 12 Mathematics results.

##### 4.4.2 Miss Dlomo's perceptions of the curriculum and lesson planning

Miss Dlomo's response to the questions from the questionnaire below has reference (where Q stands for the question and A stands for the answer):

Q: Do you feel comfortable in teaching all topics covered in Grade 10 Mathematics curriculum?

A: No.

Q: Please comment on the curriculum of Grade 10.

A: The standard is a bit higher.

Although Miss Dlomo did not specify what she found challenging in Grade 10, her last comments confirmed that she did experience some difficulties in teaching the Mathematics content of Grade 10. During the interview, Miss Dlomo was further probed with questions involving Grade 10 Mathematics curriculum and her response was as follows (where R stands for researcher and T for the teacher):

R: Which topic, when teaching Grade 10, did you find most difficult to teach?

- T: Especially the new topics like data handling, transformation and statistics.
- R: Is there anything you are currently doing in improving teaching these topics?
- T: Yes, but at times my HOD does not have sufficient time in helping me understand the topics.
- R: What makes your HOD not have enough time in helping you?
- T: The reason is because of the work load of teaching that he has. He is teaching both Mathematics and physical science in the school and is the only one.
- R: Have you ever tried getting help from someone else besides your HOD?
- T: No.

The above response revealed that Miss Dlomo only knew the old curriculum, which she learnt during her high school years. She acknowledged that she had difficulty in teaching in the NCS but had been unable to get help from her HOD because he was busy. She did not try to get help from anybody else. However, when further probed with questions involving Mathematics workshops, her response was as follows:

- R: You have taught Grade 10 for more than a year. How many workshops have you attended?
- T: I have attended only two workshops since I have taught Grade 10.
- R: What benefits have you received from the workshop?
- T: Yes, I received benefits how to do transformation geometry.

Miss Dlomo's above response reveals that she did receive benefits from workshops on transformation but from the question involving successes and challenges of teaching Mathematics curriculum Mathematics in Grade 10 confirms that she was not confident about teaching the curriculum, and her response was with reference:

- R: What can you say about the successes and challenges with regard to the implementation of the new Mathematics curriculum in Grade 10?
- T: The method used now for teaching is the one that makes it a little bit difficult. It is the NCS method which makes things difficult.

Miss Dlomo was also asked during the interview questions involving lesson preparation and her response was as follows:

- R: What headings do you find useful in organizing your lesson plan?
- T: A lesson plan cannot be a lesson plan without class work and homework.
- R: Do you feel is it necessary to have a lesson plan when teaching?
- T: I will say yes and no. If I say yes, lesson plan can help you see your pace and if no, lesson plan there must be a planner which is not like a lesson plan, showing what you will be doing the following day.
- R: When you were teaching you were observed using a textbook. Can you explain why a lesson plan was not used?
- T: In fact it was my lesson plan of using a textbook that day, so there was no need to write down what was in the textbook I was going to use.

It is notable that as with the other three teachers; Miss Dlomo did not have any lesson plan during classroom observation. However, the above comment revealed that Miss Dlomo saw the lesson plan as helpful for pacing a series of lessons rather like a weekly or monthly planner. However, she did not see the need for a lesson plan and was comfortable following the textbook.

#### 4.4.3 **Miss Dlomo's perceptions of teaching resources and support**

During the interview Miss Dlomo was asked questions involving the support she received from the HOD and her response was as follows:

- R: How often do you meet with your Mathematics HOD?
- T: We meet almost twice a week.
- R: Is it a departmental policy that you meet twice a week?
- T: Is not a policy, but we seeing the need.
- R: Did your HOD ever call a meeting to discuss how lesson planning should be made in preparation for teaching?
- T: There was no meeting specifically for lesson planning but sometimes he calls meetings relating departmental issues.
- R: Are there any minutes taken down for meetings?
- T: Most of the times there are no minutes taken.
- R: Do you get any support from your HOD that is helpful in managing Grade 10: Mathematics?

T: He used to come to class if I had a problem about something I was not sure of.

The above response raises doubts as to whether the HOD had a formulated policy regarding departmental meetings, monitoring and control of teachers' work. It seemed to be that like the other teachers, Miss Dlomo did not want to admit to any shortcomings of her HOD. She suggested that the HOD had meetings twice a week and was also available to help her if she called on him. Yet, she could not point to specific help that she got from him. She had mentioned her problems in understanding some of the content and she has said that he did not have enough time to help her. It appeared as if the HOD had never identified the challenges the teacher might have, such as the teaching of new topics and lesson design. These are challenges that could be easily predicted considering the fact that the teacher had not had any teacher training for Mathematics in the FET band. Moreover, Miss Dlomo mentioned that the HOD offered assistance only when she asked him to do so. This showed that if the teacher had not asked for help, the HOD would not know what challenges the teacher was facing. Since monitoring and control of teachers' work seemed to be not properly managed, it appeared as if there could be many other unforeseen teaching problems linked to the lack of support from the HOD. One of the reasons for poor support from the HOD could be linked to what Miss Dlomo mentioned earlier that the HOD did not have sufficient time in helping her in challenging topics. The HOD for this school appeared to have a heavy workload for teaching, as he was the only one in the school teaching Physical Science.

Although there seemed to be a lack of support from the HOD, the teacher did mention from both the interview and the questionnaire the benefits she gained from the workshops. Some of the responses from the questionnaire pertaining workshops were:

Q: Did you attend any Mathematics FET phase Mathematics workshop?

A: Yes.

Q: If yes list any benefits you have obtained by attending that workshop?

A: To understand content better.

Miss Dlomo did not give a detailed explanation of the type of content that she benefitted from, during the workshop. However when probed with the same question during her interview, her words were, “*I received benefits’ to do transformation geometry.*” These comments suggest that Miss Dlomo had deepened her understanding in the topic of transformation geometry. While Miss Dlomo was content with the benefits she gained from the workshops, it seemed as if the new topics were still daunting for her. This was evident from her comments with regards to questions involving topics she found most difficult when teaching Grade 10 Mathematics. She elaborated, “*Especially the new topics like transformation, data handling and statistics.*” This showed that even the Department of Education had not provided sufficient teacher support. All of the above shows that the little support the teacher had received was not sufficient for a better understanding and teaching of the present Grade 10 Mathematics curriculum. It is important to mention that while the teacher lacked support from the departmental officials like the HOD, parents also did not give parental support to their children. This is evident from Miss Dlomo’s response during an interview for the questions involving parental support. Miss Dlomo’s comments were as follows:

R: How do you feel about the community surrounding the school with regard to the following?

**Considering their children’s education as important? Why?**

T: They do not consider their children’s education as important because when the child is given homework you notice that there is no help from the parent and also when a parent is asked to come check the child’s work at school they do not respond.

R: Have you ever tried following up why they have not come?

T: If you ask the child, they will say that my mother is alone at home and cannot leave the house alone or such things like my mother is at work [and] cannot sent anyone to come.

**In making input by helping their children with school work?**

T: You notice that the parent is not involved.

**In buying materials for their children if they are asked to do so?**

T: They even fail to do the easiest thing of buying 2-quire exercise books.

Such response revealed that although parents appeared to be failing to help their children but a major problem was also that of children who did not stay with their parents at home. This showed that some learners stayed alone in their homes and some stayed with only a single parent which made it difficult for them to leave their homes. Some of the reasons could be linked to parents not seeing the value of their children doing Mathematics, because they failed to even go to school to check the progress of their children. It seemed as if Miss Dlomo's lack of attention to her teaching was unnoticed, since the important stakeholders who were supposed to be working with her appeared not to be actively involved. When Miss Dlomo was asked questions involving Mathematics resources during the interview her response was as follows:

R: Do all learners have sufficient Mathematics resources you need?

T: Yes.

R: What resources do learners have?

T: They have textbooks, calculators and mathematical instruments because the school provides them.

R: Are there any other materials you are using except textbooks and guides?

T: I use CDs but not most of the time.

The above response showed that while the teacher lacked support in teaching some Mathematics topics, the school appeared to be valuing the importance of Mathematics as a subject. Further than that, the school had gone an extra mile by even buying calculators specifically for Mathematics learners. The buying of such materials highlighted the commitment of the Department of Education in providing enough funds for rural schools. Although the school was few kilometres away from another well-developed town, Miss Dlomo was still experiencing similar problems as those experienced by teachers, miles away from the town. Miss Dlomo's problems were linked to geographical situation of the school and to the socio-economic background learners come from. This was revealed from her response during the interview:

R: What challenges or successes you have in teaching Grade 10 Mathematics this school?

T: Learners have difficulty in accessing information from the internet.

R: The school appears to be close to a town where they can get additional information. What can you say about that?



T: Ya, but I think they do not have money to get to town, even though it is close by.

Miss Dlomo was further questioned on networking with other schools, as previously she admitted that she had never done it. When asked for the reason for failing to network with other schools, her response was, *“Even if I like to network with other teachers it is not easy, because high schools are far away from my school. It means that I can end up spending the whole day going to one school which I think can be a problem.”* Such a comment revealed that the distance between schools did have a negative impact on curriculum implementation. Furthermore, the fact that the school is next to a well-developed area, does not necessarily mean that children close to the area were benefitting in terms of accessing modern technology like computers.

#### 4.4.4 **Miss Dlomo’s perceptions of assessment**

Miss Dlomo was also probed with questions involving assessment in the questionnaire with the aim of finding out the extent to which appropriate documents were used and whether proper measures were in place for managing assessment. Miss Dlomo’s response from the questionnaire was as follows:

Q: Did you receive the following policy documents:

**NCS Mathematics assessment curriculum statement?**

A: Yes.

**Mathematics assessment guidelines?**

A: Yes.

Q: Which method do you use most when assessing learners?

A: Ticks.

Q: How is the CASS marks kept?

A: In portfolio.

According to the above response, Miss Dlomo had received the necessary policy documents for managing learners’ assessment. Also, her comment about ticks being the most common method of assessing her learners revealed her misconception about assessment methods. In a manner similar to Mr Shoba, she saw assessment methods as referring to ways in which learners’ responses were marked without mentioning other assessment strategies such as when assessing project, posters, group work, and so forth

It was important to further probe Miss Dlomo with questions involving assessment during her interview, because her response from the questionnaire did not provide a detailed enough explanation. Miss Dlomo's response was as follows:

R: In the questionnaire you said you prefer using ticks when assessing learners. How do you feel about using rubrics?

T: The rubrics are a bit monotonous because it is like you are preparing memoranda.

R: How do you feel about learners having assessment portfolios?

T: It is good because learners learn to sort their work. In tertiary education they won't have problem.

The above response revealed that although Miss Dlomo said that she valued learners' assessment portfolios her reason was that it would help them at tertiary level because they would develop sorting skills. The teacher did not see the value of assessing learners by making use of rubrics. Her comment was that developing rubrics was monotonous, like developing memoranda. This showed that assessment like projects that were most suitably assessed by means of rubrics would be side-lined by the teacher. Although the researcher did not have an opportunity of accessing Miss Dlomo's assessment tasks, based on her response of using ticks only, it would seem that her assessment tasks were mostly reading and writing-centred items. Although Miss Dlomo's response revealed that her learners were using portfolios, in an informal interview with the teacher, it was revealed that the test was the main tool used in assessing learners. Miss Dlomo's words were as follows, "*You see here at school in each subject it is compulsory to have a test exercise book instead of portfolios.*" This shows that although Miss Dlomo's response was positive, she could not have used portfolios. According to her, portfolios were not school policy. Miss Dlomo was further probed with the questions involving understanding and prescribed assessment tasks for Grade 10, and her response was as follows:

R: What is your understanding of continuous assessment?

T: You find that continuous assessment is helpful to a kid because you find that the child has been doing well for term one, term two and term three, and the child does not write examination at the end of the year , so CASS helps the child a lot.

- R: How do you feel about the assessment tasks that need to be done each term?
- T: You know I have never thought of it, but projects and assignments- when given make them explore.
- R: Which assessment task do you prefer? Why?
- T: I prefer investigation.
- R: Why?
- T: When they are in a university they would be able to detect which soil has high water retaining capacity.

Miss Doom's understanding of continuous assessment revealed that a learner could pass at the end of the year without an examination, as long as the CASS mark was good. This showed a shallow understanding of continuous assessment practiced in Grade 10. She further admitted that she liked investigation most but her explanation was outside the context of Mathematics. Miss Dlomo was further probed with questions involving assessment and her response was as follows:

- R: What challenges or successes can you say you have in following the required assessment programmes?
- T: There are challenges in following the assessment programme especially in an investigation. I do have a problem there.
- R: Did you ever try getting assistance?
- T: I have tried but I still have a problem.
- R: Can you still remember how you got assisted?
- T: I went to my HOD but there are no resources for doing investigation.

Again, although she seemed to espouse innovative assessment methods such as investigations, she did not offer specific examples related to Mathematics. Furthermore Miss Dlomo's above comments involving successes and challenges in following prescribed assessment programme suggests that she had not in fact used investigations because the students did not have the resources but she did not specify what resources were needed and seemed not to have pursued alternatives. As to the question of teaching learners' Mathematics that would help develop knowledge and the required skills, her response was as follows:

R: What challenges or successes do you have in developing learners' mathematical knowledge, skills and values as one of the requirements for continuous assessment?

T: Learners always consider Mathematics a problem. I do not think these values can be developed.

Miss Dlomo's comment revealed that she saw learners' poor performance as their problem and not hers. She was further asked follow up questions with regard to problems that learners have in Mathematics. Her response appears below:

R: Why you think learners consider Mathematics as a problem?

T: I think is because of their performance. If you follow up their problem you will notice that there is this attitude of saying Mathematics is difficult.

R: What can be the solution to the problem?

T: I do not know because even when the principal invites people from outside the attitude and performance does not change.

Her comments revealed that she had absolved herself of blame for poor results. She placed the blame on the learners. This was also evident from her response involving contextualising the content. Miss Dlomo's response was thus:

R: Nowadays there is great emphasise in modelling Mathematics. What do you feel about that?

T: It is difficult for our learners because they have problems understanding English. So yes, English is the medium of instruction if they contextualise learners will have problem.

