Post intervention strategies of the Annual National Assessment of Grade 6 learners in the Limpopo Province

Baloyi Dingani Graham

Student No: 27595278

Department of Education Management and Policy Study

University of Pretoria

Supervisor: Dr S. T. Mampane

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I, Dingani Graham Baloyi, hereby declare that the dissertation, "Post intervention strategies of Annual National Assessment of Grade 6 learners in Manómbe Circuit, Limpopo", is my own original work and that all sources consulted and quoted have been acknowledged in the list of references.

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Mr Dingani Graham Baloyi Date

(27595278)

DEDICATION

This dissertation is dedicated to my loving family: my wife Susan and my children Ntlakuso, Twarisani and Dingani Junior for their undying support and for being patient enough to live without the full support of their father during the time they needed him most. I appreciate the support provided and acknowledge that the role they played ensured the completion of my master's dissertation. Thank you for your patience, love and care.

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ABSTRACT

The purpose of this qualitative descriptive study was to explore the "Post intervention strategies of Annual National Assessment of Grade 6 learners in Manómbe Circuit, Limpopo". Given the heightened expectations of South African citizens on better service delivery, the emphasis is now on improved learner performance in Mathematics during the early years. The focus has moved from measuring only learner performance to measuring performance against pre-agreed outputs or outcomes and the provision of support to achieve the Department's strategic goals.

While there is consensus about poor learner performance in Mathematics in the ANA assessments in the Limpopo Province, the post ANA intervention strategies for improving learner performance in Mathematics, remains under-researched. This study used a qualitative case study design to gather comprehensive, systematic and in-depth information, using semi-structured interviews. Twelve participants, 4 principals, 4 Mathematics HoDs and 4 Mathematics teachers from four primary schools in the Manombe Circuit of the Limpopo Province were purposively sampled.

The research questions were concerned with understanding the post ANA intervention strategies developed for improving learner performance; how they are used; how they influence learner performance, and the challenges teachers experience using them. The collected data was transcribed, categorized and presented as themes with direct quotations from the participants to support the themes. Findings revealed most teachers had no Mathematics qualifications and are therefore neither involved nor trained in the development and implementation of post ANA intervention strategies for learner improvement.

SUMMARY

Post intervention strategies of Annual National Assessment of Grade 6 learners in the Limpopo Province.

The purpose of the study was to explore the intervention strategies used to support the teaching of Mathematics post the Annual National Assessment (ANA), in public primary schools in the Manombe District of the Limpopo Province. The study addressed concerns raised about the poor assessment results in ANA and the strategies used post ANA to support teachers' and learners' performance in schools. The standardised national and international assessments used as a criteria for judging the quality of educational assessments was criticised on the basis that the standardisation of assessments was not context bound and that some expectations of performance might be unfair. Further comments raised were that assessments should not only focus on measuring learner performance against pre-agreed outputs or outcomes bot that support should be provided for improving performance. Because mathematics plays an important role in the society, it is imperative that intervention strategies be developed post the annual national assessments to address future performance of struggling Mathematics learners. Improved performance strategies should be linked to broad and consistent plans for staff and learner development in line with the department's strategic goals. Findings reveal that the poor learner performance in the ANA of Grade 6 mathematics is and caused by a number of factors such as: teacher-related factors, instructional leadership-related factors, learner-related factors and parent -related factors. The need for intervention strategies in schools is vital for improving learner performance.

ACRONYMS

ANA	– Annual National Assessment
CAPS	- Curriculum Assessment Policy Statement
CEMASTEA	- Centre for Mathematics, Science and Technology in Africa
DBE	– Department of Basic Education
FFLC	- Foundation For Learning Campaign
DoE	– Department of Education
HoD	– Head of Department (Mathematics)
NCS	- National Curriculum Statement
PLC	- Professional Learning Community
PSC	- Public Service Commission
RSA	- Republic of South Africa
SASA	- South African Schools Act
SGB	– School Governing Body
SMT	- School Management Team
TIMSS	– Third International Mathematics and Science Study

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CHAPTER 1

POST ANNUAL NATIONAL ASSESSMENT INTERVENTION STRATEGIES OF GRADE 6 LEARNERS IN MANÓMBE CIRCUIT, LIMPOPO

1.1 INTRODUCTION

There has been an increasing emphasis on the Annual National Assessment (ANA) of learners in Mathematics and Literacy. The Department of Education (DBE) introduced the ANA in schools due to poor learner performance. Concerns about the assessment results helped create a growing interest in alternative forms of assessments, mostly performance-based assessments (Moloi, 2010), how they are used how they influence learner performance and the challenges teachers experience using them. According to the DBE (2010), in the section on Curriculum Assessment Policy Statement (CAPS), assessment plays an increasingly important role in education. Assessment occupies an integral part in curriculum implementation. Through assessment, teachers may be able to diagnose learning problems, track learner progress, and provide feedback as well as evidence of learners' levels of achievement (DBE, 2010). The Department, through the Public Service, relies heavily on the performance of its employees for the delivery of its mandate to the community it serves. As such it is of utmost importance that the performance of its employees is managed appropriately, in particular in the identification and addressing of poor performance (Public Service Commission (PSC), 2007).

Recently the state and districts started exerting pressure on teachers and learners to achieve high levels of performance in the National and international assessments of Mathematics and English. Policymakers also used assessment results to propose changes in education and to improve the country's status in the competitive global

world (Cumming, 2010). The problem with standardised national and international assessments, however, is that the criteria against which the quality of educational assessments are judged, are standardised, hence they are not context bound and may be unfair in some of the expectations of performance in the various schools (Stanford University, 2010). Most reports on South African education indicate that the majority of teachers have not been sufficiently equipped to meet the education needs of the growing democracy in the 21st century global environment. For example, DeClercq (2008) mentions that it is accepted that teachers need competencies such as subject matter and pedagogical knowledge to enable them to understand their learners, learning and the curriculum. Clarke (2001) also suggests that there should be alignment in the school with regard to the comprehensive management of ANA, ongoing teacher development and learner support. Hence the focus of the study will be on post Annual National Assessment intervention strategies in Mathematics. Clarke (2001) suggests strategies aimed at enhancing teacher excellence that need to be followed up with proper support structures. One of the activities he suggests in this regard is to ensure that each teacher creates a Personal Learning Plan that addresses his or her need to grow to improve student learning.

After the national assessments were first done, the Department of Education (DoE) conducted an analysis of schools' and learners' performance that was designed to provide evidence about student performance levels in the identified curriculum areas (Kellaghan and Greaney, 2008). In South Africa, ANA is an important strategy used in all public schools, from Grade 1-9 to achieve the aim of improving the quality of learning outcomes in the education system (DBE, 2011). Student performance in ANA dominates current discussions on educational matters and many believe that the new curriculum has not yet been absorbed in schools. Consequently student performance leaves much to be desired (Mahlo, 2011). Poor learner performance has thus resulted in finger pointing among stakeholders. However, the fact of the matter is that something should be done to improve the current status quo (Mahlo, 2011). Everyone has a right to basic and further education and thus all children and youth can learn through support provision (Republic of

South Africa (RSA) Constitution, 1996) post ANA. This implies that every student has the potential to learn and become a responsible citizen in an atmosphere conducive to learning. Most research has been done with regard to identification of barriers to learning with very little having been done on developing strategies to overcome those barriers post ANA. This study seeks to identify post ANA intervention strategies that could be used to improve learners' performance in schools.

According to the DBE (2011) in CAPS, teachers teaching Mathematics in primary schools use the Mathematics policy statement to achieve the outcomes of Mathematics effectively. The learning outcomes and assessment standards in the policy statement help the teacher to plan his/her teaching and learning. During planning the teacher has to address three aspects, namely, the learning programme, the work schedule and the lesson plan (DBE, 2011). Teaching progresses in line with the work schedule provided by the DBE. According to Cumming (2010), learners are assessed against the assessment standards which inform the teaching and learning process and reflect the skills, knowledge and values required to achieve the learning outcomes. Assessment standards describe and demonstrate the level at which learners have achieved the learning outcomes. Assessment standards also indicate the minimum levels the learners have achieved in Mathematics and English in a specific grade (DBE, 2011). Fullan (2007) also contends that most programs do not take the needs and concerns of teachers into account and stresses the need to provide follow-up support post ANA.

1.2 BACKGROUND

The DBE's policy on testing prioritises the improvement of learner performance in Literacy/ Languages and Numeracy/ Mathematics for both Foundation and Intermediate Phases. Poor performance in Mathematics and English in Limpopo Province was indicated at various national tests administered to all learners in both phases. In trying to address this problem, the government introduced the National

Curriculum Statement (NCS) as a fundamental building block for improving teaching of English and Mathematics in conjunction with the Foundation for Learning Campaign (FFLC). The NCS remained the definitive policy statement on curriculum in South Africa (Pandor, 2008). Building on the criticisms of Curriculum 2005, the National Curriculum Statement retained many of the core features of the early curriculum framework, but in a simpler and stronger form. The NCS retained the eight Learning Areas, the three Learning Programmes in the Foundation Phase, and the three distinct phases (Foundation Phase, Intermediate Phase and Senior Phase) in the General Education and Training (GET) band (RSA, 2008). Names were changed for learning areas such as Languages to Literacy and Mathematics to Numeracy. The new curriculum policy provided greater conceptual progression, assessment standards, and guidelines for use in time (DoE, 2010).

Launched in 2008, the DoE's FFLC was designed as a four-year campaign to improve the reading, writing and numeracy achievement of all South African children, with particular reference to those learners who had not achieved the standards as prescribed in the NCS (DoE, 2010). The initial focus was on primary schooling (Foundation and Intermediate phases) with the intention of ensuring that learners across the system acquire and sustain a solid foundation for learning. All primary schools were expected to increase average learner performances in Literacy and Numeracy in the Foundation Phase to not less than 50%. Performance milestones in Numeracy/Mathematics and English and Formal Assessment Tasks were specified for each school term. The Campaign placed a strong emphasis on teachers receiving sufficient resources to ensure that effective teaching and learning of English and Mathematics takes place. These resources were to include wall charts, number and phonic decorations, suitable apparatus for teaching concepts, textbooks, reading series, workbooks and writing materials (DoE, 2010).

According to the DoE (2008), the five pillars of the Campaign were: appropriate resourcing; teacher performance; regular and effective assessment; advocacy and monitoring, and evaluation. What differentiates the Plan from earlier curriculum

policies is that it provides a clearer direction to teachers, specifying that all learners in primary school should read for at least 30 minutes per day. The reading and writing time has to last 60 minutes. Writing and oral work should be given additional time depending on the grade level. Within this structured time frame, smaller sub divisions of time are suggested. The Campaign also suggests the minimum resources for each phase and provides a package of materials for a number of schools (DBE, 2008).

1.3. STATEMENT OF THE PROBLEM

The Annual National Assessment (ANA) results released by the DBE under Minister Angie Motshekga provide evidence of the crisis faced by the education system in South Africa (DBE, 2011). The assessment results show that nationally, Grade 3 learners perform at an average of 35% in Literacy and 28% in Numeracy, while in Grade 6, National average performance in Language is 28% and in Mathematics it is 30%. Limpopo was identified as the worst performing province when its results were compared to those of other provinces (DBE, 2011), hence the need for post ANA intervention strategies to improve learner performance. Reports by the PSC indicate that poor performance is a problem in the schools and there are multiple causes for this occurrence. The reports did not, however, suggest any intervention strategies that would address these problems. Problems in performance are linked to a lack of skills and shortcomings associated with the management of poor performance itself, both of which pose a very real and serious threat to service delivery. The PSC then decided to compile a Toolkit to assist managers to deal with this extremely important responsibility allocated to schools.

According to a study conducted by Taylor (2008), the 2008 and 2009 ANA results indicate a poor performance in Grade 6 Mathematics and English, something that impacts negatively on the overall pass rate. The DBE (2011) statistics also reflect an alarming decline in the performance of learners in Mathematics and English. This raises questions like: Where does the problem lie? Is it because of a lack of support

after assessment, or is the problem in the commitment of teachers? This study is therefore aimed at finding out intervention strategies put in place to improve the performance of learners after the ANA of Grade 6 learners in Mathematics.

1.4. THE PURPOSE OF THE STUDY

The purpose of the study was to explore the post ANA intervention strategies used to support the teaching of Mathematics for improving learner performance in the Manómbe Circuit primary schools. As such the focus has moved from measuring only learner performance to measuring improved performance against pre-agreed outputs or outcomes after the provision of support (PSC, 2007). Performance in Mathematics should be managed in a consultative, supportive and non-discriminatory manner in order to improve learner performance, teacher efficiency and effectiveness, and accountability for the achievement of results. Improved intervention strategies should be linked to performance for staff and learner development in line with the Department's strategic goals. The focus should be on plans for addressing performance using interventions that allow for an effective response to consistent inadequate performance as well as for the recognition of outstanding performance (PSC, 2007). The intervention strategies should be aimed at improving performance and minimising the administrative burden on teachers.

1.5. RATIONALE FOR THE STUDY

Interest in this study was prompted by my own personal experience as a Mathematics teacher who was frustrated by both the poor performance of learners in Mathematics in our province and the lack of post intervention strategies to address the poor performance in ANA of mathematics. Because Mathematics is seen as the foundation of scientific and technological knowledge that is vital to the socio-economic development of the nation, I was concerned that our learners would not satisfy the entry requirements of any of the prestigious degree courses such as medicine, architecture and engineering, amongst others (Addler, 2006). Mathematics

plays an important role in society; therefore it is imperative that intervention strategies be developed to address the poor performance of Mathematics in the Annual National Assessment. The aim of this study was to explore post ANA intervention strategies for improving learner performance in Grade 6 mathematics. Furthermore, this study aims to contribute to policy and practice in the in-service training of Mathematics teachers' professional development and to add to literature on intervention strategies for improving learner achievement post Annual National Assessment of Mathematics at schools.

1.6. RESEARCH QUESTIONS

The following is the **main research question:** Which post ANA intervention strategies are in place to improve learner performance in the ANA at schools?

Sub - questions

- How are post intervention strategies used in the teaching and learning of Mathematics at primary schools?
- How do the Post ANA intervention strategies influence the performance of learners in Mathematics?
- What challenges do teachers experience using post ANA assessment strategies aimed at addressing learner problems in Mathematics?

1.7. LITERATURE REVIEW

Dealing with poor performance in assessments can be complex and, if this is not handled properly and in accordance with learning outcomes, schools may, amongst other things, compromise their reputation as education institutions. Issues relating to poor performance should always be handled sensitively and in a fair manner. Success in post-primary education is predicated on high quality learning experiences and outcomes in Mathematics (Choi and Tang, 2009). Intervention strategies should be developed to provide managers and teachers or supervisors with practical

guidelines on how to deal with poor performance post ANA. Intervention strategies should address uncertainties or concerns in education (PSC, 2007) and also help school managers to adopt a practical and consistent approach to the management of poor performance, both for developmental purposes and for improving learner performance.

1.7.1 Teaching and learning

According to the findings of a study conducted by Kellaghan (2008), Mathematics teachers use different strategies in teaching Mathematics, These include problem posing and problem-solving, investigation, observation, modelling, reading, group work, drill and practice and examples. Mathematics can improve if only learners engage with worthwhile and challenging mathematical tasks. Post ANA challenging mathematics tasks could help learners develop a deep and coherent conceptual understanding of Mathematics while simultaneously enabling them to see the inter-relatedness of the Mathematics concepts they have learned. During Mathematics teaching, one intervention strategy could be the creation of an environment in which effective teaching relies on teachers' understanding of learners as well as problematic Mathematic areas (Moloi, 2010). Mathematics teaching should therefore be structured in such a way that learning opportunities are appropriate to the needs of the learners concerned to support and encourage learning. Because different learners learn in different ways, the teacher should be able to accommodate all learners in the lesson, and this should be addressed during planning for post intervention teaching and learning (Kellaghan 2008). Ball, Hill, and Bass (2005) suggest that greater teacher content knowledge is a contributing factor to increasing learning. According to Zohar, Degani and Vaaknin (2001), a teacher also needs pedagogical content knowledge, or specialized Mathematics knowledge for teaching, and for creating high expectations in learners.

Teachers who are not supported in the teaching of Mathematics post ANA, usually report feelings of being overwhelmed in their attempts to meet the diverse and often

complex expectations and needs of the growing number of learners, along with ancillary duties they are expected to assume (Jacobson, 2010). Consequently, post ANA intervention strategies are necessary to support learners who struggle with Mathematics at school. According to a study conducted by Fennel (2010), post ANA intervention strategies should be a structured plan for providing instructional materials and activities to support student learning during class time, or in programs after school, or during summer or winter school. Good practice in learning and teaching should reflect post ANA creativeness and innovativeness which match the needs of learners whilst also providing challenges and support (Choi and Tang, 2009). Teachers should ensure that the pupils' experiences are enjoyable, and that there is a balance between teaching and intervention. Post ANA interventions should improve mathematics performance and also improve retention rates and lower failure rates through additional opportunities to master mathematics concepts (Fennel, 2010).

Although post ANA teaching interventions in Mathematics should aim at developing learners' independence and responsibility towards learning, teaching and learning in most Mathematics classes, however, this is not geared towards differentiation. Differentiated teaching and learning implies that teachers use varied approaches appropriate to learners needs in order to increase the likelihood for each student to improve performance (Tomlinson, 2003). Mathematics intervention strategies should occur in a climate that fosters participation and thinking to create good working relationships between the teacher and the learners (Moloi, 2010). Interventions aimed at supporting staff should make learners feel settled and motivated by considering learners' individual needs. Learners will then believe that the teacher's help and their hard work, can improve achievement (Fennel, 2010).

1.7.2 Developing Intervention strategies

According to the National Strategies (2009) document, which focuses on the provision of support for Mathematics subject leaders and teachers as well as school leaders, intervention strategies are essential to the improvement of the quality of teaching and learning towards the achievement of better results. A staff team consisting of an intervention leader, subject leaders and teachers, should be established for intervention purposes. The intervention leader should be a senior member of staff responsible for planning the provision of intervention programmes across the curriculum and for building the capacity of the intervention team through training. Turney (2010) proposes that the principal of the school, as the change agent, should be responsible for curriculum and instructional activities in the school. Departmental heads or subject leaders should have knowledge of the subject area, and manage the subjects in the different grades and across the different phases (Fennel, 2010). They should coordinate the intervention strategies as well as the approach within the Mathematics subject department to ensure that teachers teach accordingly. According to Fennel (2010), the inclusion of teachers as part of decision-making during the development of intervention strategies makes it easier for them to implement the strategies effectively, since they were part of the process.

Fennel (2010) also points out that performance will only improve if strategies - such as screening all learners to identify at risk learners with potential mathematics difficulties - are developed. He further indicates that screening might help in developing intervention strategies or a variety of arrangements for grouping learners in such a way that they would feel comfortable working in the group to which they were allocated (Fennel, 2010). Examples of such groups would be small groups, consisting of learners with similar (or different) readiness, interests, or learning profiles; pair groups, with a partner of similar (or different) readiness, interest, or learning profile; whole class, or even, individually. Cohen, Garcia, Apfel and Master (2006), recommend that assignments should be randomly selected and grouped by the teacher and the learners. Organisational factors for support, such as

the way learners are grouped for Mathematics instruction in the classroom, also contribute to improved student performance.

Intervening at the earliest stages could contribute to student success, especially since schools operate in different contexts and there is no one size fits all (Wayman, Cho and Johnson, 2007). Intervention strategies would therefore vary according to the school context and the type of activity involved. Another strategy might be through diagnostic assessments, where one-on-one interviews are conducted with learners to determine their prior knowledge, understanding and ways of thinking. This approach gives learners the opportunity to verbalize their thinking and ideas, something which, in turn, helps teachers to identify errors and to use identified barriers of understanding to inform their instructional decisions (Wayman et al. (2007). Intervention materials should create opportunities for learners to work with visual representations of mathematical ideas that develop proficiency in the use of visual representations of mathematical ideas. Assessments are important and should therefore be considered as the beginning and not the end of learning. Assessment information should guide the teacher in managing what should be done to assist learners as well and to direct teaching.

1.7.2 Using Data to guide and improve learning post ANA

Improving learner achievement requires strategies such as data analysis to get a snapshot of what learners know, what they should know, and what could be done to meet their academic needs. With appropriate analysis and interpretation of data from Mathematics ANA results, educators could make informed decisions that positively affect student outcomes (Lewis, Madison-Harris, Muoneke, and Times, 2008). Research has shown that using data for making decisions could lead to improved learner performance (Wayman, 2005; Wayman, Cho, & Johnston, 2007; Wohlstetter, Datnow, & Park, 2008). A single assessment cannot help teachers make well-informed decisions. It is therefore important to make use of multiple data sources, such as learner attendance, behaviour and performance as intervention

strategies for performance improvement (Hamilton, Halverson, Jackson, Mandinach, Supovitz, & Wayman, 2009). On-going data collection and analysis of post ANA assessments is an important part of improving poor performance. Data collected on learner performance should be incorporated into the teacher's planning schedule to directly reveal the specific section learners are struggling with. Teachers may then analyse work samples to develop strategies to address learner difficulties (Lewis, et al., 2008). According to Fuchs et al. (2008), data from assessments could also assist in giving academic support to learners through extra lessons, remedial lessons, and reading. These academic support programs should be facilitated by dedicated people who support the school's vision (Mahlo & Taole, 2012).

1.7.4 Influencing learner performance

Kurian (2008) argues that effective management and leadership is an essential characteristic of a successful school and is crucial to the improvement of institutions that perform poorly. Schools that under-perform require visionary and innovative managers to turn them into centres of excellence. According to Sharples, Khan and Lenz (2011), strong and visionary leadership, provided by head teachers and principals, is often the driving force behind improving learner performance in schools. Members of the school management teams, as senior decision-makers, play a key role in developing intervention strategies for improving teaching strategies and practices. According to Clarke (2001), structural leadership changes should be instituted to allow for meaningful involvement in decision- making by teachers and the school community. This may be done through the monitoring and evaluation of teaching and learning by school leaders in the school. Supportive communication should also take place within these groups. According to Kurian (2008), learner support within the education system should include all activities that increase the capacity of schools and respond to diversity and challenges faced by learners and staff as a whole. Teaching resources identified as crucial for educator support post ANA, are key to differentiated instruction for all types of learners (Li, 2005). Supported teachers will be highly dedicated to student affairs and will create a

supportive learning climate in the classroom (Choi and Tang, 2009). Because individuals learn in different ways, teachers also need intervention tools to explain concepts to a wide variety of learners. Schmidt and Wang (2005) indicate that morning and after school programs should be used as alternative ways to increase time on task and that, teachers must try to align the content to be taught to avoid confusing learners who struggle to learn during extra lessons.

1.7.5 Intervention strategies for improving Mathematics

Intervention strategies include systematic and explicit instruction provided to accelerate growth in an area of identified need. Intervention strategies could be provided by special and general teachers alike and are designed to improve performance relative to a specific, measurable goal (Gibbs, 2012). Post Ana intervention strategies based on valid information about current performance, realistic implementation, and on-going student progress monitoring, will be effective if based on programmes designed are based on clearly defined objectives, and are monitored and evaluated. More particularly, if learner needs were analysed, programs developed will be able to address these (Mahlo & Taole, 2012). It is important therefore important that intervention strategies should not be implemented because they are popular or interesting; rather, they should address the needs of the learner in that particular institution.