R: Have you ever tried setting such examples?

T: Yes.

R: What challenges or successes you have in setting such questions?

T: Sometimes they do not bother to answer the questions or sometimes they try but the way they write you can see that they are struggling.

Here too, it showed that she gave it up too easily. She found reasons for not doing such examples, instead of trying to find a way of doing it.

#### 4.4.5 A description of Miss Dlomo's lesson

Miss Dlomo's lesson was observed while she was teaching 8 learners. It was a one hour lesson and the classroom although it was of normal size, looked very big for only eight learners. The classroom looked neglected because of the computers that were lying unused on one side of the wall, and the teacher did not have a chair or table. There were no posters or charts hanging on the walls. Although there were desks in the classroom arranged in rows, in an informal discussion with the school principal it was revealed that the classroom was meant as a computer room, but some thieves broken in stole some computers. When Miss Dlomo was going to the class she was observed carrying a textbook, T-square, chalk and a duster. Miss Dlomo's lesson was introduced as follows:

- T: Today we are going to talk about something called linear function. The word linear? (Directing the question to learners in the class and there was no response from the class)
- T: Do not tell me is for the first time hearing this word? (Code switching)
- Class: Yes is for the first time.
- T: Let us do it to see is the first time (turning to the board drawing the Cartesian plane and continue talking after finished writing on the board). The word linear means straight. We use something called a cross (code switching), and how do we call this cross in English? (There was no response and continues). We use a cross, here is drawn on the board (code switching).
- L: A cross.
- T: A cross's mathematical term is...?
- L: Cartesian plane.

When Miss Dlomo introduced her lesson it seemed as if she was teaching the topic for the first time. However as the lesson unfolded, it became clear that the learners had been taught certain aspects previously. This was drawn from her words, when she started by saying, *"Today we are going to talk about something called linear functions."* Such an introduction created the perception that the topic was taught for the first time. It was also noticeable that her introduction included a lot of code switching. Miss Dlomo's lesson was mainly content-based and learners were asked the type of

questions that only required them to recall a mathematical term. Some of the questions and responses from learners were as follows:

- T: The Cartesian plane consists of two number lines, the vertical line and the horizontal line. The horizontal number line is called what?
- L: Y-axes.
- T: The horizontal one. (Loudly stressing the words and pointing to another learner)
- L: X-axis.
- T: The vertical one?
- Class: Y-axis.
- T: Right. Looking at the values of X-axis, how are they? Are they positive or negative? (Pointing on the board)
- L: Positive.
- T: Second quadrant?
- Class: Negative.
- T: Fourth quadrant?
- Class: Positive.

Such questions did not seem to be forcing learners to think, but only to recall what they were taught. Furthermore, learners were forced to give only one word answers, due to the type of questions the teacher was asking. It was also observed that the teacher also allowed learners to answer in groups while in the interview it showed that this was something she did not encourage. Miss Dlomo's response was as follows:

- R: How do you feel about learners responding in groups when questions were asked?
- T: I do not like chorus response. You see in a chorus response you cannot see who knows what and who does not know what only when they answer individually you can see that this one is good this one is bad.

It was also observed that Miss Dlomo's teaching style did not encourage learner involvement and discussion. After having shown them how to plot points on the Cartesian plane, the teacher was heard asking, "*Is there any question before I continue?*" (There was no response from the class). It was also observed that if no answer came from learners, that she would answer questions herself. Her question has reference:

- T:                Given the point (-1; 0). Where to draw the X- value?  
 T:                From -1. (Answering herself)  
 T:                Y-value?  
 T:                0 (answering herself)  
 T:                Where is zero? (No response and gave another point). Where must I plot the point (2; 0)? (There was also no response).  
 T:                On the Y-axis X is zero and on the X-axis Y is zero. Understand?  
 Class:           Yes miss.

When Miss Dlomo introduced her lesson, her first words were, "*Today we are going to learn about something called linear functions.*" But for the whole lesson she spoke about Cartesian plane and plotting of the points, with no linkages referencing the linear function. Although learners were observed with 2-quire exercise books and text-books on their desks, they were obviously not even used to the checking of homework. The teacher ended her lesson with the words, "*Is there anyone with the problem of just plotting the point?*" (There was no response from the learners and the teacher continued by saying) "*I will give you homework.*" The teacher then wrote coordinates on the board as homework, where learners were going to locate them in the correct place on the Cartesian plane. Learners were never referred to their books and were not given the opportunity to do class work. Also there was no reflection about the lesson.

**In summary**, Miss Dlomo is a qualified teacher, but has only a Grade 12 Mathematics background. She admitted that she struggled with new topics in the curriculum such as data handling and transformation geometry, which was not in the syllabus when she was in Grade 12. She said that her HOD was willing to help her, but that because of his high workload, he did not have much time to help. She had mentioned different forms of assessment, but offered superficial reasons for not using them. Her lesson was teacher-dominated, with no evidence of any lesson plans, allowing learners to respond when addressed directly. There was no class work, but for homework learners were given coordinates of points and asked to plot the points on the Cartesian plane.



## CHAPTER 5

### ANALYSIS AND DISCUSSION

The transformed Mathematics curriculum in the FET band in South Africa was aimed at shifting learning from a content-based learning to competency-based learning. This has brought about changes in the roles teachers are expected to assume. According to Brodie (2010), teachers are now regarded as facilitators which mean that they have to change their pedagogical assumptions about teaching and assessment methods. In order for teachers to change their teaching practices, they are expected to familiarise themselves with the NCS policy documents for Mathematics in the FET band, which spells out specific learning outcomes for the learners, who are expected to demonstrate and achieve in their respective grades. For the successful implementation of the current Mathematics curriculum in the FET band, teachers are expected to demonstrate a variety of skills, deeper content knowledge and understanding of the curriculum to mention a few in order to help learners acquire mathematical knowledge, skills and attitudes that meet learners' needs for future use.

This study is set to explore Grade 10 Mathematics teachers' understanding and teaching practices for the current NCS Mathematics in rural schools. The data presented in Chapter 4 will be used to present answers to the three research questions, with respect to the four participants in the study. The following questions were developed:

1. What are teachers' perceptions about the National Curriculum Statement (NCS) policy?
2. What is the nature of teachers' classroom practice?
3. What are some challenges faced by the teachers in trying to implement the NCS?

In answering the three research questions a comparative analysis of four case studies was used to develop answers for each question. Firstly, teachers' perceptions will be discussed followed by the nature of teaching practice and then by teachers' challenges. The last section of this chapter will be recommendations, followed by a conclusion. A cross-case analysis was used for this study, with the aim of identifying the

commonalities and differences from four cases. Such cross-case analysis was done, answering each question.

## 5.1 **WHAT ARE TEACHERS' PERCEPTIONS ABOUT THE CURRENT MATHEMATICS NATIONAL CURRICULUM STATEMENT POLICY (NCS) IN GRADE 10?**

The perceptions teachers have about the current Mathematics curriculum for Grade 10 are presented in terms of their views about contextualisation, Mathematics content, lesson preparation, teaching resources and support, curriculum workshops and assessment. This is presented as comparisons across four teachers. This cross-case analysis will help in determining different and common perspectives teachers have on the Grade 10 Mathematics curriculum. It further provides a better understanding of the quality Mathematics teachers are delivering in their classes.

### 5.1.1 **Contextualisation**

The current curriculum requires teaching Mathematics that is from and in context instead of teaching Mathematics as algorithms and procedures for later application of context. According to Brodie and Molefe (2010), it is important for educators to develop learning that makes sense to learners, by teaching Mathematics involving everyday contexts. For this reason, educators must have skills and knowledge of infusing the context of Mathematics into their teaching practice.

The participants, Mrs Mayende, Mr Shoba and Miss Yonela reported that they had never tried applying contexts in their teaching. One of the reasons cited by Mrs Mayende was that she knew nothing about contextualising content while Miss Yonela never thought of contextualising the content. Mr Shoba and Miss Dlomo both knew about the emphasis in the curriculum of contextualising Mathematics. Miss Dlomo was the only one who has tried applying it in her class, although she had not been successful in providing learners with the skills of applying Mathematics in a real life situation. Miss Dlomo had distanced herself from the difficulties learners encountered in understanding contextualised Mathematics by blaming learners for failing to comprehend English. However Miss Dlomo has demonstrated a higher level of engagement with this curriculum construct of contextualisation than the other three

teachers, who had not even considered trying to put this into practice in their classrooms.

### 5.1.2 **Mathematics content**

The Mathematics curriculum for Grade 10 has been transformed in a way that new topics have been introduced which means a shift from the content teachers' have used for a long period of time. Mrs Mayende, Mr Shoba and Miss Yonela agreed that the content was at the level of Grade 10 learners. While the three teachers agreed that the Mathematics curriculum was at the level of Grade 10 learners, they had some concerns about the Grade 10 Mathematics curriculum. For example, one of Mrs Mayende's concerns was that it could be better if other topics like Financial Mathematics and Data Handling were phased out in Grade 10. Mr Shoba felt that there should be more workshops for teachers, while Miss Dlomo's concern was that the standard of Grade 10 Mathematics was too high. Her opinion of the content could be seen in the context of her experience, as she had not studied Mathematics further than Grade 12 level, and the new topics she mentioned as challenging were those (Data Handling, Transformations and Statistics) that were not in the curriculum when she was in Grade 12. Miss Yonela reserved comment, saying the curriculum was still new to her. Although Mr Shoba did not mention specific topics of difficulty, his lesson revealed that he struggled with basic concepts and he relied on the textbook for his teaching.

### 5.1.3 **Assessment**

The move towards Outcomes Based Education has brought about the integration of continuous assessment into teaching and learning, with the purpose of providing learners with appropriate opportunities in revealing their knowledge, skills and values. For this reason it is important for us to look at how educators assess learners. Mrs Mayende was the only teacher to mention that assessment could be used to "*determine whether learners understand*" the concepts.

It is clear that all the teachers supported the traditional method of assessment, which was treated as a separate body from teaching. In fact the teachers all displayed a superficial understanding of assessment. None of them alluded to the fact that assessment was a tool to improve understanding, although Mrs Mayende came close to this by saying it was used to determine whether learners understood the work. Mrs

Mayende and Miss Dlomo both perceived the function of assessment as promotion of learners at the end of the year to the next grade. Miss Dlomo further stated that assessment helped the learner to pass at the end of the year, even though the learner had not written an examination. Mr Shoba and Miss Yonela had a different perception regarding assessment. The two teachers agreed that assessment is when marks are being awarded to a learner for a particular task. Miss Yonela said that continuous assessment promoted attendance by learners because they knew they would lose marks if they missed the tests. It was not clear whether Mr Shoba understood the term continuous assessment because when asked, he said it meant “*to assess continuously*” which is just a rephrasing of the term.

Mr Shoba and Miss Dlomo both revealed the understanding that assessment criteria were exemplified by ‘*ticks*’. Miss Dlomo further gave strange reasons for not using rubrics, saying that they were monotonous. Miss Dlomo also said she liked investigations because learners would be able to “*detect which soil has high water retaining capacity*” when they went to university. She also said that the value of using portfolios was that students would develop organisational skills.

The reasons offered by teachers for not using portfolios were mainly because loose papers were easy to lose. Miss Yonela said there was no need for portfolios, because they wrote everything in their exercise books. None of the teachers showed any evidence of high-level engagement with assessment, such as what methods worked best, or how they overcome challenges associated with certain assessment demands.

#### 5.1.4 **Lesson plan**

In order to become an efficient and effective teacher, it is necessary for educators to have a well-thought out written lesson preparation before going to class. A well-designed lesson plan can assist educators, because there is little time to think or make decisions in front of the class about the most suitable teaching methods, activities, assessment or resources to use for effective learning. The only thing required from the teacher when in front of the learners is to mediate learning.

Miss Yonela and Mrs Mayende both shared the same view that using a lesson plan when teaching was a waste of time, because when they go to class they already know what to teach. They both said that they left their lesson plans behind when going to teach. This shows that the two teachers do not understand or value the use of the lesson plan when teaching. Mr Shoba differed from the other two teachers by saying that it gave direction and saved time. However, he did not value it enough to use during his lesson. I find it difficult to determine Miss Dlomo's perceptions regarding the lesson plan, because she avoided being specific about her views in this regard. She answered, "*I can say yes or no*" on this topic. Although Miss Dlomo did not want to be more specific about the lesson plan, she disagreed with Mr Shoba that it could save time.

#### 5.1.5 **Teaching resources and support**

It is important to mention that teaching resources could assist teachers in developing a creative learning climate in the classroom. The selection of appropriate teaching resources is important for educators in imparting knowledge to learners that has a positive impact in their lives. Furthermore, the success of the present curriculum in the FET band also depends on the type of support teachers get with regard to human resources and infrastructural support. For this reason, it is important to determine teachers' perceptions pertaining to teaching resources and support.

When it comes to teaching resources and support, Mrs Mayende, Mr Shoba and Miss Yonela said that their schools still lacked teaching resources. Teachers relied on books as the only source of information. Miss Yonela further stated that she was using only those textbooks that were supplied by book sellers as samples for Grade 10 Mathematics. Miss Dlomo differed from the three teachers because her school had provided Mathematics learners with books, calculators, writing materials and mathematical set instruments. It is pertinent to note that Miss Dlomo had only 8 learners in her class, yet she complained that she could not do investigations because there were no resources.

With regard to worksheets, Mrs Mayende and Mr Shoba both said they never used worksheets when teaching. The two teachers cited different reasons for not using worksheets. It is important to mention that Mrs Mayende's school had a photocopying machine, yet she regarded worksheets as a waste of time. For Mr Shoba, all his learners have textbooks, so he said there is no need for worksheets. Miss Yonela and Miss Dlomo both said worksheets could be used when there was a need. Miss Dlomo went further, by saying that she often used worksheets when teaching geometry.