Teachers, too, need different teaching techniques in order to accommodate the full range of learners in their classrooms: some learners may, for example, require additional attention to perform better in Mathematics. Researchers such as Attwood (2001), Brodie (2004), and Maree (1997) suggest that poor performance in Mathematics at primary schools is influenced by variables such as learner ability, attitude and perception, family and socio–economic status, and low expectations by principals and teachers. Singh and Adam (2002) argue that these factors alone cannot account for the lack of Mathematics achievement and adds that persistent differences among traditionally disadvantaged learners may be another factor. These

explanations, however, fail to account for intra-group achievement differences because of the success of some South African disadvantaged learners in spite of their background. According to the PSC (2007), performance management is one of the processes that should be followed in schools to improve post ANA performance. Teacher competencies and teacher enthusiasm can be improved by meeting performance expectations through on-going performance management. Improved teaching may lead to improved results which will result in improved recognition and rewarding of deserving teachers.

1.7.6 Curriculum implementation for improved performance

According to Miller (2005), aligning the curriculum to post ANA intervention strategies is integral to any attempt to improve Mathematics performance. What learners learn should reflect what is in the curriculum, and educators should be encouraged to present topics in ways that are intended to improve learner performance. Both procedural and conceptual fluency in Mathematics should be prescribed in the curriculum. Curriculum that includes meta-cognitive strategies and multiple presentations should help learners perform better. Presentations such as graphs, tables, symbolic expressions and narrative descriptions need to be taught pre ANA in mathematics to help learners understand concepts, use different representations and reason better (Miller, 2005). This should be a pre-requisite for effective and successful Mathematics teaching post ANA to improve performance in mathematics.

Over the years, performance in Mathematics has continued to show a downward spiral (DBE, 2011). Factors identified as reasons for poor performance in Mathematics include teachers not using student–centred approaches, and lack of professional exposure that could have articulated issues related to teaching Mathematics in primary schools. According to Makgato and Mji (2006), a lack of motivation amongst teachers and learners, as well as a lack of parental support, were noted as factors attributing to poor performance. Eshiwani (2001) agrees that poor

performance in Mathematics is due to poor teaching methods and a shortage of textbooks but, according to Mbugua (2012), there are three other factors which should also be considered causal factors. They are student factors (which include entry behaviour, motivation and attitude), socio-economic factors (which include education of parents and their economic status), and school-based factors (which include availability and usage of teaching and learning facilities, school type and teacher characteristics).

1.8. STANDARDISED ASSESSMENT THEORY

According to Hacker, Newton, and Akinyele (2001), education departments are constantly seeking new ways to improve learner performance. In order to succeed, efforts should focus on existing knowledge as basis for the improvement of teaching and learning. This study is framed within the Standardised Assessment Theory, a theory which focuses on the measurement of learner attainment to improve the "performance quality" of learner output. Learner attainment serves as a measurement of those responsible for providing the service (teachers, schools and the education department) and the administrators, often at national level, to improve learner performance in schools. Standardised Assessment is therefore a management tool that both measures the actions of the implementing agents and provides information about developing improvement strategies in schools (Woessmann, 2007). The intention in using Standardised Assessment is to provide information to people outside the school – the general public, in other words - and to parents in particular, with the aim of developing intervention strategies to improve performance (Mons, 2009).

School managers are responsible for supporting teachers and learners to understand which employee activities are critical to the attainment of organisational objectives. Often it is difficult to determine whether changes initiated by government for performance improvement actually do contribute to improvements in performance because one cannot objectively assess what has changed following an improvement

intervention. Yearta, Maitlis, and Briner (1995), and Hinsz (1995), using Goal Theory Research to measure assessment, found that well-defined, challenging, and attainable goals improve performance. In addition to assessment theory, two other leading goal theory scholars, Locke and Latham (1990), found that performance in assessment is enhanced when goals that exist are specific, difficult but possible, generate commitment, and provide feedback mechanisms.

1.9. RESEARCH METHODOLOGY

1.9.1 Research approach and design

This is a qualitative study which capitalises on ordinary ways of getting acquainted with things (Stake, 1995). Furthermore, the data does not include judgments about whether what occurred was good or bad, appropriate or inappropriate, or any other interpretive judgements: it simply describes what occurs (Patton, 2001). According to Merriam (2007), qualitative research is an umbrella term used to describe forms of enquiry which assist us to understand and interpret the meaning of social phenomena with as little description of the natural setting as possible (Merriam cited in Hogdskiss, 2007). Bassey (1999) believes, moreover, that the term, 'qualitative', could be used to describe the data collected by interpretive researchers in that it usually consists of field notes, reports and interviews. With reference to the researcher's study of post-intervention strategies of Annual National Assessment of Grade 6 Mathematics learners in Manómbe Circuit, the qualitative approach is most appropriate because it could provide rich information gleaned from participants involved in post ANA intervention strategies to improve performance.

This study used a case study design approach located in an interpretive paradigm. According to Gay, Mills and Airasian (2009), a case study enables the researcher to gather comprehensive, systematic and in-depth information about each case of interest. A case study is, in fact, the study of an instance in action (Cohen, Manion and Morrison, 2000). It could provide a unique example of real people in real

situations, enabling readers to understand ideas more clearly than simply presenting them in the form of abstract theories or principles (Cohen et al., 2000). Given that this study is an investigation into a specific small set of Mathematics teachers, Mathematics Heads of Department and principals – as people responsible for ANA in schools - it lends itself very well to the bounded characteristics of a case study and the nuanced interaction between elements for which an interpretive case study is deemed suitable.

This research is informed by an interpretive paradigm concerned with interpreting and understanding human actions (Merriam, 2008), hence data collected by interpretive researchers is usually so rich that it requires interpretation of language (Bassey 1990). According to Merriam (2008), the best way to understand a phenomenon is by studying it in its natural context, such as a classroom because the phenomenon, requires not only a rich description but also, according to Hodgkin (2007) some explanation for its occurrence / existence. The interpretive researcher should, therefore, be able to identify emerging patterns of meaning which s/he then has to interpret in order to gain a better understanding of the phenomenon (Connole, 2007).

1.9.2 Sampling

The researcher employed purposeful sampling as a means of selecting research participants. Leedy and Ormrod (2010) describe purposeful sampling as a sampling method in which a researcher selects participants or individuals that will yield the most information on the topic or phenomenon under investigation. Manómbe Circuit consists of 20 primary schools but only four of them were purposively sampled for this study. The 12 participants selected are 4 Grade 6 Mathematics teachers, 4 HoDs and 4 principals. The sampled participants are all involved in the teaching of Mathematics in Grade 6. Heads of Departments in Mathematics are in charge of Grade 6 Mathematics teachers, and principals are chief coordinators of ANA in schools. The sampled participants consented to participate in this study and,

since schools from varying socio-economic circumstances were purposively selected, the sample reflects most of the characteristics and attributes of population representivity (Neuman, 1994; Strydom and De Vos, in De Vos, 2005). In using the purposive sampling method the researcher was able to acquire information that would assist him in constructing arguments towards a deeper understanding of the ways in which participants understand the post-intervention strategies of ANA for Mathematics in schools.

1.9.3 Interviews

The researcher used semi-structured interviews to collect data for this study. Interviews allow a specialised form of communication between people for a specific purpose associated with some agreed subject matter (Arsenault and Anderson, 2000). Semi-structured interviews are highly purposeful and go beyond mere conversation. Arsenault and Anderson (2000) point out that the strength of the semi-structured interview is that it allows for the clarification of questions and makes allowances for the probing of participants' answers, thereby ensuring that information is complete and available in written form. Interviews provide participants with the opportunity to discuss interpretations of their world and to express, from their own point of view, their impressions of a situation (Cohen et al., 2000). Interviews are therefore the predominant mode of data collection in case studies and qualitative research (De Vos, 2005).

1.9.4 Data analysis

Data analysis of the information collected in Mopani District Primary schools highlighted several factors about post ANA intervention strategies in Grade 6 Mathematics. Data analysis continued after data collection and a process of data reduction, data display, results, conclusion and verification was used (Miles and Huberman, 1994). The deductive data analysis strategy was used to synthesise and make sense of massive raw data and information (Best and Kahn, 1998). Basically,

this method involved coding, categorising (grouping) and interpreting data through provisionally preconceived categories (Bell, 1998; McMillan and Schumacher, 2001). In this approach data codes and categories are decided in advance to aid the researcher in the analysis of data. Thus, when the researcher began his analysis and exploration of the data, he was guided by the research questions, research problem and the theoretical framework (Best and Kahn, 1998, (McMillan and Schumacher, 2001; Neuman, 2006; Best and Kahn, 1998).

1.10. TRUSTWORTHINESS AND CREDIBILITY

Multiple strategies were employed by the researcher to ensure and enhance the validity and reliability of data. To seek corroboration of the information gathered the researcher compared and cross-checked data from interactive interviews. This strategy of enhancing data validity and reliability is called "Investigator triangulation" (Cohen, Manion and Morrison, 2010), or "Multiple researchers" (McMillan and Schumacher, 2001). Participant reviews/member checks or respondent validation helped to ensure the credibility and trustworthiness of data through triangulation, a way of assuring "agreement" between different sources and methods of information. To provide readers with the possibility of assessing the trustworthiness and credibility of the researcher's interpretation of data, information collected from the research was presented in direct quotes and as vignettes. All the above enlisted strategies outlined were continuously used during the data gathering and data analysis exercises.

1.11. ETHICAL CONSIDERATIONS

Ethical considerations are of the utmost importance when conducting research (Strydom in De Vos, 2005) since they are concerned with beliefs about what is wrong and / or right from a moral perspective (McMillan and Schumacher, 2001). Research ethics therefore demands compliance with acceptable research norms, morals, standards and principles. To conform to and comply with the University's research

ethical codes, guidelines, protocols and practices, permission to conduct research was applied for from the Limpopo Department of Education in the Mopani District office. Further permission was sought from the Ethics Committee of the University of Pretoria.

After approval was granted, and prior to entry into the research sites (primary schools), the researcher sought permission from the school SGBs and consenting participants. The researcher accepted the assertion that research contributes to scientific knowledge and that human and technological advances are based on this knowledge. The researcher, in line with Strydom (2005), promised non-deception of participants, non-violation of participants' privacy, and the non-release and non-publication of the research findings.

Having obtained informed consent, the researcher honestly and openly explained the nature, aims, purpose and educational benefits of the study to participants. The researcher also explained the fact that participation is voluntary and withdrawal from the study was allowed at any time. The participants' consent, confirmed through the signed consent form, indicated agreement to be interviewed. All these forms were in English, a language understood by the participants. Ethical issues of confidentiality, anonymity and privacy, non-disclosure or discussion of information gained from an interviewee deliberately or accidentally were promised to avoid identification of individuals (Wiles, Graham, Heath and Charles, 2008). Names of the participants and schools are not disclosed, and pseudonyms are used throughout the study. All information is written in a way that does not reveal or identify participants from whom the information was obtained. The data gathered in this exercise will solely and strictly be used for the purpose of this research project. During and after completion of the study, the raw data will be safely stored by the researcher at the University of Pretoria.

1.12. LIMITATION OF THE STUDY

This study is confined to Grade 6 Mathematics learners, teachers, HODs and principals. This is, therefore, a limited study confined to selected participants in schools found in the disadvantaged rural areas, in Giyani who are involved in Grade 6 ANA of Mathematics.

1.13. SIGNIFICANCE OF THE STUDY

The study aimed to explore post-intervention strategies used for Grade 6 ANA of Mathematics in public primary schools. The study may create awareness of the plight of schools' instructional strategies to improve performance in Mathematics at primary schools post ANA of mathematics. Curriculum advisors and district officials may also benefit from the study by taking cognisance of effective/successful support strategies that emerge from this study.

1.14. SUMMARY

In this chapter, Chapter 1, the researcher presented the research purpose, explained the rationale for the study, and indicated what the research questions were. The researcher also briefly described the research design and the measures that were taken to ensure the trustworthiness and credibility of the study. The researcher acknowledged the limitations of the study, and indicated the possible significance of the study to the greater research community.

CHAPTER 2
LITERATURE REVIEW

2.1. INTRODUCTION

In the previous chapter, I presented my research purpose, explained the rationale for the study and indicated what my research questions were. I also briefly described my research design and the measures that I took to ensure trustworthiness and credibility of the study.

Chapter 2 deals with the literature review. It focuses especially on post intervention strategies employed to improve performance in the Annual National Assessment of Mathematics in Grade 6. Factors resulting in poor performance are also highlighted. The literature review also includes a look at the importance of ANA in Mathematics, factors that contribute to poor performance as well as factors that could contribute to improved performance in Mathematics post ANA of mathematics.

2.2 SCHOOL LEADERSHIP AND MANAGEMENT

Schools require effective leaders and managers if they are to provide the best education for their learners. Kurian (2008) indicates that the important role of school leadership in the success of the schools is undeniable. This view is supported by Fullan (2007) when he states that the quality of leadership makes a significant difference to school and learner outcomes. In order to improve teaching and learning, the DBE should give more time and space for school leaders and managers to develop policies and strategies that will solve problems in their specific teaching and learning situations. The Constitution of RSA (1996) also declares that improving the quality of learning requires strategies which focus on change at school and

classroom levels, therefore managers can no longer simply wait for instructions or decisions from government.

A study conducted by Kurian (2008) reveals that effective management and leadership is an essential characteristic of a successful school. Poor performing schools require visionary and innovative managers to turn them into centres of excellence. Effective leadership, based on sound knowledge of management and leadership, is essential to the improvement of learner performance. Kellaghan et al. (2011) concur that strong and visionary leadership, provided by head teachers and principals, is often the driving force behind improved outcomes for children with low performance in schools. Members of School Management Teams (SMTs), as senior decision-makers, play a key role in improving teaching strategies by providing extensive professional development in evidence-based programmes and practices. Monitoring and evaluation of teaching and learning should be part of checking intervention strategies put in place at the school.

According to Clarke (2001), structural leadership changes should be instituted to allow for meaningful involvement in decision- making by teachers, and the school community. Kurian (2008) indicates that supportive communication should take place within these groups. The actions needed to support such involvement of stake-holders should be a formalised participation of learners, teachers, families and community members in site-based decision making teams. School leadership councils, strategic planning and school improvement teams should develop programs to support learner's Personal Plans for Progress to allow learners to plan their learning and the activities to support it. Family involvement may offer significant opportunities for monitoring learners' progress on a regular basis if family and community members are involved in curriculum conversations. Regular meetings with families over weekends, or at home, where possible, should be accommodated in their work schedule.

2.3. THE IMPORTANCE OF ANNUAL NATIONAL ASSESSMENT AND MATHEMATICS TESTING IN SOUTH AFRICA

The use of ANA to test learners in Mathematics seems to be a priority for the South African education system. According to Elmore (2008), one reason for the implementation of ANA testing, especially in Mathematics is to gauge the standard of performance of learners in Mathematics as compared to the rest of the world. Moloi (2010) indicates that South Africa's participation in local, regional and international studies points towards consistently low achievement among learners in public schools. The researcher further indicates that this low achievement by learners prompted a proactive introduction of more regular and standardised testing in all grades, particularly at the key transitional stages. The DoE (2011) indicates that ANA is a strategic tool for monitoring and improving the level and quality of basic education, with a special focus on the fundamental skills of Mathematics and English. According to Moloi (2010), ANA serves as a diagnostic tool to identify areas of strength and weakness in teaching and learning; exposes teachers to better assessment practices; provides the education department with information to support schools in need for assistance and empowers parents by giving them information about the education of their children. Therefore ANA assists School Management Teams (SMTs) to develop and implement school-based intervention for improving learner performance in Mathematics.

2.4. FACTORS THAT CONTRIBUTE TO POOR PERFORMANCE

Over the years, performance in Mathematics has continued to show a downward spiral (DBE, 2011). A study by Mbugua (2012) found that factors contributing to poor performance in Mathematics are divided into three categories, namely: *learner factors* (which include entry behaviour, motivation and attitude); *socio-economic factors* (which include level of education of parents and their economic status), and *school based factors* (which include availability and usage of teaching and learning facilities, school type and teacher characteristics). Various studies by Makgato and Mji (2006);

Eshiwani (2001); Mbugua (2012); and Spaull (2011) have discovered other factors that also contribute to poor performance in Mathematics. They are the use of student-centred approaches, a lack of professional exposure, the education and economic level of parents; lack of teacher and learner motivation in Mathematics, curriculum coverage, and a shortage of textbooks.

2.4.1 Learner factors

According to Burnmaster (2005), the performance of learners should be investigated in conjunction with indicators of opportunity-to-learn for learners, such as class attendance. Such opportunities could highlight attendance irregularities related to performance. These indicators are early signs that might determine learner academic performance and indicate, before it is too late, whether or not remedial measures are required. The effects of learner participation in extra-curricular activities also relate to learner performance in academic life (Burnmaster, 2005). When these indicators are known, it becomes easy for teachers to see that a learner has learning difficulties and the necessary assistance could then be provided. In a study conducted in India and South Africa by Sayed, Subrahmannian, Soudien, Carrim, Balgopalan, Nekhwevha, and Samuel (2007), it was found that the indicators in both countries, where language is a barrier to learning, are similar. In South Africa, there is a blanket denial of access to mother tongue learning, while in India children are forced to learn Hindu at the expense of their mother tongue. The researchers point out the link between the struggle of Grade 6 learners to interpret English questions and their poor performance in Mathematics, thus the need to consider language in intervention strategies.

According to Mbugua (2012), absenteeism and late coming by learners is another factor responsible for poor performance. Makgato and Mji (2006) established that the lateness, absenteeism and irregular school attendance results in learners finding it difficult to understand material taught in their absence. Makgato and Mji (2006) indicate, moreover, that difficulty in the understanding of Mathematics also results

in stagnation and falling behind in content and knowledge learning. Their views are supported by Davidson (2008), who purports that absenteeism causes disruption in lesson instruction because the truants need extra attention from the teacher. This, in turn, forces good attendees to take a step backward because they have to wait for the teacher to help the truants catch up (Davidson, 2008). Moloi (2010) states that many learners whose teachers are regularly absent, have lost their respect for, and trust in, these teachers. Teacher absenteeism reduces the amount of instructional time and this leads to the syllabi not being completed. This, in turn, results in a lower output of work by learners (Mbugua, 2012).

According to a study Mullins (2005) conducted in England, motivation to learn is a factor that can assist in the improvement of learner performance in Mathematics. The findings of this research indicate, moreover, that motivation is often affected by the rate and enjoyment of learning. According to the study, once an individual has experienced something, and has stored that experience, while also enjoying that experience, he or she will be able to refer to and use it at a later stage. The study also found that reward and punishment affect motivation and attitude towards learning. Learners who get punished may cease to enjoy learning in that subject. This may result in poor performance. On the other hand, rewarding good work and conduct during the teaching of Mathematics may have a positive effect on the improvement of learner performance in Mathematics.

Anderson (2007) suggests that maintenance of high motivation influences psychological and social functioning and facilitates academic performance as well as positive school perceptions. Mullins (2005) concurs, arguing that motivation is fundamental to high level academic performance, and that a learner can make good progress if he/she is motivated by his/her subject teacher. This may enhance the effectiveness of teaching and learning since neither can be effective without a relationship between a teacher and his/her learners in which both parties are motivated to accomplish the mission of good academic performance.

2.4.2 School based factors

Makgato and Mji (2006) found in their study that poor Mathematics performance is, on the one hand, the result of teachers using student-centred approaches and, on the other hand, a lack of professional exposure to new developments in the teaching of Mathematics. The researchers indicate that s lack of proper and effective approaches in the teaching of Mathematics is caused by a shortage of curriculum specialists who are supposed to provide expertise and guidance in the teaching of Mathematics. The study also found that the absence of parental involvement contributes to poor learner performance in Mathematics. If teachers were continuously supported in Mathematics' teaching approaches, and if parents devoted their time to helping their children in Mathematics, learner performance would improve.

According to a study conducted by Miller (2005) high-achieving schools are those where the syllabus is completed. The completion of the syllabuses for each class provides a good foundation for the next class to build upon; when the syllabus is not completed, content has to be taught again in the next class. Miller (2005) states that the non-completion of the syllabus has a cumulative effect on learners as they move from grade to grade because learners encounter material for which they have no foundation and, consequently, end up performing poorly. According to Li (2005), other factors which contribute mostly to syllabus coverage are absenteeism, teachers' workload, school discipline, time management, sickness, group discussions and supervisory activities by the heads of departments and institutions. Mbugua (2012) also agrees that absenteeism by teachers and learners alike play a major role in the non-coverage of the syllabus. My understanding is that when the teacher needs to complete the syllabus and fails to do so, learners will have problems in responding to the questions in the examination and as a result their performance will be poor.

2.5 TEACHER MOTIVATION AND ATTITUDE TOWARDS MATHEMATICS

According to Mbugua (2012), learner factors such as motivation and attitude play an important role in the poor performance of learners in Mathematics. According to the researcher, motivation and attitude of learners is very important in determining learners' levels of performance. The study indicates that a lack of teacher commitment and dedication results in learner demotivation which, in turn, leads to poor performance. Once learner attitude and motivation improve, performance in Mathematics follows suit. Motivated learners with a positive attitude in Mathematics tend to concentrate more during Mathematics learning and may devote more time to studying it. Lastly, the study also found that school based factors, such as the availability of resources, usage of teaching learning resources and school type, also play a role in the poor performance in Mathematics. When a school does not have adequate resources to assist with teaching and learning, performance suffers. In support of the findings Mbugua (2012) suggests that performance in Mathematics at primary schools is influenced by variables such as learner ability, attitude and perception, family and socio-economic status, and low expectations by principals and teachers

2.6. FACTORS THAT CONTRIBUTE TO GOOD PERFORMANCE IN MATHEMATICS

Regardless of uncertainties regarding the future of South African learners who perform poorly in Mathematics, there is some hope that performance in Mathematics could improve. Various studies (Mullins, 2005; Anderson, 2007; Brodie, 2007; Attard, 2011; Jacobson, 2010, and Miller, 2005), found that learner performance in Mathematics could be improved by motivation, increased knowledge of subject matter, adherence to policy documents, frequent teacher development, strong curriculum leadership and management, instructional leadership, high standards and expectations for learner success, adequate curriculum resources and effective support from curriculum advisors.

Brodie (2007) identifies subject knowledge as one of the most important knowledge types that teachers should possess in order to teach effectively. According to Brodie (2007), a Mathematics teacher with a good knowledge of subject matter will be able to assist learners in gaining the indispensable mathematical reasoning required in life. Teachers of Mathematics, who are able to make their lessons more learner-centred, will help learners to improve their performance in Mathematics. It follows that the subject matter knowledge of Mathematics teachers is a factor in learner performance in Mathematics. Attard (2011) indicates that schools need quality teachers who have the appropriate knowledge and the art of teaching. According to the researcher, teachers are one of the most powerful influences on learners' engagement in Mathematics, and such teachers, according to Tobia (2007), create experiences that help learners make sense of the knowledge and skills being taught. Attard (2011) also argues that good Mathematics teachers, who have specialised in Mathematics teaching, can achieve high and consistent levels of engagement and effective learning which, in turn, will lead to learners performing better in the subject that is taught.