Mrs Mayende, Mr Shoba and Miss Dlomo all said that they received support from their respective HODs. Three teachers agreed that the support they received from their HODs was when they were approached for help. While the teachers perceived this to be support from their HODs, they only received help when they experienced a problem. None of the HODs seemed to have a system in place for regular monitoring, supporting or discussion of progress. Miss Yonela revealed that she could not remember any form of support from her HOD, except when checking whether her work was up to the required standard or not. While Miss Yonela perceived her HOD to be passive in terms of support, her HOD appeared to be the only one taking responsibility to check teachers' work. On the other hand, Miss Yonela's HOD did not provide feedback about her progress.

All the four teachers agreed that parents in their schools did not give support to their children in Mathematics. Miss Yonela for example, mentioned that they did not come to collect their children's reports at the end of each quarter. Mr Shoba highlighted an important point regarding working parents which they appeared to have an interest in their children's school work while those who were not working and staying with their children dragged their feet in helping their children. Mr Shoba further linked such negligence of their children's education to the impoverished lives that they lived. The teachers agreed that learners at times failed to have the required Mathematics exercise books, except for Miss Dlomo, whose learners were fortunate enough to be provided with books by the school.

### 5.1.6 **Workshops**

The success of the NCS depends on the training and support educators receive to implement the curriculum. The Department of Education promised teachers and other stakeholders that workshops were going to be conducted by qualified department officials for different learning areas. While the curriculum has been in place for more than four years, the teachers in this study showed that they have attended a maximum of two workshops for Grade 10. Miss Yonela is the only one who received three workshops.

All teachers agreed that the workshops they attended helped them improve teaching and understanding of the NCS. For example, Mrs Mayende benefited in understanding the use of a work schedule. Mr Shoba's benefit was a better understanding of assessment standards. Both Miss Yonela and Miss Dlomo said that they benefited in understanding how to teach transformation. The above responses showed that there are no regular workshops arranged for Grade 10 Mathematics teachers by the department while they regard them as important.

### 5.1.7 **Discussion of teachers' perceptions**

The above teachers' perceptions about the current Mathematics curriculum revealed some challenges rural school Mathematics teachers have in providing quality education to learners. The NCS policy document emphasises the value and importance of teaching Mathematics in context. It further suggests that "learning programme guidelines will assist teachers to plan and design quality learning, teaching and assessment" (DoE, 2003, p. 7). While teachers agreed they received NCS policy documents, the study revealed teachers are still book-dependent in planning work for the learners. Furthermore, teachers did not use contextualisation in their classrooms and the blame was in one instance shifted to learners' lack of understanding English. According to Boaler (1993), teaching Mathematics in context seems appropriate in the sense that it prepares learners for the mathematical requirements they would face in their everyday lives. This suggests that the teaching of Mathematics in the FET band should not be approached as a ready-made system, viewing teachers as the holders of mathematical knowledge and students as empty vessels waiting to be filled. This is what was learned from the teachers' teaching practices. They viewed themselves as the holders of required Mathematics knowledge in the classroom. Learners were not asked

questions forcing them to think about what was learned. Teachers asked questions that would require learners to recall what was taught by teachers from the previous lessons. It appears teachers are still challenged in teaching Mathematics that will develop skilled and knowledgeable learner who can contribute and benefit from the country's economy.

It is important to mention that the introduction of the current curriculum in the FET band in 2006 was aimed in bridging the gap between an abstract Mathematics curriculum and an informed Mathematics curriculum with the purpose of developing "skilled and knowledgeable citizens who can contribute to and from a growing economy, and a participatory democracy" (Brodie, 2010, p. 1). For this reason, new topics were introduced and others were phased out in the current Mathematics for Grades 10, 11, and 12. The study revealed some mixed feelings from teachers about the Grade 10 Mathematics curriculum. This suggests that there is still a need to support teachers in curriculum management and in the design of learners' tasks which are in line with the needs of the present Mathematics curriculum in the FET band.

The importance of in-service training for Grade 10 Mathematics teachers is also revealed in teachers' comments about the benefits they received from workshops they have attended. Such benefits teachers received from the workshops shed light on the challenges Mathematics teachers have before attending these workshops, and the need for having regular workshops. The teachers also revealed some misconceptions about what is expected in terms of preparation for teaching. Four of the teachers were observed teaching, without making use of lesson preparation. In their interview, it was revealed that they do not make use of it. This shows that teachers go to the class for teaching without doing the necessary planning. It also revealed that teachers are not getting support from the schools in monitoring their lesson preparations. Du Plessis et al. (2007) cautioned that teaching without lesson plans can result in unstructured lesson presentation with inappropriate communication, which was evident in the lesson presentations in this study. The teachers did not involve learners in the learning of Mathematics by determining learners' prior knowledge, assessing learners' level of understanding of what was taught, engaging learners in meaningful tasks and creating a conducive learning environment. Detailed lesson preparation would help teachers to present their lessons, reflecting detailed and sequenced teaching and assessment activities.



The implementation of the current Mathematics curriculum in Grade 10 still faces some challenges particularly in rural schools, as revealed by these teachers' poor knowledge and understanding of continuous assessment. The teachers still perceive assessment as an isolated classroom-based activity from teaching and learning. The results show that teachers are not familiar with the current curriculum policy documents as the current curriculum put forward the notion of assessment as an integral part of teaching and learning.

In order to ensure that the educational system is functioning effectively, it is important for teachers to be provided with the required support by the school management, Department of Education and parents of the learners at the school. Teachers are currently regarded as the main source of information and are in the forefront of implementing the curriculum. The study showed that while teachers claim to be getting support from their HODs, all four of them agreed that there are no support programmes in place for Grade 10 teachers. They get support only when they ask for help. Caroline (2005) criticises the lack of support of teachers, stating that it can result in traditional ways of teaching. The traditional teaching approach was criticised as failing to equip learners with the necessary skills and knowledge required for developing the country. It is therefore important for teachers to work in collaboration with all stake holders involved in education, including the SMT, parents and the DoE, for the successful implementation of the curriculum. In order to improve the quality of education, Yashau et al. (2005) argue that for effective implementation of any curriculum, teachers must be put in the forefront and be given all the necessary support they need.

It is necessary to conclude this aspect by highlighting the importance and value of accessing teaching resources by teachers. Although teachers had the perception that they lack resources, teachers have more than one textbook and the NCS policy documents to use for teaching, while their learners have textbooks to use for learning. Their schools have photocopying machines, which can be used in developing learners' hand-outs and worksheets. The teachers were also observed having other materials like Mathematics set squares for drawing. The teachers' lack of skills and knowledge in developing their own teaching materials was revealed in their comments about not

providing work sheets to learners, although they do have photocopying machines in their schools. Based on the minimal teaching resources teachers have, they should be able to minimise challenges with the NCS.

The NCS policy document sheds light on the importance of educators having the necessary skills and knowledge in developing their own materials for teaching and learning. In such cases, teachers can make use of the photocopying machine in developing worksheets for their learners but still lack the necessary skills and knowledge expected of them. Even though South Africa has better teaching resources when compared to other African countries, some rural schools in South Africa still have difficulty in accessing modern technology like computers in their schools (Roodt & Conradie, 2003). Such modern technology may bring about curricula based on real world problems that are expected by governmental education policy.

## 5.2 **WHAT IS THE NATURE OF TEACHERS' CLASSROOM PRACTICE?**

In answering the above question teachers were observed teaching Mathematics in their respective Grade 10 classes. According to the NCS, one of its main objectives is to “enable all learners to reach their maximum learning potential by setting the learning outcomes to be achieved by the end of the education process” (DoE, 2003, p. 8). Maximal learning depends on how much effort classroom teachers are prepared to apply in changing their classroom practices. It is for this reason that teachers were observed to see whether the following were being used during teaching practice or not. That is, “Making use of lesson preparation; constructivist teaching strategies; making use of available resources; making use of assessment as an integral part of teaching and learning” (Brodie, 2010, p. 43).

### 5.2.1 **Lesson preparation**

Teaching involves the structuring of learning activities that will enable the learners to gradually take control of their learning. It is therefore necessary for the teachers to have adequate lesson preparation reflecting all learning activities involved before going to the class. Observing whether teachers were using their lesson preparation for this study was important, as it was one of the requirements for the successful implementation of the NCS in the FET band.

The four teachers observed, taught without undertaking lesson preparations. While Mr Shoba and Miss Dlomo agreed that it is necessary to have lesson preparations, their teaching was based upon textbooks that they were using. The importance of lesson preparation is difficult to overlook because it reflects a detailed structure of teaching, learning and assessment activities (Du Plessis et al., 2007). It is for this reason that their lesson presentation was unstructured in terms of subject content and communication with learners. This was evident in Mrs Mayende's lesson, when she was observed revising analytic geometry with a single question paper at her desk. Learners did not have the opportunity to look at the question asked by the teacher. For all three teachers, their lesson presentation did not reflect a well-structured introduction and conclusion to the lesson. Teachers were actively talking, while learners were listening to the teachers.

#### 5.2.2 **Teaching strategies**

The present curriculum in the FET band requires teachers to adapt their teaching strategies to learners' needs and shortcomings (Nieman & Monyai, 2006). It is therefore necessary for teachers to provide learners with opportunities to learn by taking the trouble of assessing learners' prior knowledge with the purpose of identifying possible difficulties and learning experiences that learners may have. When Miss Dlomo, Mr Shoba and Miss Yonela were introducing their lessons, learners' prior knowledge about their topics was not identified. Miss Yonela introduced her lesson by continuing with what was taught during the previous lesson, while Miss Dlomo and Mr Shoba introduced their lessons by telling learners what they were going to learn. Mrs Mayende introduced her revision lesson by saying, "*let us do analytic geometry on the board*" and without wasting further time, she asked learners questions from the question paper.

None of the lessons included feedback on homework or class work, suggesting that they had not been given any work in the previous lessons. Another concern was the introduction of the lessons by the teachers. They just went into teaching the content without giving a relevant introduction or outline of what they were going to do and how it linked with other sections. It was further observed that teaching was content-based in all cases.

Learners were never given mathematical problems that were context-based. It was also observed that teachers often asked learners whether they understood or followed. Learners replied in turn by saying yes, or by giving no response. There was no attempt by the teachers to provide consolidation activities on the work that they taught in the class. Learners appeared to be passive, showing no interest in what was taught. For example, Mrs Mayende was observed constantly asking learners to keep quiet, and for the other three teachers, there were instances when the teacher asked a question and no response came from the learners. The four teachers were also observed not giving learners opportunities to discuss Mathematics problems amongst themselves. Learners were observed participating in lessons by answering only teachers' questions. In Miss Dlomo's lesson, the learners often answered by chanting the answers in groups.

Learners of the four teachers were also observed as having 2-quire exercise books on their desks, which were assumed to be Mathematics exercise books. Those exercise books were hardly used during the lesson for writing. Miss Yonela, Mr Shoba and Miss Dlomo gave their learners homework at the end of the lesson, while Mrs Mayende did not give her learners anything to do as homework. Mrs Mayende ended her lesson by saying, "*We will continue tomorrow, the time is finished.*" These words were said at the end of her Mathematics period, so learners were not given any opportunity to work on their own during the lesson. In fact none of the teachers provided learning opportunities for their learners in the form of consolidation or practice exercises.

### 5.2.3 **Making use of available resources**

For meaningful learning of Mathematics, Audet and Jordan (2005) stressed the importance of a skilful selection of appropriate instructional learning materials by teachers. According to Yashau and Wessels (2005), teaching resources include materials that are taken for granted like textbooks, blackboards, charts, worksheets, maps and models. Although the schools of the four teachers are in rural areas, they have electricity. The schools do have a photocopying machine, except for Mr Shoba. It is important to mention that while Mrs Mayende was revising using a question paper, learners were not provided with copies of the question paper. Miss Dlomo's learners were observed not having the books the teacher was using. Although the two teachers could have made copies for learners, this was not done.

Mrs Mayende's and Miss Dlomo's lessons were on analytical geometry, while Miss Dlomo's and Mr Shoba's lessons were on functions. Both topics required the teacher to have a T-square and set squares for drawing diagrams, but were not used even by Miss Dlomo and Miss Yonela, who came into the classroom with T-square. Teachers could have been models to their learners by showing them the importance of using such instruments when drawing diagrams. Miss Yonela and Miss Dlomo were observed drawing on the board without making use of a ruler. Mrs Mayende and Mr Shoba did not have these instruments.

The classrooms for these teachers did not have any Mathematics charts on the walls which could have been designed by the teachers or learners under their supervision. Mrs Mayende admitted that while she liked to have charts in her classroom, she did not know how to make them. Furthermore, it was only Miss Yonela's learners who were observed making use of textbooks. Mr Shoba and Miss Dlomo both used textbooks but their learners were not asked to refer to the books until the end of the lesson. It is important to mention that both these teachers admitted that their learners have textbooks.

#### 5.2.4 **Creation of a conducive learning environment**

Orton (1992) describes learning as an "active process, so concept formation is promoted by providing a suitable learning environment with which children can interact (p. 151). For this reason, it is necessary for the teacher to develop a teaching-learning environment that is not intimidating and negative to learners, because this can result in a very negative impact on the learning process. It was important to observe how innovative teachers were in creating a healthy learning environment in their classrooms. It is important to mention that of the four teachers that were observed, their Mathematics classrooms did not have any charts or posters on the walls and desks were arranged in a traditional setting in rows. This kind of arrangement is not conducive to teaching strategies such as discussions or group work. Furthermore, neither of the classrooms had a teacher's table or chair.

During the lesson observation, Miss Dlomo's classroom had old computers that were lying against one wall while Mrs Mayende's classroom had papers behind a falling door. During teaching it was observed that learners did not show much interest in the lessons, with some learners even falling asleep in class. One method that the teachers could have used was to ask learners questions about their previous lesson to create links. Such an introduction could have made learners talk about the problems they had encountered from the previous lesson. However the teachers did not seem to be perturbed by the learners' disinterest. Neither did they show any interest in creating an environment conducive to learning. The NCS visualizes a competent teacher, whose teaching encourages learners to discover learning for themselves through interaction with their environment (Du Plessis et al., 2007). This can be achieved by making the classroom more attractive with the use of charts, posters, models and group work in the classroom. None of this was observed in the four lesson observations.