Mirshra and Koehler (2006) supports the above researcher and add that teachers need to have a good grasp of the subject matter before being able to transform learners' conceptions of the topic. A good teacher prepares and gives explanations that will help eliminate or reinforce conceptions as necessary. According to Turnuklu and Yesildere (2007), knowledge of Mathematics and knowledge of mathematical representations are related to content knowledge. The teaching of Mathematics topics starts with the teacher's understanding of what must be taught and how it must be taught to the learners. Such a teaching process consists of a range of activities, with learners being given a series of instructions and the opportunity to learn.

2.6.1 Departmental policy documents

Adherence to departmental documents such as CAPS, NCS and FFLC could improve learner performance in Mathematics. According to Brodie (2007), the NCS in South Africa calls for teachers to make sure that learners participate during Mathematics lessons and express their knowledge of mathematical ideas. Getting learners to talk is important because it shows that they are attentive during lessons. This creates the opportunity for them to express and clarify their own ideas, and to share these with each other. At the same time it provides teachers with information on what learners know and do not know as well as of how learners are thinking and trying to make sense of ideas.

The DoE (2008) expects teachers to lay a solid foundation for learning by making sure that all Grade 1-6 classes have the basic resources they require to teach effectively. Every teacher must set aside time for reading and working out Mathematics tasks every day (including 10 minutes of mental Mathematics). Teachers must monitor and track learner progress and give feedback to learners and parents. The DOE (2010) further indicates that teachers have to plan and teach according to the prescripts of CAPS. When teachers adhere to departmental documents when teaching learners, learners perform better because these departmental documents guide teachers on what to do at what time, a factor that could be said to address the issue of curriculum coverage.

Good teachers get continuous professional development in their learning areas to enable them to improve learner performance. According to Jacobson (2010), In Service Training (INSET) adds an undeniable value to the efficiency and effectiveness of service delivery. It yields increased productivity, reduces costly mistakes, increases job expertise and work standardisation. Attendance of workshops, courses and seminars as professional development opportunities should be organised by education district officials on a continuous basis (Kellaghan, 2008).

Subject committees should be established in schools and professional programmes should be aligned to teachers' needs.

Subject committees could elect strong curriculum leaders who have the ability to empower other teachers in their efforts to improve learner performance in Mathematics. According to the DoE (2010), the management of curriculum requires strong leadership from principals and teachers. Curriculum leadership and management is an essential element in the improvement of learner performance in the entire school. According to Turney (2010), principals should work together with teachers and school communities to develop a highly detailed definition of what is intended for each learner achievement. In school situations principals, SMTs and teachers are curriculum managers, and each level must execute its functions in a manner that contributes to the effective management of the curriculum. Sharples et al. (2011) agree that learner performance improves when teachers understand the curriculum and its elements for effective implementation.

2.6.2 Instructional leadership

According to Miller (2005), instructional leadership emphasises supportive behaviour by principals. The instructional leader should promote quality instruction by encouraging teachers to attend teacher conferences on Mathematics issues and by doing evaluations of Mathematics teaching through class visits. Evaluations are important because the principal can use them to provide specific suggestions and feedback on Mathematics teaching and learning processes but also for determining teacher assignments for Mathematics learning. Additionally, the principal may allocate and protect instructional time with school policies and procedures on Mathematics teaching and assessment. Kurian (2008) indicates that the principal should frequently work with teachers to coordinate the curriculum and to align school goals and objectives with state standards for curriculum assessment and for the monitoring of learner progress.

2.6.3 Setting standards and expectations for learner success

Setting high standards and expectations for learner success is a factor that can improve learner performance in schools. Schmidt and Wang (2005) indicate that learners must be made to believe that they are capable of learning Mathematics content and achieving its performance standards. Learners need to be offered an ambitious goal and be assisted to overcome significant barriers that stand in their way. Teachers need to change their perceptions about learners' current levels of achievement to enable learners to conform to the standards and expectations (Fuchs et al., 2008). Once the standards and expectations for learner success have been set, learners are accountable for the consistent completion of work within the established quality standards. According to Schmidt and Wang (2005), challenging assignments that are appropriate to Mathematics learning should be set. Teachers should maintain high standards of learning and learner behaviour to reflect classroom practice related to standards and expectations. All learners should receive constructive feedback regardless of their levels of achievement and remedial lessons should form part of teachers' schedules for learner improvement.

2.6.4 Support from curriculum advisors

Curriculum specialists play an important role in supporting schools to improve learner performance through curriculum practice. According to the DoE (2010), effective curriculum support, and monitoring that is non-threatening, is the responsibility of district curriculum advisors and curriculum specialists, who must provide such support to the teachers at schools. The DoE (2010) stipulates that curriculum advisors must visit schools for monitoring and support in curriculum implementation of the relevant subject. Curriculum advisors provide relevant teaching and learning material to improve performance in particular subjects. De Clerq (2008) states that the support given to teachers in their delivery of the curriculum in the classroom results in improved performance in schools. All schools that get support from curriculum advisors have improved their learner performance

because teachers are assisted with different approaches that may be used in the classroom to accommodate all learners in the classroom.

A study by Li (2005) also found that the availability of adequate curriculum resources is a factor that can help improve learner performance in Mathematics. According to Li (2005), the minimum standard of one textbook per learner per subject is a norm for the Department of Education. The DoE (2010) regards teaching and learning resources as essential to the effective running of an education system and these materials are an integral part of curriculum development. A well-resourced classroom should ideally include learning support materials. According to the DoE (2010), textbooks must be ordered in time for all learners, and schools should manage the use of these textbooks by storing them in a safe place to prolong their lifespan for future use by other learners.

2.7. STRATEGIES EMPLOYED BY SCHOOLS TO IMPROVE PERFORMANCE

According to (Choi and Tang, 2009), good practice in the learning and teaching of Mathematics should reflect creativity and innovation which match the needs of learners whilst also providing them with challenges and support. Teachers should not only ensure that learners' experiences are enjoyable but should also strive for a balance between teaching and the provision of support interventions. Fennel (2010) describes intervention as a structured plan for providing instructional materials and activities to support student learning during class time, or in programs before school, after school, or during summer school. Teaching should aim at developing learners' independence in and responsibility for learning (Fennel, 2010). Zohar et al. (2001) emphasise that intervention strategies are necessary for learners at primary schools who struggle to perform well. When support interventions are considered, they should be aligned to the aims and goals for conducting the particular exercise concerned. Fennel (2010) is adamant that, in most instances, interventions help decrease retention rates and lower failure rates; moreover, learners are given

additional opportunities to master concepts, a strategy which would hopefully raise performance levels.

According to the Centre on Response to Intervention (CRI) (2010), which supports Mathematics subject leaders and teachers with intervention strategies, support to school leaders and teachers is essential to the improvement of the quality of teaching and learning and the achievement of better results. The CRI (2010) suggests that a team of staff be established to deal with intervention strategies as a matter of urgency. Such a team must consist of an intervention leader, subject leaders and teachers. According to the Centre on Response to Intervention (2010), the intervention leader should be a senior member of staff responsible for the planning for the provision of intervention programmes - the principal for example. The principal, who is responsible for curriculum and instructional activities in the school, should, in his/her role as a change agent, build the capacity of the intervention team through training (Turney, 2010). Departmental heads, who work under the principal in schools, are subject leaders, who have knowledge of the subject area, and are responsible for managing subjects in grades and across phase. Therefore principals and departmental heads should coordinate the use of interventions in a subject department to ensure that teachers teach according to the policy document provided by the DoE (Fennel, 2010). Different strategies for schools teaching Mathematics, especially in Grade 6, emphasize the importance of interventions to improve the performance of learners (De Clerq, 2008; Hoadley, 2010; Kellaghan and Greaney, 2008); Ball, Hill and Bass, 2005); Zohar et al., 2001; Jacobson, 2010; and Murnane, Sharkey and Boudelt, 2010). Strategies such as performance management, the use of correct teaching and learning methods, effective Mathematics teaching, the use of data to guide and improve learning, the use of data to support teaching, data teams and strong leadership in the use of data have resulted in improved performance in mathematics learning.

2.7.1 Performance Management

Learner performance could also be improved through the management of teacher performance (PSC (2007). Performance management is one of the processes that should be followed in schools to improve teacher competencies, raise teacher enthusiasm and meet performance expectations. Performance management should be done annually and on an on-going basis. Improving teaching may also lead to improved results, and once performance has improved, recognition and rewards should be given to teachers deserving them (PSC, 2007).

Based on the findings of his study, De Clerq (2008) also indicates that performance management has become a key instrument used by policy-makers to improve education, to raise levels of attainment and to increase the accountability of teachers. According to him, performance management uses indicators such as pupil test scores to rank pupils, schools and countries and to generate performance targets that are used to manage performance. Internationally, countries such as Scotland are also using performance management and measurement in a number of ways, in particular as part of their efforts to raise pupil attainment and improve teacher performance (De Clerq, 2008).

In support of De Clerq, Hoadley(2010) claims that improvements in the effectiveness of teachers have a major impact on the performance of the country's schools, in particular the attainment of children across the education system. The researcher further indicates that teachers are by far the biggest resource in schools, and that major reforms are needed to the performance and pay system for teachers. The researcher also indicates that assessment of teachers for performance appraisal should be based on three core factors, namely improvement in classroom results, reviews by head-teachers, and external appraisals. The DoE should also consider other factors such as previous qualifications, previous experience, or years spent teaching. My opinion is that for teachers to perform to the best of their ability, the

DoE should find means to recognise and reward good performance because good performance will indirectly lead to improved learner performance.

2.7.2 The use of differentiated teaching and learning strategies

The use of correct teaching and learning techniques is also a strategy that can improve performance in Mathematics. According to a study conducted by Kellaghan and Greaney (2008), Mathematics teachers use different strategies in the teaching of Mathematics. Included in these strategies are problem posing and problem-solving, investigation, observation, modelling, reading, group work, drill and practice and examples. Informing the use of strategies like these is the assumption that learning will only be effective if learners engage with worthwhile and challenging mathematical tasks that help them develop a deep and coherent conceptual understanding of Mathematics. Teaching and intervention strategies should enable learners to recognize and understand the interrelatedness of the Mathematics concepts they learn. Moloi (2010) indicates that during the teaching of Mathematics the teacher should therefore create an environment in which effective teaching relies on the understanding of Mathematics and the understanding of learners.

Mathematics teaching should be structured in such a way that learning opportunities are appropriate to the needs of the particular learner, while learning support should encourage learning. Because different learners learn in different ways, the teacher should be able to accommodate all the learners in a lesson. This is only possible if learner differences are taken into account during the planning of intervention strategies for teaching and learning (Carnoy, Chisholm, Addy, Arends, Baloyi and Irving, 2011). Ball, Hill, and Bass (2005) suggest that comprehensive teacher content knowledge is a contributing factor in improved student learning. According to Zohar et al. (2001), a teacher also needs pedagogical content knowledge or specialised Mathematics knowledge for teaching and should have higher expectations of their learners. According to Mahlo (2008), the key role of the school

leader/manager is to guide and support staff to provide opportunities for learners to be motivated through achieved skills. Examples of teaching strategies which could provide innovative approaches to learning include personalised learning, experiential learning, assessment for learning and a variety in teaching approaches and learning styles.

Murnane, Sharkey and Boudelt (2010) argue that intervention strategies which address the needs of learners include having them work in small groups or pairs. This arrangement is a beneficial instructional strategy for struggling learners because learners who need intervention may be insecure about their abilities and may feel comfortable working with motivated learners. Small groups or pairs are less intimidating for struggling learners and may lead to them learning to ask questions and admitting when they get confused. Murnane et al. (2010) indicate that this instructional strategy can make it possible for teachers to spend time listening to, observing, and providing support to learners as they work on given tasks such as an assignment or project.

Murnane et al. (2010) further state that teachers must also use differentiated strategies to improve mathematics learning. The researchers indicate that many learners who need intervention struggle to learn concepts because they may not able to grasp abstract concepts. Teachers need to vary their instructional techniques to best address the learning styles of their struggling learners: the more varied the instructional strategies which they incorporate into their lessons, the more likely it is that they will be able to reach all learners. The incorporation of multiple representations when introducing new concepts could help to address the needs of all learners in the learning process. Such representations may include manipulative representations and models, real life examples, technology, and symbolic representations (Mahlo, 2008).

2.7.3 Teaching and learning culture

Teacher knowledge and classroom culture are also factors contributing to the effective teaching and learning of Mathematics. Project Good Start (William and Thompson, 2005) found that effective teachers have high expectations of all learners and set challenging tasks and goals appropriate to each learner. Such teachers integrate their content knowledge and their teaching skills to make connections that capture learner interest, sustain their involvement and monitor their progress by using their knowledge of each learner's current achievement and of the steps appropriate to the provision of feedback (William and Thompson, 2005). Key elements emerging from studies examining effective teaching practices focus on concepts and thinking, encouraging children to share their strategies and solutions with the teacher and the class as a whole (William and Thompson, 2005). Fuchs et al. (2008) regard the key to improved learning as the assurance that good teaching is the norm rather than the exception in classrooms. The most powerful strategy to improve both teaching and learning, however, is not by micro-managing instruction but by creating the collaborative culture and collective responsibility of a professional learning community (PLC)(William and Thompson, 2005).

Moloi (2010) indicates that with regard to Mathematics, learning should occur in a climate that fosters participation, thinking and good working relationships among the teacher and the learners. According to her, the factors that help create an atmosphere conducive to learning are group arrangement, cleanliness of the classroom, availability of light, the conduct of teachers - which include respect, being approachable, warm and supportive. Creating a climate conducive to learning may help learners to relax and feel comfortable, and these feelings, in turn, may contribute to their improved performance in Mathematics.

2.7.4 Using Data to guide and improve learning

A study conducted by Lewis et al. (2008) indicates that data analysis could provide a snapshot of what learners know, what they should know, and what could be done to meet their academic needs. According to these researchers, teachers could, following the appropriate analysis and interpretation of data, make informed decisions that positively affect learners' achievement of outcomes. Research has shown that using data for decisions making could lead to improved learner performance (Wayman, Cho, & Johnston, 2007; Wohlstetter, Datnow, & Park, 2008). Elmore (2005) contends, however, that a single assessment cannot help the teachers make well-informed decisions; therefore it is important to make use of multiple data sources such as learners' attendance, behaviour and performance. Developing intervention strategies for performance improvement may be determined by how the information is used (Hamilton et al., 2009). On-going data collection and analysis on learners are important to the improvement of poor performance and should be incorporated into the teacher's planning schedule since the findings may point directly to a specific section with which learners are struggling. Teachers could learn a lot about learners' difficulties by analysing samples of their work (Lewis et al., 2008). According to Fuchs et al. (2008), learners could be given academic support through extra lessons, remedial lessons, and reading labs, and these academic support programs should be facilitated by a qualified and dedicated person who supports the school's vision.

2.7.5 Using data to support teaching

According to Fuchs et al., (2008), using data to support teaching is a strategy that could help to improve performance in Mathematics. The researchers indicate that data-based support includes helping teachers use assessment results and learners' work samples to identify and address learning difficulties and academic needs. They further indicate that it also includes training on approaches such as Response to Intervention and the Professional Teaching and Learning Cycle to help school staff members identify areas for improvement and modify their practice.

The idea of using learners' outcome data in such important areas as reading, Mathematics, and Science is a means towards the setting of priorities for professional development that has a measurable impact on learner performance (National Reading Panel, 2000; The Education Alliance, 2005). According to Lewis et al. (2008), the team's objectives for data use requires that all teachers engage in weekly quality professional learning to ensure the delivery of effective instruction to learners. Learner data from several sources and responses on standardized tests, writing samples, and projects should be analysed and interpreted during weekly meetings and the results of the analysis and interpretation should be used to adjust instruction, plan lessons, and develop intervention strategies for Mathematics teaching.

2.7.6 Establishing support teams

Intervention strategies may result in the improvement of performance in Mathematics if schools establish teams devoted to the setting and reviewing of learning goals and the organization of data collection, analysis, and interpretation (Boudett, City, & Murnane, 2005; Ikemoto& Marsh, 2007, and Murnane et al., 2005). Schools may establish and make teams like these central to their improvement process by providing them with rubrics, protocols, and other tools that will help them make sense of the data (Datnow et al., 2008; Ikemoto& Marsh, 2007). According to Hamilton et al. (2009), teachers at school can constitute the core of teams that examine learning goals, learner progress, and instructional interventions. Through their participation in these teams, teachers could learn more about the content they teach, consider interventions that might improve learner progress, and support one another in adopting new teaching strategies or school initiatives.

Boudett et al. (2005) indicate that not all the teams must be devoted explicitly to data examination: different teams should be established for different tasks. Teams should brainstorm strategies for intervening to improve learners' achievement and conduct

research on successful interventions and on how learners learn Mathematics. The outcomes of the research may lead to further research on the teaching of Mathematics concepts, or they may lead to a sharing of specific strategies for teaching these concepts, thereby encouraging teachers to use those strategies. Teachers implementing researched intervention strategies should be supported and well managed otherwise they might not be able to implement the intervention, resulting in intervention failure. The established team might also consider using the data in other ways, such as making an instrumental decision to focus a professional development session on teaching area concepts.

According to Boudett et al. (2005), after agreeing on strategies to address a problem, the team should set specific, measurable goals (long-term, medium-term, and short-term) to determine whether or not the intervention is working. They add that, for the short term, teachers could set goals for student performance on curriculum-embedded assessments and classroom activities; for the medium term, teachers could resolve to examine interim assessments for progress on items related to the area, or even construct interim assessments on area concepts to give to all their learners. The constructed tests would allow the teachers to diagnose learners' problems within the area more thoroughly. A shared assessment for the long term could be used to set as goal for learners the correctly answer a certain percentage of area problems on the next external test (Boudett et al, 2005). The team must identify a specific problem to address, design two to three strategies to address it, and provide detailed indicators of progress made towards its solution. The team should then continue developing a plan for collecting further data on the problems.

According to a study by Murnane et al. (2005), the team must always draw up an intervention plan for a single problem or document and share it with teachers in the school who might face the same problem. Boudett et al. (2005) further indicate that teachers belonging to the team may voice opinions on any needed revisions to the plan. Murnane et al. (2005) as well as William and Thompson (2008) indicate that, to implement the plan, teachers should consider forming learning communities around

each problem. These communities could then meet to share problems and successes in implementing the plan. Such collaboration would encourage and support adjustments along the way, and might also indicate whether or not the teachers are implementing the plan appropriately. Moreover, teachers should continue their conversations about successful instructional strategies for teaching specific mathematical skills.

According to Black and William (2009), plans for intervention strategies should entail formative assessment and interventions related to the problem at classroom level so as to encourage and monitor learners to develop a sense of ownership and accountability for their own data. Campbell (2006) contends that teachers need to work shoulder-to-shoulder in classrooms with colleagues, assisting one another in the collection and analysis of student performance data as well as in using data to inform planning, modelling of lessons and team teaching.

2.7.7 Leadership and the use of data

According to (Newcombo, Ambady, Eccles,Gomez, Klahr,Linn, Miller, and Mix, 2009), strong leadership is provided by a principal who works with staff to communicate the mission of the school, provide reliable support for staff, and meet with teachers and other members of the staff frequently to discuss classroom practices. Establishing a culture of data usage requires strong leadership, and this strategy could help improve performance in Mathematics. A number of researchers (Datnow et al., 2007; Hamilton et al., 2009; Ikemoto and Marsh, 2007) indicate that leaders should allocate time for teachers to meet on data analysis, time and specialist support for implementing data-based interventions with learners. Goertz, Olah and Riggan (2009) suggest that leaders who recognize that the most crucial data consumers are teachers will stimulate improved interpretations of data usage to improve instruction. According to Datnow et al. (2007), if teachers are able to draw useful conclusions from data, they will determine their own professional development, pedagogical content knowledge, data analysis, and formative

assessment needs. Leaders could also adopt technology-based systems for timely data capture, management, and analysis, and highly sophisticated systems could reveal ideas for instructional interventions appropriate to particular learners' needs (see Goertz et al., 2009). Finally, leaders could promote data use by not using achievement data to punish or embarrass teachers or learners (Firestone, 2009). Where data is used for blame, teachers will no longer view it as a tool for improvement.

2.7.8 Implementation of intervention strategies

According to Fennel (2010), the inclusion of teachers as part of decision making during the development of intervention strategies makes it easy for them to implement the strategies effectively. Implementation of the intervention strategies in the classroom may assist learners to achieve better results. According to Fennel (2010) strategies such as screening all learners should be developed to identify those at risk and/or with potential Mathematics difficulties. Screening might help in implementing developed intervention strategies or a variety of arrangements, or in grouping learners in ways that make them feel comfortable (Fennel, 2010). Learners may be grouped in small groups with other learners of similar (or different) readiness, interests, or learning profiles; partnered with someone who is similar in (or different from) them in terms of readiness, interest, or learning profile; individually or as a whole class (Fennel, 2010).

According to Cohen, Garcia, Apfel and Master (2006), group assignments may be selected by the teacher, by the learner, or randomly. Cohen et al. (2006) indicate that organisational factors such as the way learners are grouped for Mathematics instruction may provide support for learning. According to Wayman et al. (2007), another intervention strategy might be to group learners in terms of their performance in diagnostic assessments, by conducting one-on-one interviews with individual learners in order to improve their knowledge, understanding and ways of thinking within the relevant groupings. Learners should be allowed to verbalise

their thinking and ideas, to use errors to identify barriers of understanding and to inform instructional decisions. Cohen et al. (2006) indicate that intervention materials should include opportunities for learners to work with visual representations of mathematical ideas and interventionists should be proficient in the use of visual representations of mathematical ideas. Assessments should be seen as the beginning, not the end of learning, and the assessment results should tell the teacher what should be done to keep on assisting as well as guiding learners through teaching.

According to Newcombo, Ambady, Eccles,Gomez, Klahr,Linn, Miller, and Mix, (2009), effective school characteristics are what help to create a fertile school culture, one that facilitates learner achievement. Researchers such as Newcombo et al. (2009) have identified an emphasis on obtaining specific Mathematics goals and objectives, a belief that all learners can learn regardless of factors outside of the school's control, setting high academic expectations for all learners, achieving higher levels of efficacy in the teaching of basic of Mathematics skills, allocating more time to the acquisition of Mathematics, and embracing the school and state accountability assessment programmes. Learners excel when these factors (characteristics) are present, where schools are organised around high learner achievement, and where teachers demonstrate high expectations for learners' achievement and make learners aware of and understand these expectations.