#### 5.2.5 **Involvement of learners in a lesson**

For meaningful learning of Mathematics, teachers are expected to engage learners in tasks that will enable them to make sense of Mathematics in order to investigate, analyse, explain, and so forth. This is supported by Audet and Jordan (2005), saying "genuine mathematical learning occurs through active engagement in exploration, that gives students the opportunity to recognise how mathematical ideas connect through activities that promote reflection and communication" (p. 89). It is these ways that I looked for when I observed how teachers were involving their learners in the meaningful learning of Mathematics.

Mrs Mayende's lesson was on revision of analytic geometry. Miss Yonela's lesson was on co-ordinate geometry while Miss Dlomo's and Mr Shoba's lessons were on functions. None of the teachers used any additional resources or aids to make the lessons more meaningful. Some teaching aids could have been games to teach the concept of the Cartesian coordinate system, worksheets or supplementary activities based on functions.

While the NCS put mathematical reasoning firmly on the agenda, the lesson presentation of four teachers lacked the involvement of learners by not encouraging them to give reasons for the answers they were giving. Again, learners were not given the opportunity to discuss among themselves what they were learning. Furthermore, when the teachers asked questions during their lessons, it was observed that the answers for the questions required learners either to recall formula or recall mathematical algorithms. This was common across all four lesson presentations. It appeared that allowing learners to express their ideas in the classroom was not on the teachers' agenda. This could have lent itself to lateral thinking in both learners and teachers.

The teachers' teaching styles did not encourage learner involvement in their lessons in a way that enabled them to discuss and share their experiences about what was learned. Thus, their teaching styles are not in line with specifications of the current Mathematics curriculum, which encourages teaching and learning as participation in socially-situated practice. Communication in the classroom between learners and the teacher and among learners themselves, form an important component in teaching learners to think and reason mathematically (Brodie, 2010). Mrs Mayende, who claimed her lesson, was on revision, she spent the whole lesson asking questions from the question paper and learners either responded to the question or the teacher explained further in cases where learners could not answer the question. For the four teachers, none had tried rephrasing the learners' answers and helping the class to listen, nor asking for clarity. This could have encouraged learners to be more vocal about their learning because they would be getting support from their teachers.

#### 5.2.6 **Integrating assessment into teaching and learning**

The present Mathematics curriculum in the FET band regards assessment as a means of monitoring progress and measuring the value of learning as well as determining whether teaching and learning is successful in achieving intended learning outcomes. Assessment plays an important role in shaping teaching and learning. It is for this reason that Du Plessis et al. (2007) stress the importance of including assessment in teaching and learning. Such inclusion of assessment in teaching and learning seeks to monitor the progress of learning by the learners. The four teachers were therefore observed on how assessment was included in their teaching practice.

With the assessing of learners' prior knowledge, it was observed that both Mr Shoba and Miss Dlomo were teaching new topics to learners but very little was done in determining learners' prior knowledge. Both teachers introduced their lessons by asking learners questions related to functions in an un-innovative way of determining their level of understanding about the topic. Mr Shoba simply asked learners to give examples of functions while Miss Dlomo asked for the meaning of linear. Learners of both teachers did not respond to the questions. Mr Shoba without further probing simply turned and wrote the example of function on the chalkboard. Dlomo also simply gave the explanation of the word linear. It appeared that the two teachers did not plan in advance the questions that they were going to ask learners in order to determine their prior knowledge about the topic. Mrs Mayende and Miss Yonela did not waste time asking introductory questions about the topics they were teaching. Miss Yonela simply introduced her lesson by saying "*let us continue*". It appeared as if she continued from where she ended the previous lesson. It is important that teachers should have introduced their lessons by first assessing learners' levels of understanding about their topics which could have resulted in a more meaningful learning among learners.

As the lessons progressed for the four teachers it was also observed that there was no form of assessment that was planned in their lessons. None of the teachers gave learners hand outs for activities or wrote activities on the board. The only thing dominated their lessons was the question and answer method which is regarded as a traditional teaching method. The answers learners gave appeared to be the answers teachers were expecting. Teachers' questioning skills appeared to be less thought provoking which could have encouraged learners to present a variety of responses. This was evident across all four teachers' questioning styles

It was further observed that at the end of the lesson Mr Shoba, Miss Yonela and Miss Dlomo gave their learners homework which formed part of the assessment while Mrs Mayende did not give learners any form of home work to do. She ended her lesson by saying "*now the period is finished we are going to continue tomorrow with the questions*". Such closing comments showed that her lesson had no clear focus on what she intended to achieve from her revision.



### 5.2.7 Discussion of teachers' teaching practices

Among other things the study intends to explore are teachers' classroom practices. This is because the current Mathematics curriculum regards teachers as "key contributors to the transformation of education in South Africa" (DoE, 2003, p. 5). This shows how important it is to have Mathematics teachers in the FET band who are qualified, competent and dedicated in presenting lessons that "promote meaningful learning, worthwhile Mathematics tasks and encourage learners to explore their mathematical ideas" (Brodie, 2010, p. 73). It is therefore imperative for Mathematics teachers, regardless of the environment the school may be situated in, to deliver Mathematics that will promote such values. The empirical evidence revealed in this study about teachers' teaching practices showed that they lack knowledge and implementation skills of the current Mathematics curriculum in Grade 10. Teachers choose to adhere to traditional teaching methods. By traditional teaching methods in this study I refer to the teacher uses only a book when teaching; learners sit passively in rows on their desks collectively chorusing answers; providing learners with some activities at the end of the lesson; not practising what was done by the teacher during the lesson; and asking questions which do not allow learners an opportunity to explain or say what they understand.

The above teaching approach was observed in the four teachers who were observed teaching. Their teaching strategies have not encouraged learners to engage in making sense of Mathematics. Such an approach serve as an effective way of submerging the recommended teaching strategies required for the current curriculum in the FET band. The recommended constructive teaching approach of Mathematics must enable learners to:

Communicate appropriately by using descriptions in words, graphs, symbols, tables and diagrams; use mathematical process skills to identify, pose and solve problems creatively and critically; organise, interpret and manage authentic activities in substantial ways that demonstrate responsibility and sensitivity to personal and broader societal concerns; collaborate in teams and groups to enhance understanding; collect, analyse and organise quantitative data to evaluate and critique conclusions; and engage responsibly with quantitative arguments relating to local, national and global issues. (DoE, 2003, p. 10)

There appears to be a serious set of drawbacks in teaching meaningful Mathematics in these four schools. The manner in which teachers presented their lessons encourages rote learning. Lessons were full of habitual repetition and devoid of conceptual understanding. Teachers failed even to use the space they have in their classrooms to their advantage, by arranging desks into smaller groups. Brodie (2010) asserts that putting learners into groups without mediation from the teacher does not provide enough support for developing a deeper understanding of Mathematics. Such concern is noted for this study.

Dossey et al. (2002) argue that the conceptions of Mathematics held by teachers significantly influence how they teach it. This was observed when one teacher, instead of providing learners with question papers that she was using for revision, expected learners to listen passively to the teacher reading the questions from the question paper. This happened in the school with a photocopying machine, which could have been used in making questions available to learners. This shows that teachers not only lack skills in teaching the current Mathematics curriculum in Grade 10, but they also lack organisational skills.

The poor understanding on the part of teachers regarding the contextualisation of Mathematics and by making assessment an integral part of teaching and learning leads to a failure in properly and effectively implementing the curriculum. Teachers agreed in various ways that they are making use of contexts in their teaching of Mathematics. It is necessary for teachers to contextualise Mathematics because it is one of the purposes of current Mathematics practices as outlined in the NCS policy document. The NCS policy document emphasises the type of Mathematics with “establishment of proper connections between Mathematics as a discipline and the application of Mathematics in a real world context” (DoE, 2003, p. 50). Furthermore, all four teachers did not understand how continuous assessment is used in the current curriculum. They understand continuous assessment as summative, with learners assessed for the purpose of promotion. The current curriculum in the FET band makes it difficult to draw a line between teaching and learning on the one hand and assessment on the other. Such difficulties are based on the notion of assessment being intertwined in teaching and learning. Teachers appear not to know the value and use of assessment while teaching. Furthermore, they do not even know the purpose of continuous assessment in

Mathematics. From the results of the study it is clear that it is necessary for teachers to be equipped with skills of assessing learners in their teaching as it is important in the current Mathematics curriculum for the FET band. It is therefore important for teachers to integrate assessment in their teaching as it serves in measuring the degree of teaching and learning taking place in a classroom situation.

### 5.3 WHAT ARE SOME CHALLENGES FACED BY TEACHERS IN IMPLEMENTING THE NCS?

#### 5.3.1 Discussion of teachers' challenges

This question was aimed at identifying challenges that teachers might face in implementing the curriculum. The study revealed some challenges that teachers have. These were challenges that were expressed by teachers during interviews and some were developed during their lesson presentations. Challenges that were developed from teachers during the interview are as follows:

- *Challenges in teaching new topics and assessing other assessment tasks such as project.*
- *Challenges in developing worksheets for learners.*
- *Having difficulty in contextualisation of current Mathematics content.*
- *Challenges in teaching in an outcomes based approach.*

Challenges developed during their lesson presentation are also as follows:

- *Challenges in planning for their lessons.*
- *Challenges in mediating a meaningful learning.*
- *Challenges in utilizing available teaching resources.*
- *Challenges to create a conducive learning environment.*

The above challenges revealed teachers' shortcomings in implementing the current Mathematics curriculum as outlined in the learning programme guidelines for the FET band. It is understood that the traditional role of the educator has changed a great deal in recent years. An Outcomes-based teaching approach is currently used for the current curriculum. According to Nieman and Monyai (2006), for effective lesson presentation, the educators are expected to match a lesson plan to a particular teaching strategy. Teaching without making use of lesson plans, shows that teachers simply look at the book when deciding what to teach. This was evident from two of the teachers'

responses about the use of lesson plans. Their responses devalued the use of the lesson plans when they said, *“I do not carry lesson plan to the class, and I just plan and know by the time of going to the class what to teach.”* It is for this reason that the recommended teaching strategy was not observed from their teaching, which included a higher level of questioning, meaningful problem tasks and the involvement of learners in a meaningful way. Such teaching strategies are not fixed but can be adjusted in accordance with the outcomes of the particular lesson.

It is important to mention that the current Mathematics curriculum for Grade 10 introduced new topics, which the teachers have not done in the years of their schooling. The study revealed that teachers are still challenged in understanding these topics and the new ways of assessment. Clark and Linder (2006) point out that for any curriculum transformation there should be an acceptance that it possesses a range of challenges to teachers with regard to the content knowledge, teaching approach and methods of assessment. While the above statement is important, the OBE teaching approach requires a teacher with a sound knowledge of the subject (Nieman & Monyai, 2006). Furthermore, the curriculum has been in place for more than four years, which means that some of the implementation problems have been resolved. The extent of the lack of knowledge by teachers is indeed a setback.

Observing learners sitting passively in their desks; teachers teaching only from the textbook without lesson preparation; and without providing learners with worksheets when there are means of accessing photocopying machines is totally unacceptable for the current curriculum. Their teaching strategies were unsatisfactory in helping learners to make sense of Mathematics. Boaler (1993) regards such teaching strategies as “cold, detached and remote form of knowledge making” (p. 36). It is important for teachers not to take current teaching practices for granted because it can result in falling back on traditional practices. Such traditional teaching practice encourages memorisation of formulas and algorithms, without any link to real life situation and this is a type of teaching that these teachers are practicing whilst ignoring much of Outcomes-Based Education. It is of great concern that in spite of the current curriculum, which has been in place for more than four years, the reformed teacher education remains unchanged. This shows that in some schools in remote areas, teachers are implementing the transformed curriculum with the anachronistic ways of

thinking. This is in contrast with one of the aims of the current curriculum which is to provide equal educational opportunities for all people.

Four of the teachers' lesson presentations were focused on content, with the emphasis on memorising certain mathematical concepts. It is important to mention that the study is informed by constructivist theory, based on the notion of how teachers are expected to mediate their teaching to learners. In a constructivist view, the learning of Mathematics should be based and built on everyday life world experiences, whereby each learner constructs his or her own internal frameworks for mathematical thinking and conceptual understanding made through social interaction (Parker, 1994). It is therefore important for Mathematics teachers to engage learners in context-based tasks that are meaningful to the learning of Mathematics. While contextualisation is important in Mathematics, it appears the selection of actual classroom practice is still constrained by teachers' lack of skills in choosing appropriate tasks that will be sufficient in supporting learning for the learners.

One challenge revealed by the study but not acknowledged by the teachers, is the attitudes of the teachers in not doing things on their own. The teachers expressed opinions about not having enough resources, and also mentioned their limitations with respect to not knowing how to develop worksheets or posters. This is, however, not a specialised skill. Miss Yonela said she did not see any reason for networking with other teachers. Not wanting to share ideas and learn from others is a constraint to teaching. Such an attitude may be linked to her interest in Physical Science over Mathematics. Another issue of concern is revealed by Miss Dlomo's attitude. She had only eight learners in her class, all of them had textbooks, calculators and mathematical instruments provided by the schools. Yet she complained that her learners had difficulty in accessing the internet. She also said that she could not do investigations because of a lack of resources. Even the well-resourced school will not develop high-achieving learners if the teachers are not motivated. A professional attitudes study carried out by Grayson and Biedenbach (2001) on 1200 South African Mathematics and Science teachers revealed that various unprofessional attitudes were widespread, such as coming late to the class, not preparing for class, and being reluctant to do more than the bare minimum. The teachers in this sample have also displayed no willingness to do more than the bare minimum with respect to planning effective lessons, creating learning

environments conducive to learning, designing teaching activities, or using assessment for learning.

Another constraining influence on the teachers' professional development was the lack of support from their HODs. All the teachers said that their HODs were available should they have a problem and need to approach them. Although Miss Dlomo seemed to have received some help from her HOD, she said the HOD was too busy to help her more regularly. The HOD's task is to monitor and support teachers for whom they are responsible (Mbhele, 2008). Yet in these schools, the support offered was minimal, with none of the teachers being able to explain what kinds of meetings they had and what they learnt from the meetings. Miss Yonela said that she did not like projects so she replaced it with a test, without seeing the need to ask her HOD's permission. This demonstrates a lack of oversight by the HOD.