2.7.9 Teacher quality and professional development

According to The Education Alliance (2005), a teacher quality and professional development system recognises a teacher's need for deep content and pedagogical knowledge and includes a broad set of recruitment, preparation, induction, professional growth, and retention policies. School Management Teams (SMTs) should help teachers develop and build on their Mathematics teaching skills and abilities over time, preferably in collaboration with other teachers and instructional leaders in order to promote effective Mathematics knowledge (Kvale, 2006).

According to a study by Louis (2010), for a flourishing school culture in which Professional Learning Community are involved, principals need to focus on five key steps: acknowledging that all learners learn at high levels, and enlisting the staff in examining every existing practice, program, and procedure to ensure it aligns with that purpose; organising staff into meaningful collaborative teams that take collective responsibility for learner's learning and working interdependently to achieve shared goals for which members hold themselves mutually accountable; calling on teams to establish a guaranteed and viable curriculum for each unit that clarifies the essential learning for all learners, agreeing on pacing guidelines, and developing and administering common formative assessments to monitor each student's learning at the end of each unit; using evidence from learner's learning to identify learners who need additional time and support to become proficient; through enrichment and extension of their learning using highly proficient teachers to help learners achieve at high levels. Team members could examine those teachers' practices and create a coordinated intervention plan which ensures that learners who struggle receive additional time and support for learning in a way that is timely, directive, diagnostic, precise, and most important, systematic.

In order to implement these five steps, managers could start by forming teams in which members share the responsibility of helping all learners learn essential content and skills, providing teams with time to collaborate, helping to clarify the work that teams need to do, and ensuring that teams have access to the resources and support they need to accomplish their objectives (Louis, 2010). The researcher also indicates that schools need to monitor learner progress to ensure that all learners are successful in attaining state and district standards. Teachers need to assess the indicators they are responsible for teaching on an on-going basis so that they will know where learners are at any given time in relationship to those indicators being monitored (Louis, 2010).

2.7.10 Learner support intervention programmes

According to the National Mathematics Advisory Panel (2008), learner support within the education system should be defined as all activities that increase the capacity of schools to respond to diversity and challenges faced by learners and staff as a whole. Research on comprehensive school reform suggests that improvement (intervention) strategies have the best chance of succeeding and of being sustainable when they take into account the broad array of elements that make up the system being improved (Harris et al., 2008). According to Harris et al. (2008), teachers must commit to the following to improve learner support programmes to the learners: rigorous curriculum and instruction; assessment and accountability; formal and informal assessment; co-operative/collaborative learning; differentiated instruction and teacher's use of teaching/learning resources. If teachers could implement these learner support/intervention programmes effectively, the performance of learners in Mathematics would improve markedly.

2.8. CONCLUSION

In this chapter, the literature review was discussed. The review focussed on the importance of ANA, especially in the South African education system. Indications from the literature review are that the main reason for implementing ANA in South Africa is to compare the level of performance of South African learners to those from other countries. The literature review also indicates that there are certain factors that contribute to poor performance in Mathematics. Amongst these are learner profiles, medium of instruction, absenteeism, insufficient syllabus coverage, lack of motivation, learner conduct, and a lack of resources. Further indications are that the post intervention strategies most likely to enhance learner performance in Mathematics are performance management, the use of correct teaching and learning techniques, the effective teaching of Mathematics, the use of data to guide and improve learning and support teaching, and strong leadership in the use of data. The next chapter, Chapter 3, will discuss my research approach and methodology.

CHAPTER 3
METHODOLOGY

3.1. INTRODUCTION

In the previous chapter, the literature review was discussed. This chapter attempts to give a blueprint of the various steps involved in the research study. What comprises qualitative research is identified and explained. The chapter also gives a detailed description of the sample and sampling techniques used in the study. Data collection methods (strategies) are described, and the strengths/suitability of each data collection technique is discussed. The research design of the study and the approaches and techniques that were used to collect, analyse and interpret data are presented. The chapter also describes the research goals and research questions, followed by a description of the sample, the research orientation, data collection tools, ethical protocols and validity.

3.2. THE INTERPRETIVE PARADIGM

This research is orientated within an interpretive paradigm. Bassey (in Nongubo, 2004) claims that data collected by interpretive researchers are usually rich and presented in understandable language. According to Merriam (2008), the interpretive paradigm is concerned with interpreting and understanding human action. The researcher claims, moreover, that the best way to understand a phenomenon is by studying it in its natural context such as a classroom since this allows for a rich description of the phenomenon under investigation. Studying a phenomenon in a natural setting also helps the researcher to gain a clear understanding of the phenomenon and of how it could be interpreted. Connole (2007) affirms that a researcher is able to identify patterns of meaning that emerge

while studying a phenomenon. This allows for a better understanding of the phenomenon and therefore for a better interpretation of the collected data.

3.3. QUALITATIVE RESEARCH APPROACH

The study used a qualitative approach. According to Merriam (2008), the term, 'qualitative approach' is an umbrella term used to describe forms of inquiry which assist researchers to understand and interpret the meaning of the social phenomenon being studied. Leedy and Ormrod (2010) indicate that qualitative research usually occurs in a natural setting. In this study, the use of qualitative research allowed the researcher to study and interact with participants in their natural setting, such as their workplace. Furthermore, Bassey (1999) believes that the natural setting characteristic of qualitative research lends itself well to the use of different data collection techniques such as field notes, reports and interviews. With reference to the researcher's study of post intervention strategies of the ANA of Grade 6 Mathematics learners in Manómbe Circuit, the qualitative approach was most appropriate because it allowed the researcher to use interviews which entailed face to face interactions that yielded rich information from participants answering the research questions.

In support of Bassey and others, Patton (2001) indicates that qualitative research uses a naturalistic approach that seeks to understand phenomena in a context-specific real world setting where the researcher does not attempt to manipulate the phenomenon of interest. According to Patton (2001), researchers using the qualitative approach seek illumination, understanding, and the opportunity to extrapolate to similar situations. In this study, the researcher aimed to get a clear understanding of the post intervention strategies of the ANA of Grade 6 Mathematics learners in Manómbe Circuit as well as of how the powers that be and educators deal with the challenges associated with Mathematics in Grade 6.

Qualitative research has special characteristics that make it suitable for this study. According to Spencer (2003), one of the special characteristics of qualitative research is its potential to provide in-depth information. This benefited the researcher who was able to use the in-depth information to present data that is rich and understandable. It also allowed the researcher to study the participants' social and material circumstances, their experiences, perspectives, and histories. Qualitative research is concerned with the opinions, experiences and feelings of individuals producing subjective data (Hancork and Algozzine, 2006).

Using qualitative research has special advantages for researchers. According to McMillan and Schumacher (2010), qualitative researchers take an in-depth look at the phenomenon they study in order to understand it more thoroughly. This assisted the researcher to study the participants thoroughly in order to gather a rich and thick description of data. Qualitative research methods can convey richness and intensity of detail in a way that quantitative research cannot (Rocha, 2004). It allows for a much more detailed investigation of issues, answering questions of meaning, of who is affected (by the issue), why they are affected in this way, which factors are involved, and whether or not individuals react or respond differently to each other. My opinion is that the use of qualitative approach can help to reveal more information about the topic being studied.

Again, qualitative research also has disadvantages that can derail the study of a novice researcher. According to Sarantakos (2005), a common criticism of qualitative research is that the samples are small and to that effect may not necessarily be representative of the broader population. The author also indicates that it is difficult to know to what extent someone can generate the results in qualitative research. On the other hand, McMillan and Schumacher (2010) indicate that the findings of qualitative research lack rigour and it is difficult to tell how far the findings are biased by the researcher's own opinions.

3.4 RESEARCH METHOD/DESIGN

According to Creswell and Clark (2011), research designs are procedures for collecting, analysing, interpreting, and reporting data in research studies and decisions about design, measurement, analysis and reporting all flow from the research purpose. On the other hand, McMillan and Schumacher (2010) describe a research design as a plan or blue print of what is intended when conducting research.

This study used a qualitative case study design. According to Gay, Mills and Airasian (2009), a case study enables the researcher to gather comprehensive, systematic and in-depth information about each case of interest. According to Cohen, Manion and Morrison (2000), a case study is the study of an instance in action whereas Rule and John (2011) describe it as the systematic and in-depth investigation of a particular instance in its context in order to generate knowledge. Gerring (2004) indicates that a case study is likely to produce first-hand information and provide distinctive opportunities for the in-depth analysis of a phenomenon. It could provide unique example of real people in real situations, enabling readers to understand ideas more clearly than simply presenting them with abstract theories or principles (Cohen et al., 2000). Given that this study was an investigation of a specific small set of Mathematics teachers, Mathematics Heads of Department (HoDs) and principals as chief coordinators at schools, it lends itself very well to a case study and also to the study of normal interactions between participants in a real life situation. The decision of the researcher for the use of the case study design was also informed by his research question.

According to Sarantakos (2005), case studies have the ability to provide in-depth information. The in-depth approach taken in case studies means that, by documenting and analysing developments as they occur, it is possible to provide timely insights into the factors that the researcher considers to be critical to the outcomes of the case under examination. The researcher further indicates that a case

study could include multiple perspectives. By collecting information from a range of different stakeholders such as teachers, HoDs and principals, the researcher can document multiple viewpoints and highlight areas of consensus and / or conflict. According to Regen, Martin, Glasby, Hewitt, Nancarrow and Parker (2007), a case study uses a wide range of data collection methods, including audio-recorded data, observation, interviews and field notes. The use of a range of data collection methods can give a richness and variety to the way that the research report is written up (Rocha, 2004).

Rocha (2004) further stresses that the results generated in case studies are more easily understood by a wide audience (including non-academics) as they are frequently written in everyday, non-professional language. According to the researcher, the findings are immediately intelligible and speak for themselves; they catch unique features that may otherwise be lost in larger scale data (e.g. surveys) and these unique features might hold the key to understanding the situation; they are strong on reality; they provide insights into other similar situations and cases; they can be undertaken by a single researcher without needing a full team; and they can embrace and build in unanticipated events and uncontrolled variables.

A case study also has disadvantages that can cause problems to an inexperienced researcher. Hancork and Algozzine (2006) state that one of the criticisms aimed at case studies is that the case under the study is not easily representative of similar cases, therefore the results of the research are not generalizable. According to a study by Flyvberg (2006), a case study is impossible to generalise from a single case and there is a tendency for verification, that is, for researchers to use data to confirm their preconceived notions. Leedy and Ormrod (2010) state that case studies take too long. Yin (2009) pointed out that standards in the conduct of case study research are variable, particularly in the development of case study protocols or plans of analysis.

3.4.1. Data collection

According to Leedy and Ormrod (2010), data collection in qualitative research makes use of multiple data collection strategies such as observation, interviews, objects, written documents, audio-visual material and electronic documents.

3.4.1.1 Interviews

In this study semi-structured interviews were used to collect data. Merriam (2005) describes an interview as a procedure that aims to search out the experiences, opinions and feelings of the participants. Interviewing is the predominant mode of data collection in case studies and qualitative research (De Vos, 2005). According to Anderson (2007), interviews allow a specialized form of communication between people for a specific purpose associated with some agreed subject matter. Thus the interview was a highly purposeful task which went beyond mere conversation. Bahora, Sterk and Elifson (2009) indicate that interviews in qualitative research remains the most common data collection method and it is a familiar and flexible way of asking people about their opinions and experiences. Anderson (2006) points out that the strength of the semi-structured interview is that it can clarify questions and allow for the probing of participants responses, providing more complete information than would not be available in written form. The use of interviews enabled the participants to discuss interpretations of their world and to express how they regarded situations from their own point of view (Cohen et al., 2000).