#### 5.4. RECOMMENDATIONS

##### 5.4.1 Recommendations to teachers

- Teachers need to familiarise themselves with current NCS policy documents and learning programmes by making use of them when planning for the lesson.
- The study revealed that teachers do not make use of lesson preparation when going for teaching. It is important that teachers do their lesson plan in order to know before going to the class how much time to spent in introducing the lesson and time to spent doing class activities.
- Teachers should work with other Grade 10 teachers of their neighbouring schools with the aim of developing appropriate preparatory materials with tasks which enables their learners to make sense of Mathematics, that give them opportunities to investigate, analyse, explain, conjecture and justify their thinking.
- Teachers need to seek new ways of teaching that will present a variety of responses from learners. As stated in the literature review, this can be done by considering the social and backgrounds in which learners come from in order to mediate meaningful learning. This suggests that the teacher can develop a wide

variety of topic related mathematics problems by considering the outside contextual elements, culture and lifestyle.

- Teachers should work towards helping learners develop a positive attitude to Mathematics by engaging them in critical thinking. Learners can be engaged in critical thinking by choosing problems that can be solved in a variety of ways and by so doing teachers can work towards helping learners develop a positive attitude about Mathematics.
- Teachers need to have a sound knowledge of dealing with learning barriers. One of the learning barriers revealed by the study is the problem of understanding English by learners which is the medium of instruction for Mathematics. Learners can be introduced to various activities with the help of English teacher (s) in the school that will help them practice writing and speaking English.
- Teachers must make use of available teaching resources from their schools that can be used or developed as supplements to textbook like charts and work sheets.

#### 5.4.2 **Recommendations to schools**

- The schools should organise regular school-based workshops to support teachers in a current teaching approaches and in assessment strategies. Among other things the school can do is to invite subject specialists of different learning fields to workshop teachers.
- HODs should have programmes to monitor and develop teachers with regard to teaching and assessing learners in Mathematics as this is the main responsibility of the HODs to monitor and manage the curriculum implementation in their schools.
- The school should involve teachers when ordering Learner Teacher Support Material (LTSM).
- The school should have effective strategies to attract parents and other stakeholders of the school with the aim of improving the quality of teaching and learning within the school.

#### 5.4.3 **Recommendations to the department of education**

- The Department of Education must conduct Grade 10 Mathematics workshops every year instead of focusing on only grade 12 teachers.
- It should devise a plan of attracting more Mathematics teachers in rural schools with the aim of increasing the number of Mathematics teachers with required skills and knowledge of teaching the current mathematics in FET band.
- It should provide rural schools in particular with sufficient resources and see to it that Mathematics teachers access new technology, regardless of the place the school is situated in.
- Roads should be upgraded leading to these schools and more classrooms must be built in rural schools. It was very difficult to reach the school because of the muddy conditions of the road leading to school. One of the classes that did the observation in, was a room which is the size of an office. This does not arouse interest to teach and learn especially on hot and rainy days.
- Subject advisors must visit rural schools on a regular basis, with the aim of developing and supporting teachers in curriculum implementation.

#### 5.4.4 **Recommendations for further research**

The research was conducted in four schools in one rural district. The study showed that schools that were initially selected were not used in this study, based on the fact that the geographical situation of some of these schools made them difficult to visit. Thus, the findings of this study can neither be generalised to other schools under the same region nor to the entire population of South African Mathematics teachers for Grade 10. However, this study has shed light on the need for further research on the following:

- Exploring teachers' teaching strategies and the impact they have upon learning.
- Exploring the role played by HODs in helping teachers and the impact they have in curriculum implementation.
- Finding ways that can help teachers make a shift from seeing themselves as victims to seeing themselves as agents of change in their classroom.
- Identifying strategies that help teachers use their time in class effectively.



## 5.5 CONCLUSION

The current Mathematics curriculum in the FET band was developed with the aim of promoting equity, economic competitiveness and quality learning for all learners (DoE, 2003). This suggests that teachers have to change their teaching practices to new ways of teaching. The current teaching practices require teachers to demonstrate skillful methods in facilitating meaningful learning.

Apart from the problems and challenges some rural schools face in implementing the current curriculum as stated in the NCS policy documents, the same performance is expected of them as that of the well-established schools. Mathematics in such rural schools is either taught by unqualified teachers, or professionally qualified teachers not qualified to teach Mathematics. These teachers end up teaching Mathematics based on the knowledge of Mathematics they acquired in their own years of schooling. This means that some learners in Grade 10 are taught Mathematics by a teacher with grade 12 level of knowledge.

The research showed that there has been a great discussion in recent years about the NCS based on the challenges negatively impacting the quality of education. In some schools, particularly in rural areas, teachers are still struggling to take up reform practices in substantive ways and have remained unchanged from the previous classroom practices envisaged as a teacher-centred approach. It appears that teachers still engage with learners' ideas in superficial ways, compromising curriculum transformation.

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APPENDIX A

**QUESTIONNAIRE FOR GRADE 10 MATHEMATICS TEACHER**

**PLEASE FILL IN THE INFORMATION BELOW**

1. Name of the school.....
2. Name of the teacher.....
3. Number of years teaching experience.....
4. Number of years teaching Grade 10.....

**PLEASE RESPOND TO THE FOLLOWING QUESTIONS BY PUTTING A CROSS INSIDE THE SQUARE NEXT TO EITHER YES OR NO WHERE POSSIBLE FURTHER EXPLAIN YOUR ANSWER**

8. Does the school have Mathematics and Science Head of Department?

YES	<input type="checkbox"/>
NO	<input type="checkbox"/>

If no who monitors the Department? -----

9. Do you have the following policy documents:

9.1 NCS Mathematics Curriculum Statement?

YES	<input type="checkbox"/>
NO	<input type="checkbox"/>

9.2 Mathematics assessment guidelines?

YES	<input type="checkbox"/>
NO	<input type="checkbox"/>

If you do not have one of them or both What do you have? Explain-----

-----

-----

-----

-----



10. Did you attend any Mathematics FET Phase Workshop?

YES	
NO	

List any benefits you have obtained by attending that workshop?

-----  
 -----  
 -----  
 -----

11. If YES:

Did you receive any materials or hand-outs which you are currently using for teaching?

YES	
NO	

Explain how often you have used materials?-----  
 -----  
 -----  
 -----

12. Do you have sufficient resources for Grade 10 Mathematics?

YES	
NO	

If No: Explain the challenges you have of not having sufficient resources

-----  
 -----  
 -----

13. Do you feel comfortable in teaching all topics covered in Grade 10 Mathematics curriculum?

YES	
NO	

Explain what makes you successful or challenged in teaching new topics-----  
 -----  
 -----  
 -----

14. Do you have work Programme or year plan

YES	
NO	

14.1 If no, Explain -----

14.2 If yes, explain how you manage your year plan? -----

-----

**THE FOLLOWING QUESTIONS HAVE MULTIPLE CHOICE ANSWERS. PLEASE RESPOND BY CIRCLING THE LETTER NEXT TO THE ANSWER YOU THINK IS MOST APPROPRIATE**

- 15 If you responded by yes in question 12 say how can you rate the Mathematics resources in your school?  
 a. Very useful  
 b. Useful  
 c. Less useful  
 d. Not useful
16. Which method you use most when assessing learners' work?  
 a. Ticks  
 b. Levels  
 c. Both a and b  
 d. Do not know  
 e. Other (please specify) -----
17. How is the evidence of learner achievement for CASS kept?  
 a. Kept in portfolio  
 b. Kept in exercise books  
 c. Not kept  
 d. Other (please specify) -----
18. How can you rate the Mathematics content for Grade 10?  
 a. Very high to the level of Grade 10  
 b. At the level of Grade 10  
 c. Below level of Grade 10  
 d. I am not sure  
 e. I do not know

19. If there is anything you would like to add or comment about it regarding Grade 10 Mathematics curriculum, please briefly explain -----  
 -----  
 -----  
 -----  
 -----  
 -----

---

THANK YOU FOR YOUR TIME IN COMPLETING THIS QUESTIONNAIRE



2.2 Assessment standards	Yes	No
2.3 Resource/ Tools	Yes	No
2.4 Learner activity	Yes	No
2.5 Teacher's activity	Yes	No
2.6 Assessment type	Yes	No
2.7 Expanded opportunities/ special needs	Yes	No
2.7 Enrichment	Yes	No
2.8 Teacher reflection	Yes	No
2.9 Worked out examples	Yes	No
2.10 Solutions for activities	yes	No
2.11 Teaching materials like		
(a) Books	Yes	No
(b) Charts	Yes	No
(c) Calculator	Yes	No
(d) Other .....		

### **3. LESSON TOPIC AND PURPOSE**

What appears to be the main purpose of the lesson? (Cross one or more):

- a) Learning a new topic/ procedure.
- b) Practicing/ revising work previously covered
- c) Learning a new procedure/ topic
- d) Applying learnt concepts/ skills to a practical situation.
- e) Other .....

Comment.....  
 .....

#### 4. TEACHING STRATEGIES

Does the teacher keep a lesson register?	Yes	No
Does the teacher introduce lesson by identifying learner's prior knowledge or experience?	Yes	No
Does the teacher use a book when teaching?	Yes	No
Does the teacher uses lesson preparation when teaching?	Yes	No
Does the teacher do talking to the whole class without interaction with learners?	Yes	No
Does the teacher allow learners to ask questions?	Yes	No
How does the teacher respond to the learner's questions? .....		
Does the teacher identify learners that need special attention?	Yes	No
How does the teacher respond to these learners?.....		
Does the teacher give learners opportunity to reflect on the lesson?	Yes	No
Is the reflection (i) Verbal?	Yes	No
(ii) Written form?	Yes	No

#### 5. ACTIVITIES FOR THE LEARNERS

5.1 Does the teacher refer learners to the text books?	Yes	No
5.2 Does the teacher use worksheets?	yes	No
5.3 Does the teacher write activities on the chalk board?	Yes	No
5.4 Are instructions clear and understandable by most of the learners?	Yes	No
5.5 Are the activities doable by most of the learners?	Yes	No
5.6 Are learners doing activities in?		
5.6.1 Pairs	Yes	No

5.6.2 Groups	Yes	No
5.6.3 Their own	Yes	No
5.7 Do learners appear to have interest in doing activities?	Yes	No

## **6. CONTEXT**

6.1 Does the teacher use any context?	Yes	No
6.2 Is the context relevant to learners?	Yes	No
6.3 Is the context relevant to the content?	Yes	No
6.4 Do learners appear to have acquired a skill of applying content knowledge to real life situation?	Yes	No

6.5 Comments.....

.....  
.....

## **7. CLASSROOM MATERIALS AND INSTRUCTIONAL RESOURCES**

7.1 Do learners have text-books?	Yes	No
7.2 If not what learning materials they have? .....		
7.3 If yes do they use them during 7.3.1 teaching?	Yes	No
7.3.2 activities?	Yes	No
7.3.3 other .....		
7.4 Do learners keep their written work in (i) Exercise Books	Yes	No
(ii) Files	Yes	No
7.5 Do all learners have scientific calculators?	Yes	No
7.6 If some learners do not have calculators, how does the teacher respond to the		

learners? .....

7.7 Does the teacher have teaching materials? Yes No

7.8 What teaching materials are available? .....

7.9 How often does the teacher use them? .....

## 8. MEDIUM OF INSTRUCTION

8.1 Does the teacher use English as the medium of instruction? Yes No

8.2 How often does the teacher do code switching? .....

8.3 What language is used in:

8.3.1 Learner – teacher interaction? .....

8.3.1 Learner- Learner interaction? .....

## 9. ASSESSMENT

1. Does the teacher :

(a) Have assessment policy? Yes No

(b) Use different strategies for assessment? Yes No

(c) Provide feedback on any previous work handed  
in or done in previous lesson? Yes No

(d) Check on learners class work? Yes No

(e) Correct class work during lesson Yes No

(f) Collect work to mark Yes No

(g) Provide homework? Yes No

(h) Check homework? Yes No

(i) Have assessment records? Yes No

2. Where is learner's assessment task recorded? .....

3. Are the assessment tasks in line with assessment guidelines?                      Yes    No

4. Are the learners informed about the assessment criteria that will be                      Yes    No

5. Does the teacher appear to have assessment plan?                      Yes    No

6. Comments.....  
.....  
.....  
.....



## APPENDIX C

## INTERVIEW QUESTIONS

1. COMMUNITY SURROUNDING THE SCHOOL

*How do you feel about the community surrounding the school with regard to the following?*

- 1.1 Considering their children's' education as important. Why?
- 1.2 By making input in helping their children's' with school work.
- 1.3 In buying learning materials for their children's' if they are asked to do so.

2. INVOLVEMENT OF SCHOOL IN CURRICULUM IMPLEMENTATION

- 2.1 How do you feel about the involvement of parents by the school in curriculum planning?
- 2.2 How often do you meet with your Mathematics HOD discussing Mathematics issues?
- 2.3 What Mathematics learning materials the school has provided you with which you are currently using?
- 2.4 What is your feeling about the school controlling and monitoring of your progress in teaching Mathematics?
- 2.5 Do you get any support from your HOD which is helpful in managing Grade10 Mathematics?
  - 2.5.1 If YES. What type of support you receive?
  - 2.5.2 If NO. What is your feeling for not getting the support?
- 2.6 Is there any criteria you are using as school in selecting learners who are supposed to do Mathematics in Grade 10?
  - 2.6.1 If YES. What criterion is used?
  - 2.6.2 Is it helpful to learners and teachers?
  - 2.6.3 If no. How do learners choose doing Mathematics in Grade 10?

2.7 You have taught Grade 10 Mathematics for more than a year. How many workshops have you attended?

2.8 What benefits have you received from the workshops?

### 3. CLASSROOM ENVIRONMENT

2.6 What are your likes and dislikes about the classroom learners use during your Mathematics period and why?

2.7 One of the things that make classroom a conducive environment for learning are charts or posters on the walls. How do you feel about that?

2.8 What would you like to have in your Mathematics classroom? Why?

### 4. LESSON PREPARATION

4.1 When preparing for your lesson what materials or resources you use?

4.2 Which document do you use as a guide for lesson preparation?

If NO. What do you use and why?

4.3 What headings you find useful in organising your lesson plan?

4.4 How do you feel about the necessity of using lesson plan when teaching? Why?

### 5. TEACHING STRATEGIES

5.1 What is your feeling about keeping a lesson register for your Grade 10 Mathematics class?

5.2 What challenges or successes you have in using worksheets?

5.3 How often do you use worksheets when teaching?

5.4 What strategies or methods do you use involving learners in a lesson?

5.5 How do you feel about learners responding in group when question is asked to the class?

5.6 How do you encourage learners to ask questions during lesson?

5.7 How do you feel about group work?

5.8 How often do you use it?

5.9 Which language do you prefer when teaching and why?

5.10 What is your feeling about code switching when teaching?

5.11 Which book(s) you use for home work? Why?

5.12 How often do you assign home work to learners?

5.13 What successes or challenges you have in teaching new Mathematics topics?

## 6. CONTEXTUALISING THE CIN10T

6.1 In nowadays there are great emphases in modeling Mathematics?

What do you feel about that?

6.2 Have you tried setting examples like that?

6.2.1 If YES. What challenges or successes you have in setting such questions?

6.2.2 If NO. Why you have not tried such examples?

## 7. RESOURCES IN THE SCHOOL

7.1 Do all learners have sufficient Mathematics resources you need?

7.1.1 If YES. What resources learners have?

7.1.2 If NO. Which resources you would like your Mathematics learners to have?

7.2 Do all learners have scientific calculators?

7.2.1 If YES. How do you make all learners have scientific calculators?

7.2.2 If NO. How do you feel teaching learners without calculators?

7.3 What teaching materials you use for teaching?

7.4 Why is it important in using teaching materials you have?

7.5 What are advantages and disadvantages of teaching Grade10 Mathematics in this school with regard to?

7.5.1 Accessing and using of teaching and learning resources?

7.5.2 Networking with other Grade 10 Mathematics teachers?

7.5.3 Support from school management?

## 8. ASSESSMENTS

8.1 What is your understanding of continuous assessment?

8.2 How do you feel about assessing learners continuously in Mathematics?

8.3 There are prescribed assessment tasks that need to be done each term. How do you feel about these assessment tasks?

8.4 Which assessment task you prefer most? Why?

8.5 Which assessment criteria do you prefer to use when assessing learners' work?

8.6 What materials you use when setting learners' assessment tasks?

8.7 How do you feel about learners having assessment portfolio?

8.8 How often have you used learners' assessment portfolio?

8.9 What challenges or success you have in:

8.9.1 Keeping learners' assessment records?

8.9.2 Following the required assessment program

8.9.3 Developing learners' mathematical knowledge, skills and values as one of the requirements for continuous assessment?

8.10 What do you feel about the Mathematics results of your school? Why?

9. In closing what can you say about the successes and challenges with regards to the implementation of the new Mathematics curriculum in Grade

## APPENDIX D

**INTERVIEW WITH MISS MAYENDE****COMMUNITY SURROUNDING THE SCHOOL**

**Q:** How do you feel about the community surrounding the school with regard to the following?

**Considering their children's education as important. Why?**

**A:** They consider it is not important to them reason if you give a learner a work like homework they do not do that no parent questions his or her child.

**By making input in helping their children with school work.**

**A:** They do not have at all.

**In buying learning materials for their children if they are asked to do so.**

**A:** Some of them they do like 2-quire exercise books for Mathematics some they don't.

**INVOLVEMENT OF SCHOOL IN CURRICULUM IMPLEMENTATION**

**Q:** How do you feel about the involvement of parents by the school in curriculum planning?

**A:** I feel e.....e...h they involve them because of the SGB. For streams and other learning areas they don't.

**Q:** How often do you meet with your HOD discussing Mathematics issues?

**A:** All the time when I got problem. We do not write down.

**Q:** What Mathematics learning materials the school has provided you with which you are currently using?

**A:** Yes there are text-books, student guide.

**Q:** What is your feeling about the school controlling and monitoring of your progress in teaching Mathematics?

**A:** I feel good controlling properly for example like controlling file, like IQMS.

**Q:** Do you get any support from your HOD which is helpful in managing Grade 10 Mathematics?

**A:** Yes I do like team teaching.

**Q:** Is there any criteria you are using as a school in selecting learners who are suppose to do Mathematics in Grade 10?

**A:** No, if the learner feels I can do Mathematics they can even if there is no ability in doing it.

**Q:** You have taught Grade 10 mathematic for more than a year. How many workshops have you attended?

**A:** NCS workshops? More than two by the subject advisor

**Q:** What benefits have you received from the Workshops?

**A:** Yes I did like the first time I did not know how to introduce number patterns now I benefit how to teach them, how to create formulas.

**Q:** What type of documents you received from the workshop?

**A:** NCS documents, time table for examination.

### **CLASSROOM ENVIROMENT**

**Q:** What are your likes and dislikes about the classroom learners use during your Mathematics period?

**A:** I like chalkboard is green and clear to the learners.

**Q:** One of the things that make classroom conducive environment for learning are charts or posters on the walls. How do you feel about that?

**A:** I feel good but I do not know how to do them, I like them.

**Q:** What would you like to have in your Mathematics classroom? Why?

**A:** If it can be clean, have tiles, board using mark pen, fan not broken window.

## LESSON PREPARATION

- Q:** When preparing for your lesson what materials or resources you use?
- A:** I use NCS document where I can find e .....e.....h learning outcomes; assessment standards; work schedule where I will find topic; text-book the example of that topic; how to introduce it; the guide I use the guide for more examples or text-book for exercises; chalkboard and duster.
- Q:** Which document do you use as a guide for lesson preparation?
- A:** Yes there is a guide, NCS document.
- Q:** What headings you find useful in organizing your lesson plan?
- A:** Yes, teacher's activity and learner activity. They are more useful.
- Q:** How do you feel about the necessity of using lesson plan when teaching? Why?
- A:** It is helpful but when you are teaching there is no need of that. I do not use it when I am teaching I just plan and then I know what I have planned.
- Q:** Do you mean there is no need of lesson plan when going to the classroom?
- A:** Yes, I leave it in the staff room.

## TEACHING STRATEGIES

- Q:** What is your feeling about keeping a lesson register for your Grade 10 Mathematics class?
- A:** It is not important because you can sign even if you did not go to the class. I do not see the point.
- Q:** What challenges or successes you have in using worksheets?
- A:** I have tried but is wasting the time.
- Q:** Why?
- A:** For example it needs you to touch some books. You need to go to number of books.

**Q:** Where do you get activities for your learners?

**A:** From the text book.

**Q:** How do you involve learners in a lesson?

**A:** I think is the questioning method. I just question, they respond to the questions, I guide them to the correct answer if they do not.

**Q:** How do you feel when asking the question and learners respond in groups?

**A:** I feel bad about that I even discipline them.

**Q:** Why is it bad?

**A:** It is bad for the learner that is academic challenged because the learner loses.

**Q:** How do you encourage learners ask questions during lesson?

**A:** To me? Yes I do. (Kept quiet for long time before responding)

**Q:** How?

**A:** I give them class work or homework and then go group by group questioning them their problems and then questioning back and then I answer.

**Q:** How do you feel about the group work?

**A:** Sometimes the group work is not good because especially when assessing them for recording purpose because they copy from one another and do all that but in the other side it is important it is right because the other one is taught better by other learners

**Q:** How often do you use it?

**A:** I use it but not always.

**Q:** Which language do you prefer when teaching and why?

**A:** I use to teach in English because questions come in English.

**Q:** How do you feel about code switching when teaching?



**A:** It is right doing that because other learners do not understand English properly.

**Q:** Which book(s) you use for home work? Why?

**A:** I use a book classroom Mathematics sometimes study and master. In study and master questions are clear; they are straight to the point.

**Q:** How often do you assign home work to learners?

**A:** Almost every day.

**Q:** What successes or challenges you have in teaching new Mathematics topics?

**A:** Yes there are topics which are challenging me like linear programming; transformation; areas and volumes but I am good in number patterns although they are new topics.

### **CONTEXTUALISING THE CONTENT**

**Q:** In nowadays there are great emphases in modeling Mathematics.

What do you feel about that?

**A:** E...ish I have never tried that.

**Q:** Did you know about that?

**A:** I did not know about that

**Q:** What type of examples you give your learners if you have never tried contextualized mathematical problems?

**A:** I use to give them practical examples for example parallel lines it's a rail way

**Q:** Have you ever tried giving learners questions like that?

**A:** No I give them examples.

**Q:** What type of problems you normally give them?

**A:** They are content-base.

**Q:** Can you give me the reason why you are using these content-based problems?

**A:** I just pick them from the text book. It is because I am using text book.

### **RESOUECES IN SCHOOL**

**Q:** Do learners have sufficient mathematic resources you need? If yes which resources do they have?

**A:** They do not have.

**Q:** Which resources you would like to have?

**A:** For example calculators, they do not have calculators, they do not have instruments for measurements and others they do not have enough exercises like 2-quire.

**Q:** How do you feel teaching learners without calculators?

**A:** I feel very bad because they are like visitors to the class they will not understand Mathematics.

**Q:** Are there any materials you are using for teaching?

**A:** Ruler, chalk and duster, exercises and books.

**Q:** Do you feel that it is important using the materials you are using?

**A:** It is not important. It is not important using chalk and duster for example if we can have OHP or computers where they will see the shapes of the graphs.

**Q:** What are advantages and disadvantages of teaching Grade 10 Mathematics in this school with regard to the following?

#### **7.1 Accessing and using of teaching and learning resources?**

**A:** E...ey there are disadvantages like I have mentioned there are no HOP, there is no computer where they will the shapes making equal spaces for graphs. They fail to make equal squares. It is easy on the computer. That is the disadvantage of this school.

## 7.2 Networking with other Grade 10 Mathematics teachers?

**A:** Yes I do have an advantage in networking with our neighboring schools.

## 7.3 Support from school management?

**A:** Yes there is the support.

## ASSESSMENT

**Q:** What is your understanding of continuous assessment?

**A:** E....ey it is good continuous assessment it gives a picture about the performance of the learner, there are no wonders at the end of the year.

**Q:** How do you feel about assessing learners continuously in Mathematics?

**A:** Ya it is good, if it is something that need practice they have to practice all the time it is good to assess them continuously.

**Q:** There are prescribed assessment tasks that need to be done each term. How do you feel about these assessment tasks?

**A:** something I did n't know how we call it? Tutorial I did n't know what that mean but once you know there is no problem.

**Q:** Which assessment task you prefer most? Why?

**A:** Assignment because a learner will go to another learner and learn even if he has not understood at the beginning.

**Q:** Do n't you think that they will copy from one another?

**A:** Yes I do

**Q:** Is there any strategy you are using in preventing that?

**A:** I have no strategy but I use to discipline them.

**Q:** Which assessment criteria do you prefer to use when assessing learners' work?

**A:** Is analytic that one in Mathematics I use step by step.

**Q:** What materials you use when setting learners assessment tasks?

**A:** Text books.

**Q:** How do you feel about learners having assessment portfolio?

**A:** Hey is not right. It needs a lot of time, papers get lost, If the learner did n't get mark he/she do not put it in the portfolio, It ends up not right.

**Q:** Have you ever used them?

**A:** Yes.

**Q:** How often have you used learners' portfolio?

**A:** Last year only.

**Q:** What challenges or successes you have keeping learners' assessment records?

**A:** I am successful because this is evidence when learner leaves the school which shows I have gone so far.

**Q:** In following the required assessment program?

**Q:** In developing learners' mathematical knowledge, skills and values as one of the requirements for continuous assessment?

**A:** Yes there are problems, some they do not have the ability to do maths it is not easy to develop them.

**Q:** Can you summarise for me what you see as the main purpose of assessment?

**A:** The main purpose is to promote the learner to another level. Is to determine whether learners understand learning area and the topic.

**A:** What do you feel about the Mathematics results of your school? Why/?

**A:** They are not good because the learners we are teaching are not serious, if they are asked to come to school they do not come, they are not good.

**Q:** What can you say about the successes and challenges with regard to the implementation of the new Mathematics curriculum in Grade 10?

**A:** Yes there is challenge like there are no resources in our school, this curriculum needs more they will do resources. If we can have calculators and computers where research.

## **INTERVIEW WITH Mr SHOBA**

### **COMMUNITY SURROUNDING THE SCHOOL**

**Q:** How do you feel about the community surrounding the school with regard to the following?

#### **Considering their children's education as important?**

**A:** I think some do consider and some do not consider their children's education as important. The reason I am saying this is because one parent has come to our school to find out how her child is performing with his work. The parent did this because the child failed to show her the school work when she asked her to do so although there are few parents who do so.

#### **By making input in helping their children with school work?**

**A:** What normally happen is that the few parents who work far from their homes are the ones when they are at home help their children and those who stay with their children they are illiterate.

#### **In buying learning materials for their children if they asked to do so?**

**A:** That does not happen in many learners because the majority of learners come from poor families.

### **INVOLVEMENT OF SCHOOL IN CURRICULUM PLANNING**

**Q:** How do you feel about the involvement of parents by the school in curriculum planning?

**A:** In some aspects parents are involved but not for curriculum planning.

**Q:** How often do you meet with your HOD discussing Mathematics issues?

- A:** Twice a term or at any time when I have a problem.
- Q:** What Mathematics learning materials the school has provided you with which you are currently using?
- A:** Set squares and calculators, I use to give to learners and take them back after using them.
- Q:** What is feeling about the school controlling and monitoring of your progress in teaching Mathematics?
- A:** I think it is doing enough because the HOD every week checks whether the work for the week is done and completed.
- Q:** Do you get any support from your HOD which is helpful in managing Grade 10 Mathematics?
- A:** Yes I do. When I have problem in a certain part of Mathematics I went to the HOD and get some help.
- Q:** Is there any criteria you are using as a school in selecting learners who are suppose to do Mathematics in Grade 10?
- A:** They look at the Mathematics results of Grade 9.
- Q:** You have taught Grade 10 for more than a year. How many workshops have you attended?
- A:** Normally twice a year.
- Q:** What benefits have you received from the workshops?
- A:** Has helped me how to deal with assessment standards because OBE is new.

### **CLASSROOM ENVIROMENT**

- Q:** What are your likes and dislikes about the classroom learners use during your Mathematics period and why?
- A:** It is different because in science class there are few learners is easy to work with them and commerce class is a big group I have to make big groups or small but many groups which makes difficult to teach them.

**Q:** One of the things that make classroom a conducive environment for learning are charts or posters on the walls. How do you feel about that?

**A:** It is nice to have but I once requested in the school and they say they do not have.

**Q:** What would you like to have your classroom?

**A:** At least to have charts where learners can see at least different shapes.

### **LESSON PREPARATION**

**Q:** When preparing for your lesson what materials or resources you use?

**A:** I use learner's books and calculator.

**Q:** Which document you use as a guide for lesson preparation?

**A:** I use NCS document I received from the workshop and other one the school managed organise it for me.

**Q:** What heading you find useful in organising your lesson plan?

**A:** Topic, context, learning outcome, activities, learning activity and learner's homework.

**Q:** How do you feel about the necessity of using lesson plan when teaching and why?

**A:** It is important to have lesson plan, it saves time and it give you a direction of what you are expected to do.

### **TEACHING STRATEGIES**

**Q:** What is your feeling about keeping lesson register for your Grade 10 Mathematics class?

**A:** It is important to have because it helps in monitoring the attendance of both learners and teachers.

**Q:** What challenges or successes you have in using worksheets?

- A:** We do not use them we use different books.
- Q:** What strategies or method do you have use involving learners in a lesson?
- A:** I make group in doing work sometimes.
- Q:** How do you feel about learners responding in group when question is asked to the class?
- A:** I ask question that will force them to raise up their hands.
- Q:** How do you encourage learners to ask questions during lesson?
- A:** I always ask them whether they understand before proceeding to the next part
- Q:** How do you feel about group work?
- A:** It helps the learners to share ideas and find the common problem.
- Q:** How often do you use it?
- A:** Every time I am teaching.
- Q:** Which language do you prefer when teaching and why?
- A:** English because it is the only language used when asking question during examination.
- Q:** What is your feeling about code switching when teaching?
- A:** I think is important to do because some learners fail to understand English properly and also for clarity of other terms.
- Q:** How often do you assign home work to learners?
- A:** I give three to four times a week.
- Q:** What successes or challenges you have in teaching new Mathematics topics?
- A:** I did have problem before going to the workshop but now is better and I work with my HOD.



## **CONTEXTUALISING THE CONTENT**

**Q:** In nowadays there are great emphases in modeling Mathematics. What do you feel about that?

**A:** When teaching learners the content at times learners get confused but when contextualising the content it becomes clear for the learners.

**Q:** Have you tried examples like that?

**A:** Yes I have tried by doing because if telling them it becomes a problem to them.

**Q:** What challenges or successes you have in contextualising the content?

**A:** There are challenges and successes to some, like if you want to change currencies for another country it becomes difficult to get that currency.

## **RESOURCES IN SCHOOL**

**Q:** What resource you use for teaching?

**A:** I use chalkboard, set square if necessary, book and calculators.

**Q:** Can you give the reason why is important for using these resources?

**A:** It is important in using a T-square because it tells them the important of using a ruler and for calculators there are big numbers where it is difficult to work with them without a calculator.

**Q:** What are advantages and disadvantages of teaching Grade 10 Mathematics in this school with regard to:

### **Accessing and using of teaching and learning resources?**

**A:** I can say the main advantage is that books are available although there is a problem groups.

### **Networking with other Grade 10 Mathematics teachers?**

**A:** It is easy because I am able to meet with other teachers of the neighboring school if there is a need concerning the learning area.

### **Support from school management?**

**A:** I do get support from school management because they arrange for me the classes to use when I am teaching on holiday and able to access book as they keep with them.

### **ASSESSMENT**

**Q:** What is your understanding of continuous assessment?

**A:** Continuous assessment you mean cass? (After this kept quit for some time) is to assess continuously where by the learner mark is recorded to from cass.

**Q:** How do you feel assessing learners continuously in Mathematics?

**A:** Each and every time getting into the classroom class work and home work is part of assessment. There are those, assessment not used and others used which I think assessing learners continuously is important.

**Q:** There are assessment tasks that are prescribed to be done each term. How do you feel about these assessment tasks?

**A:** I feel these assessment tasks are important in opening the mind of the learners like research which forces the child to go out and search for the information from internet. This makes learners get used in internet.

**Q:** Which assessment tasks you prefer most? Why?

**A:** Is class work and home work and because it is where a learner get practice.

**Q:** Which assessment criteria do you prefer to use when assessing learner's work?

**A:** I normally use ticks.

**Q:** What materials you use when setting learner's assessment tasks?

**A:** I use learner's text book.

**Q:** How do you feel about learners having assessment portfolio?

**A:** in my own opinion I prefer exercise books because in portfolios get lost.

**Q:** What do you use exercise books for?

**A:** I use it for assessment.

**Q:** What challenges or successes you have in using it?

**A:** As mentioned you find some piece of work is missing and also the work is mixed.

**Q:** What challenges or successes you have in:

**Keeping learners' assessment records?**

**A:** I do not have any problem in keeping learner's records because I use to dive learners papers after marking and keep them in their portfolios and I keep the records.

**Following the required assessment program?**

**A:** The program shows what assessment to do in which term.

**Developing learner's Mathematics knowledge, skill and values as one of the requirement for continuous assessment?**

**A:** Yes I think tasks like project where the learner's apply mathematical knowledge like measuring if the project requires them to build like a house.

**Q:** What do you feel about Mathematics results of your school?

**A:** Is embarrassing. I think networking is done late instead of doing it at the beginning of the year.

**Q:** Can you summarise for me what you see as the main purpose of assessment?

**A:** I see assessment as the means of finding out where the learner has not understood and as the teacher you help in clearing up that area.

**Q:** In closing what can you say about the successes and challenges with regards to the implementation of the new Mathematics curriculum in Grade 10?

**A:** I do not think there is much problem regarding how learners learn because they are now used to the new curriculum. The only problem is on our sides as

educators for not getting materials in time like me I did not get NCS documents in time while learners require to be assessed according to this new curriculum.

## **INTERVIEW WITH MISS YONELA**

### **COMMUNITY SURROUNDING THE SCHOOL**

**Q:** How do you feel about the community surrounding the school with regard to the following?

#### **1.1 considering their children's education as important? Why?**

**A:** I think they do not consider it as important the reason I am saying that because are supposed to collect their children's reports quarterly but you find that out of 315 which is the enrolment of the school they do not come or only 10 end upcoming out of 315 in terms of support because it is here at school they will find out how their children perform.

#### **1.2 by making input in helping their children's with school work?**

**A:** Some they do but most they do n't.

#### **1.3 In buying learning materials if they are asked to do so?**

**A:** Not at all in fact everything is provided by the school from the department including exercise, pens and files except for calculators.

**Q:** Do they buy calculators?

**A:** No they do n't only few.

### **INVOLVEMENT OF SCHOOL IN CURRICULUM IMPLEMENTATION**

**Q:** How do you feel about the involvement of parent by the school in curriculum planning?

**A:** JA yes since the SGB represent parent I think they are involved.

**Q:** How often do you meet with your Mathematics HOD discussing Mathematics issues?

**A:** We use to meet on Fridays twice a month.

**Q:** What Mathematics learning materials the school has provided you with which you are currently using?

**Q:** What is your feeling about the school controlling and monitoring of your progress in teaching Mathematics?

**A:** Yes I will say the control is satisfactory.

**Q:** Do you get any support from your HOD which is helpful in managing Grade 10 Mathematics?

**A:** Mm... I can n't remember very clear. I do not think I got any support. I can n't remember any support I got. The only thing he does was to check files and check the work was up to standard in terms of Los and ASSs.

**Q:** Was there any time you needed a support and you did not get it?

**A:** Not really.

**Q:** Is there any criteria you are using as a school in selecting learners who are suppose to do Mathematics in Grade 10?

**A:** Yes it does have, we normally set a test for them to write at the beginning that particular year and then those who get 40% and above we recommend them to do Mathematics. Only those who get 40% and above and the test they write is Grade 9 Mathematics and is easy to pass but not all of them manage to pass. The reason we do that is because we normally avoid the tendency of pupils choosing Mathematics because their friends are doing Mathematics. That is why we set test for them because we had problem in the past of having pupils doing Mathematics for the sake of pleasing their friends.

**Q:** You have taught Mathematics for more than a year. How many workshops have you attended?

**A:** I think is about 3 times, the 5 days' workshop.

**Q:** What benefits have you received from the workshops?

**A:** Ja there are benefits. In the workshop not only we learn how to teach in the classroom there are other thing we look like teacher's portfolio of which at that time most of us was not clear about them. Issues like lesson plan were covered and content as well.

### **CLASSROOM ENVIROMENT**

**Q:** What are your likes and dislikes about the classroom learners use during your Mathematics period and why?

**A:** It is too small and not very clean it need some painting (laugh), windows are broken. In fact that classroom gave us a problem especially in winter because the door is broken, no glasses. It is n't a normal class.

**Q:** One of the things that make classroom a conducive environment for learning are charts or posters on the walls. How do you feel about that?

**A:** I think the conducive environment is helpful because you can learn in the class. It influences learning in the class.

**Q:** What would you like to have in your Mathematics classroom? Why?

**A:** Is the class with windows, class which is locked because posters or charts on the walls can be found missing the following day if the door is not locked.

### **LESSON PREPARATION**

**Q:** When preparing your lesson, what materials or resources you use?

**A:** Oh I use two text books the spot on Mathematics and classroom Mathematics and one study guide I got from UWU.

**Q:** Which document you use as a guide for lesson preparation?

**A:** Oh there is one document from CASME.

**Q:** What headings you find useful in organising your lesson plan?

**A:** Los, Ass, ex10ded opportunities things I will do if I find out that learners did not catch up with the lesson. Yes these are the things I can remember.

**Q:** How do you feel about the necessity of using lesson plan when teaching? Why?

**A:** No I do not carry lesson plan to the classroom because everything I have written is in my head at that time I go to the classroom. I know what to tackle and how.

### **TEACHING STRATEGIES**

**Q:** What is your feeling about keeping a lesson register for your Grade 10 Mathematics class?

**A:** A lesson register I did not necessarily find useful. The reason I am saying so there are few learners is very easy for me to notice who is in and who is not in. Yes that's why I do not make use of period register, I use to get learners about 10 or 19. Is very easy to notice them.

**Q:** Have you ever tried using worksheets when teaching?

**A:** Yes I have tried.

**Q:** What challenges or successes you have in using worksheets?

**A:** It is not easy to say I am challenged or successful because it depends to the needs.

**Q:** When do you normally see the need of worksheets?

**A:** The need for the worksheet? Sometimes you find they cannot tear pages from their text-books and they do not have files so I make something where they can write on.

**Q:** What strategy or method you normally use involving your learners in a lesson?

**A:** E...eh (kept quiet for sometimes and ask herself) what strategy? I use to group them because it is easy for them to interact.

**Q:** How do you feel about learners responding in groups when question is asked to the class?

**A:** I do not like that thing, that does not give me a clear direction as to who knows what and who does not what.

**Q:** How do you encourage learners to ask questions during lesson?

**A:** I did not have specific way of teasing them what I do I give them a test making sure no one copies and I will identify a problem then.

**Q:** How often do you use group work?

**A:** At certain times.

**Q:** When do you decide to do group work?

**A:** When I feel the lesson wasn't clear for some learners, I usually gave them a problem to answer in group so that I will create that atmosphere to be free.

**Q:** What is your feeling about code switching when teaching?

**A:** I do not think it does have problem may be it does have problem to other learning areas but now at times when you use English you find not even a single learner understand you but if you mix some of the learners are able to understand easily by

**Q:** Which language do you prefer when teaching and why?

**A:** 80% English because the questions are asked in English.

**Q:** How often do you assign home work to learners?

**A:** There is home work time table. The home work is given according to the time table.

**Q:** Is there any book or material you use for home work?

**A:** No I just pick up the problems from any book; I do not have specific material.

**Q:** What challenges or successes you have in teaching new Mathematics topics?



**A:** I will say is late coming which makes it difficult especially if it is the first period, it is difficult to cover up the work. Some learners stay far from school and if given homework and not done at school surely the next day they will copy work from one learner.

### **CONTEXTUALISING THE CONTENT**

**Q:** In nowadays there are great emphases in modeling Mathematics. What do you feel about that?

**A:** I feel its fine because it gives a learner an understanding how the particular problem will help me in life.

**Q:** Have you ever tried giving learners such problems?

**A:** Can't think of any that I give but I have seen such problems.

**Q:** Why you have n't tried them

**A:** I have never thought of it.

### **RESOURCES IN SCHOOL**

**Q:** What learning materials you think your learners are shot off which you need most?

**A:** Calculators and text-books are insufficient it makes me write everything on the board.

**Q:** How do you feel teaching learners without calculators?

**A:** Not all problems necessarily need calculators but to problems like compound interest they need calculators. I have thee calculators of my own I have to give them the calculators to share.

**Q:** What are advantages and disadvantages of teaching Grade 10 Mathematics in this school with regard to:

### **Accessing and using of teaching and learning materials?**

**A:** Advantages? I do not think of any advantages. For classroom base the only disadvantage I have is the movement from one class to another class, that's the only disadvantage I have.

### **Networking with other Grade 10 Mathematics teachers?**

**A:** I have never tried networking with other teachers for Grade 10 Mathematics. I have done with other subjects but for Grade 10 I have not seen any need.

### **Support from school management?**

**A:** What can I say are the advantage? I can't say anything about this question.

### **ASSESSMENT**

**Q:** What is your understanding of continuous assessment?

**A:** Cass that's where by I record students work and that work contribute at the end of the year towards their final mark, that's how I understand is the continuous work of a learner whereby you monitor the progress of that particular learner and that at the end contribute to the final mark of that particular learner.

**Q:** How do you feel about assessing learners continuously in Mathematics?

**A:** I think continuous assessment is useful because it also promotes the attendance learners because learners know if I miss a test that contributes a negative mark towards my Cass so a Cass promote the attendance of learners because you have explain to the more the Cass is and how does it help One of them and they know that being present is one of the contributing factors towards your Cass because if you are present you'll do the work yes.

**Q:** There are prescribed assessment tasks that need to be done each term. How do you feel about these assessment tasks?

**A:** The one that normally give me a problem is the project. The project that one give me how this project going to help them in terms of answering questions so I do n't necessarily think there was a need of it because in the end of the day

each learner must answer the question in the final exam and get a good mark. I was n't show of the project how does it work.

**Q:** Which assessment task you prefer most? Why?

**A:** The one I prefer most is the investigation. I prefer investigation for one reason that it will actively involve all learners because each learner would do his or her own investigation.

**Q:** Which assessment criteria do you prefer to use when assessing learners' work?

**A:** I prefer the ticks.

**Q:** What materials you use when setting learners' assessment tasks?

**A:** Past exam question papers.

**Q:** How do you feel about learners having assessment portfolio?

**A:** The work just let them write everything there except for the exam. Because in the exercise books they write everything and they say the files are too heavy.

**Q:** What challenges or successes you have in:

**Keeping learners assessment records?**

**A:** I do not have a problem except for the project.

**Following the required assessment program?**

**A:** When it comes to assessing project I use another assessment task.

**Developing learners' mathematical knowledge, skills and values as one of the requirements for continuous assessment?**

**A:** Mathematical knowledge is developed giving them a task to do and if I find that they fail I repeat that work but for the others like values I do not knew how to develop that.

**Q:** What do you feel about the results of your school? Why?

**A:** Results are dropping reason there is a lack of motivation from learners and lack of resources.

**Q:** In closing what can you say about the successes and challenges with regards to the implementation of the new Mathematics curriculum in Grade 10?

**A:** I am unlike the old teachers, I came when the new curriculum was in place. It is difficult for me to compare.

## **INTERVIEW WITH MISS DLOMO**

### **COMMUNITY SURROUNDING THE SCHOOL**

**Q:** How do you feel about the community surrounding the school with regard to the following?

#### **1.1 Considering their children's' education as important? Why?**

**A:** Mm.. they do not consider their children's' education as important because if when the child is given a home work you notice that there is no help from the parent and also when a parent is asked to come to check the child's work at school they do n't respond.

**Q:** Have you ever made the follow up to find out why the parent has n't come?

**A:** If you ask for the child will say that my mother is alone at home can n't leave the house alone all such things like my mother is at work can n't sent any one to come.

**Q:** Do parents make an input in helping children with their school work?

**A:** You notice that the parent is not involved.

#### **In buying learning materials for their children if they are asked to do so?**

**A:** The easiest they even fail to buy 2-quire exercise books, when it comes to calculators and mathematical instruments is now better because the school buy because of the LTSM

**INVOLVEMENT OF SCHOOL IN CURRICULUM IMPLEMENTATION**

**Q:** How do you feel about the involvement of parents by the school in curriculum planning?

**A:** I have never seen such.

**Q:** How often do you meet with your Mathematics HOD?

**A:** We meet almost twice a week.

**Q:** Is it a departmental policy?

**A:** Is not a policy but we see the need.

**Q:** Can you give me one example of the need that makes meet with the HOD?

**A:** When doing something and find is not (she answered slowly as if she was thinking what is it that can make her meet with HOD) basically at times when I have problem I use to call him to the class. Infect we work hand in hand.

**Q:** What Mathematics materials the school has provided you which you are currently using?

**A:** I have text books, mathematical instruments and calculator.

**Q:** Do you get any support from your HOD which is helpful in managing Grade10 Mathematics?

**A:** Of course yes. He use to come to class and if I have problem for something I am not sure of.

**Q:** Is there any criteria you are using as a school in selecting learners who are suppose to do Mathematics in Grade 10?

**A:** Mm... (mumbles)

**Q:** They do not use any criteria? If so how do you make learners do Mathematics in Grade 10?

**A:** At the beginning there is orientation that is done. The learner chooses the career she wants to do and that is how is done.

**Q:** You have taught Grade 10 Mathematics for more than a year. How many workshops have you attended?

**A:** I have attended only two workshops since I have taught Grade 10.

**Q:** What benefits have you received from the workshop?

**A:** Yes I received benefits how to do transformation geometry.

### **CLASSROOM ENVIRONMENT**

**Q:** What are your likes and dislikes about the classroom learners are using during your Mathematics period and why?

**A:** I like is spacious.

**Q:** One of the things that make classroom a conducive environment for learning are charts or posters on the walls. How do you feel about that?

**A:** They may be useful, say for example if you are teaching conversions like centimeters to meters and so on.

**Q:** What would you like to have in your Mathematics classroom? Why?

**A:** E...e...eh is the charts a.....nd I do not know. (Sounds very unsure of the type of classroom she wants)

### **LESSON PREPARATION**

**Q:** When preparing your lesson what materials or resources you use except text book. I saw you carrying when you were teaching?

**A:** I use guide and past examination papers.

**Q:** Which document do you use as a guide for lesson preparation?

**A:** I use assessment guide.

**Q:** What headings you find useful in organising your lesson plan?

**A:** lesson plan cannot be a lesson plan without class work and home work.

**Q:** Do you feel is it necessary in having a lesson plan when teaching?

**A:** Mm... I'll say yes and say no. If I yes a lesson plan can help you see you pace and if no lesson plan there must be a planner which is not detailed like lesson plan, showing what you will be doing the following day.

### **TEACHING STRATEGIES**

**Q:** What is your feeling about keeping a lesson register for your Grade 10 Mathematics class?

**A:** I think is very useful because it makes easy to determine which learner is present and also it motivates the learner to attend on regular bases because the if I am not attending the teacher will notice that I am not attending.

**Q:** What challenges or successes in using the worksheets?

**A:** In Mathematics it depends upon the context that you are teaching, there are context that need a worksheet and there are context that need an exercise book.

**Q:** How often have you used worksheets when teaching?

**A:** I use them more often when teaching angles.

**Q:** What strategies or methods do you use in involving learners in a lesson?

**A:** I give them some work in class trying to check what I have been doing are clear on them, trying to do the work in groups or giving some learners la chalk to wrote on the board in order to find whether are they cooperative or not.

**Q:** How do you feel about learners responding in groups when question is asked to the class?

**A:** I do not like chorus response. You see in a chorus response you cannot see who knows what and who does not know what only when they answer individually you can see that this one is good, this one is bad.

**Q:** How do you encourage learners to ask the questions during lesson?

**A:** Yes I am too flaxy at times, they normally ask the question when they do not understand.

**Q:** How do you feel about group work?

**A:** The group work is good some times because the more gifted will plant something to other learners.

**Q:** How of do you use it?

**A:** I use it mostly yes all the time. (it looks like she has never used group work because she could n't mention the instances where group work is used)

**Q:** Which language do you prefer when teaching and why?

**A:** I prefer using both English and isiZulu sometimes you explain something in English and they do not understand and you better when explaining with their mother tongue.

**Q:** Which book(s) you use for home work? Why?

**A:** I use different books when assigning home work to learners. It depends apou the content and context, quality of the book and richness of the book.

**Q:** How often do you assign home work to learners?

**A:** Home work is given daily.

**Q:** What successes or challenges you have in teaching new Mathematics topics?

**A:** Ja there are challenges. Paper three but working hand in hand with my HOD becomes a success?

## **CONTEXTUALISING THE CONTENT**

**Q:** In nowadays there great emphases in modeling Mathematics. What do you feel about that?

**A:** It's a bit difficult for our learners because they have problem in understanding English, so yes English is the medium of instruction if they contextualise English learners will have a problem. So if they contextualise Mathematics learners will have a problem.

**Q:** Have you tried setting such examples?

**A:** Yes.



**Q:** What challenges or successes you have in setting such questions?

**A:** Sometimes they do not bother to answer the questions or sometimes they try but the way they write you can see that they are struggling.

### **RESOURCES IN SCHOOL**

**Q:** Do all learners have sufficient Mathematics resources you need?

**A:** Yes.

**Q:** What resources learners have?

**A:** They have text books, calculators and mathematical instruments because the school provide.

**Q:** Are there any other materials you are using except books and guides?

**A:** We use television board but not most of the time.

**Q:** Why is it important in using teaching materials you have?

**A:** Like cassettes they are not important.

**Q:** What are advantages and disadvantages of teaching Grade 10 Mathematics in this school with regard to:

#### **accessing and using of teaching and learning resources?**

**A:** There are challenges in accessing internet.

#### **networking with other Grade 10 Mathematics teachers?**

**A:** I have never done. I have not seen the need.

#### **support from school management?**

**A:** There is great support.

### **ASSESSMENT**

**Q:** What is your understanding of continuous assessment?

**A:** You find that continuous assessment is helpful to a kid because you find that the child has been doing well for term one, term two and term three, and the child does not write the examination at the end of the year, so cass helps a lot to the child.

**Q:** How do you feel about the assessment tasks that need to be done each term?

**A:** You know I have never thought of it but projects and assignment when given makes them to explore.

**Q:** Which assessment task you prefer? Why?

**A:** I prefer investigation

**Q:** Why?

**A:** (kept quiet for a long time to answer) when they are in a university they would n't be able to detect which soil has a high water retaining capacity.

**Q:** Which assessment criteria do you prefer to use when assessing learners' work?

**A:** The rubrics are a bit monotonous because it is like you are preparing a memorandum.

**Q:** What materials you use when setting learners' assessment tasks?

**A:** I use past question papers so that they know the style of setting?

**Q:** How do you feel about learners having assessment portfolio?

**A:** It is good because they learn to sort their work. When at tertiary they won't have problem.

**Q:** I always use assessment portfolio so that the learner can see whether is progressing or not.

**Q:** What challenges or successes you have in

**keeping learners' assessment records?**

**A:** Keeping the records is so important because you find the learner is complaining how did I fail and you go back to the records and show that is how your marks look like, that is why you have failed.

**following the required assessment programme?**

**A:** There are challenges in following the assessment program, especially in an investigation, I do have problem there.

**Q:** in developing learners' mathematical knowledge, skills and values as one of the requirements for continuous assessment?

**A:** Learners always consider Mathematics as a problem I do not think these values can be developed.

**Q:** Can you summarise for me what you see as the main purpose of assessment?

**A:** Is to monitor the progress of learner and determine the areas where the learner is not doing well, the child is then assisted where is lacking behind. Even at the end of the year continuous assessment is used to determine how the child has performed in assessment and then help the child if he or she has not done well in examination.

**Q:** How do you feel about the Mathematics results of your school?

**A:** They are not good

**Q:** Is there any solution you think can be tried in order to improve the school Mathematics results for Grade 12?

**A:** I do feel that the school must get help from outside but the school is trying it's level best, they work extra hours and even call educators outside the school but the results are not improving instead you find one or two learners who are known that are capable passing the rest say it is difficult. Once the child has developed that attitude it is difficult to teach that learner.

**Q:** Why learners have that attitude?

**A:** I think is because of their performance because you cannot tell that a learner in Grade 12 has a problem to solve for X. Learners normally have problem in

trigonometry and you will find that the underlying problem these learners is on the mentality that Mathematics is difficult.

**Q:** In closing what can you say about the successes and challenges with regards to the implementation of the new Mathematics curriculum in Grade 10?

**A:** There is nothing much but the only problem is the new method of teaching which makes Mathematics as if is difficult.

## APPENDIX E

## LETTER OF CONSENT

**Dear Educator**

I am studying for Masters of Education specializing in Mathematics education at the University of Kwa-Zulu Natal, Edgewood Campus. I am now working on the research component of my M. Ed. The title of my topic is: **An exploration of Grade 10 rural Mathematics teachers' understanding and practices of the National Curriculum Statement (NCS) curriculum.**

I am currently an FET phase educator (Grades 10 to 12). My interest is to find out the successes and challenges Grade 10 educators have in implementing new Mathematics curriculum in their classrooms. The concern is that NCS has been in place in Grade 10 since 2006 but some rural schools have not received enough resources, enough Mathematics educators and poor infrastructure. I am now trying to find out how other educators are dealing with the new Mathematics curriculum in Grade 10. The benefit of taking part in this study will give you an opportunity to reflect on the New Curriculum Statement (NCS) and thereby possible improving your understanding.

Please be assured that your name will not be used in any material that I write up and the data collected will be used for the study only. Participation in the study is voluntary you are free to withdraw from the study at any time you wish.

Your participation in the study will be highly appreciated. Thank you for your willingness to assist me. If you require any further information, feel free to contact my supervisor, Sarah Bansilal at 083-5002207 or contact me Mthembeni Khumalo at 073-2544122.

Yours Sincerely

M.C.N. Khumalo

I \_\_\_\_\_ (full name of participant) hereby confirm that I understand the contents of the document and the nature of the research topic, and I consent to participating in the research study.

I understand that I am at liberty to withdraw from the study at any time, should I so desire.

SIGNATURE OF PARTICIPANT

DATE

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## APPENDIX F



RESEARCH OFFICE (GOVAN MBEKI CENTRE)  
 WESTVILLE CAMPUS  
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17 APRIL 2009

MR. MC KHUMALO (982230274)  
 LANGUAGES, LITERACIES, DRAMA AND MEDIA EDUCATION

Dear Mr. Khumalo

**ETHICAL CLEARANCE APPROVAL NUMBER: HSS/0134/09M**

I wish to confirm that ethical clearance has been granted for the following project:

**“How Grade 10 Mathematics Teachers are dealing with the new Mathematics Curriculum in Rural Schools in KZN”**

**PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years**

Yours faithfully

  
 .....  
**MS. PHUMELELE XIMBA**

cc. Supervisor (DR. S Bansilal)  
 cc. Mr. D Buchler