According to Simons (2009), the purpose of qualitative interviews is to contribute to a body of knowledge that is conceptual and theoretical and that is based on the meaning that life experiences hold for participants. Silverman (2012) indicates that a semi-structured interview is often the sole data source for qualitative research studies and is usually scheduled in advance at a designated time and location outside of everyday events. In this study, participants were interviewed at their

work place. The researcher also allowed the participants to arrange suitable times that would not inconvenience them.

Gray et al (2009) also support the use of semi-structured interviews by indicating that they are generally organised around a set of pre-determined open-ended questions, with other questions emerging from the dialogue between the researcher and participants. Borg and Gall (2005) indicate that semi-structured interviews are used effectively in individual face-to-face interviews. Face-to-face interviews ensured undivided attention being paid to and by the participants and enabled follow-ups or probes whenever it was necessary. Interviewing the participants one by one and face-to-face allowed the researcher to delve deeply into social and personal matters. These interviews were appropriate because they were able to inform a wide range of research questions which yielded rich and in-depth information about the experience of individuals (Silverman, 2012). Qualitative interviewing is a flexible and powerful tool to capture the voice and people's meaning of their experience (Leedy and Ormrod, 2010). During the interviews, the researcher used the format of an opening statement and a few general questions to elicit conversation. The initial questions also assisted the researcher to gather personal or biographical information about the participants. Some additional questions were designed to probe for information if it did not emerge naturally. This, according to Kvale (2006), is important in anticipation of such a situation.

The semi-structured interviews used in this study asked participants the same questions, but the questions were worded so that responses were are open-ended. The open-endedness allowed participants to contribute as much detailed information as they desired. According to Turner (2010), semi-structured interviews also allow the researcher to use probes as a means of follow-up. Participants can fully express their viewpoints and experiences, according to Creswell and Clark (2011). Gall et al. (2003) are of the view that semi-structured interviews reduce researcher biases within the study, particularly when the interviewing process involves many participants. Chenail (2009) also states that semi-structured

interviews create a more relaxed atmosphere in which to collect information and participants feel more comfortable having a conversation with the researcher about the phenomenon (i.e. post intervention strategies of ANA in Mathematics). When participants feel relaxed during the interviews, they might be able to provide rich data about their knowledge and experiences (Chenail, 2009).

Besides the good reputation that semi-structured interviews have in qualitative research, researchers, especially novice researchers, must be aware of pitfalls associated with the use of semi-structured interviews. According to Boyce (2006), Gall, Gall and Borg (2003) and Cresswell (2007), semi-structured interviews can be time-consuming; it is sometimes difficult to code data; they could display an asymmetrical relationship between the researcher and the participants where the researcher occupies the most powerful position, namely that of an interrogator. It is also sometimes hard to ensure anonymity of responses from the semi-structured interviews and responses might be biased. Researchers sometimes find it hard to extract similar themes or codes from the interview transcripts as they would with less open-ended responses; it is a more cumbersome process for research to sift through the narrative responses in order to fully and accurately reflect an overall perspective of all interview responses through the coding process.

3.4.2. Sampling

Leedy and Ormrod (2010) describe sampling in qualitative research as the seeking out of individuals, groups and settings where specific processes being studied are most likely to occur. According to Cohen et al. (2009), sampling involves dividing the population into homogenous groups, with each group including subjects with similar characteristics. The study employed purposeful sampling as a means of obtaining a research sample. Bahora et al. (2009) indicate that one of the major benefits of purposive sampling is the wide range of sampling techniques that can be used across such qualitative research designs. These purposive sampling techniques range from homogeneous sampling to critical case sampling, expert sampling, and

others. According to Brown and Kandrrira (2007), whilst the various purposive sampling techniques have different goals, they provide researchers with the justification to make generalisations from the sample that is being studied.

According to Leedy and Ormrod (2010), purposive sampling represents a group of different non-probability sampling techniques. The main goal of purposive sampling is to focus on the particular characteristics of a population that is of interest, and which would best enable the researcher to answer the research questions. Cohen et al. (2009) indicate that qualitative researchers hand pick the cases to be included in the sample on the bases of their judgement of their typicality or possession of the particular characteristics being studied.

The population of this research study included primary school principals, HoDs and Mathematics teachers who were in a position to give their perceptions regarding post intervention strategies in the ANA of Grade 6 Mathematics for learners in primary schools in the Man'ombe Circuit of the Mopani District in Limpopo Province. In order to achieve the required results or outcomes, purposive sampling as a technique was used in schools with the permission of the district DoE and principals. Manómbe Circuit consists of 20 primary schools, but only four primary schools were purposively sampled for the study.

The 12 participants selected were 4 Grade 6 Mathematics teachers, 4 Mathematics HoDs and 4 principals. Permission was received from them to participate in this study. The sampled participants were all involved in the teaching of ANA of Mathematics in Grade 6. HoDs in Mathematics are in charge of Grade 6 Mathematics teachers, and principals are chief coordinators of ANA in schools. The sampled participants contained the most characteristics, representative or typical attributes of the population (Neuman, 1994). The purposive sampling method allowed the researcher to acquire information that would build up arguments towards a deeper understanding of how participants understand the post

intervention strategies of ANA of Mathematics in schools. Schools from varying socio-economic circumstances were purposively selected.

According to Leedy and Ormrod (2010), qualitative research designs involve multiple phases, with each phase building on the previous one. In such instances, different types of sampling techniques may be required in each phase. They further indicate that purposive sampling is useful in these instances because it provides a wide range of non-probability sampling techniques for the researcher to draw on. For example, critical case sampling may be used to investigate whether a phenomenon is worth investigating further, before adopting an expert sampling approach to examine specific issues further (Leedy and Ormrod, 2010).

Purposive sampling has disadvantages which researchers need to look out for during their research. Nissim, Gagliese and Rodin (2009) state that purposive samples, irrespective of the type of purposive sampling used, can be highly prone to researcher bias. Purposive samples had been created based on the judgement of the researcher and this was not a good defence when it came to alleviating possible researcher biases, especially when compared with probability sampling techniques that were designed to reduce such biases. According to Onwuegbuzie (2007), the subjectivity and non-probability based nature of unit selection (i.e., selecting people, cases/organisations, etc.) in purposive sampling means that it can be difficult to defend the representativeness of the sample. Cohen et al (2009) also indicate that the sample population used in purposive sampling may not necessarily entirely reflect the population that the researcher was trying to represent.

3.4.3 Data analysis

According to Leedy and Ormrod (2010), data analysis is a process of systematically searching and arranging the interviews transcripts, field notes and other materials that have been accumulated to enable the researcher to establish findings. Data analysis is a process of systematically searching and arranging the interviews,

transcripts, and field notes to come up with findings (Leedy and Ormrod, 2010). Data was analysed according to eight steps as proposed by Neuman (2006), namely: the researcher transcribed verbatim and read through each transcript to get a sense of the whole; the researcher selected all transcripts containing the richest information and read through them; the researcher made a list of topics and clustered them together to identify major topics; major topics were labelled; codes were assigned to categorised data; a cut and paste method was used to reassemble all data belonging to the same category and the data was used to start writing the research report (Neuman, 2006).

3.5 TRUSTWORTHINESS AND CREDIBILITY

According to De Vos (2005), trustworthiness refers to the degree to which an instrument measures what it intended to measure. Cresswell (2005) indicates that instead of using the term validity, researchers should use words such as trustworthiness, conformability, verification and transferability in qualitative research. Leedy and Ormrod (2010) define reliability as the extent to which an instrument yields consistent results when the characteristics being measured has not changed.

This research employed multiple strategies to ensure and enhance the validity and reliability of data. To seek corroboration of the information gathered the researcher compared and cross-checked data from interactive interviews. This strategy of enhancing data validity and reliability is called “Investigator triangulation” (Cohen et al., 2010), or “Multiple researchers” (McMillian and Schumacher, 2001). The researcher used member-checking to ensure the credibility of the study. He also provided participants with interview transcripts in order to verify the information and to correct it where the information was incorrect. The researcher shared copies of transcripts, field notes or draft reports with participants to check for accuracy of statement or interpretation. The researcher provided the respondents the opportunity to further add information and correct errors. This is was known as

respondent validation or verification. In other words, research participants reviewed findings for accuracy and representativeness.

The researcher also used triangulation as a way of ensuring "agreement" or correlation between different sources and methods of information. A study's "trustworthiness" is enhanced when data analysis and conclusions are triangulated, the participants' perspectives are verified in a systematic manner, and the project's data chain of evidence is established (Gall, Borg and Gall, 2003). To provide readers with the possibility of assessing the trustworthiness and credibility of the researcher's interpretation of data, information collected from the research was presented in direct quotes and also as vignettes. All the above enlisted strategies outlined were continuously used during the data gathering and data analysis exercises.

Peer debriefing was also used as a way of ensuring the trustworthiness of the study. This assisted the researcher to check for honesty, judge the quality of research and the appropriateness of procedures. The researcher submitted his work to his supervisor to do an external audit, to check for the honesty and to judge the quality of the research before submitting it to the higher authority. The researcher documented all procedures followed in case requests were made. The researcher used an audit trail to achieve conformability by keeping track of his development (Hall, and Ryan, 2011) in the recording of personal thoughts, theoretical ideas, and any concerns relating to the study (Bowen, 2008). In order to strengthen the validity of the study the researcher spent a long enough time in the field to collect credible data. According to De Vos (2005), prolonged engagement is important in strengthening the research by providing adequate time for the researcher to interact with the participants.

3.6 ETHICAL CONSIDERATIONS

Ethical issues in research are concerned with beliefs about what is wrong and what is right from a moral perspective in the conducting of research (McMillan and Schumacher, 2001). According to Ryan et al. (2000), ethics is thought of as the study of good conduct and of the grounds for making judgements about what is good conduct or not. Research ethics therefore implies compliance with acceptable research norms, morals, standards and principles (Hesse-Biber and Leavy, 2011). After defending the research proposal, the researcher applied in writing, with the assistance of his supervisor, to the University of Pretoria Ethics Committee for ethical clearance.

To conform and comply with the University's research ethical codes, guidelines, protocols and practices, the researcher requested authorization from the Limpopo DoE in Mopani District office. to conduct research. Permission was then sought from the Ethics Committee of the University of Pretoria. Once approval was granted, and prior to entry into the research sites (primary schools), the researcher requested permission from the School Governing Bodies (SGBs), the School Heads, the HoD participants and Mathematics teachers to carry out the research.

The researcher accepted the assertion that research contributed to scientific knowledge and that human and technological advances were based on this knowledge. The researcher also agreed with (Hancork and Algozzine 2006) that the following were observed: gaining of consent from the participants, non-deception of participants, non-violation of the participants' privacy, and the release and publication of the findings in an accurate and responsible manner (Hole, 2007). In line with the principle of "informed consent" the researcher honestly and openly explained the nature, aims, purpose and educational benefits of study and explained to participants the fact that participation was voluntary and those participants can withdraw from the study at any time (Kvale, 2007). The participants were requested

to sign on supplied forms participant information and informed consent, and the agreement to be interviewed. All these forms were written in English, a language understood by all the participants (Hancork and Algozzine, 2006).

The researcher also complied with ethical issues of confidentiality, anonymity and privacy, which refer to not deliberately or accidentally disclosing or discussing information gained from an interviewee in a way that might identify an individual (Wiles, Graham, Heath and Charles (2008). To ensure anonymity, the researcher made use of pseudonyms instead of the participants' real names. The researcher made sure that measures taken to ensure the privacy, anonymity and confidentiality of the participants, as well as any risk of breach of confidentiality and anonymity were explained. As researcher I made sure that I respected and protected the dignity, privacy and confidentiality of the participants and I never exposed them to producers not directly attached to the research project or its methodology (Cohen, Manion and Morrison, 2008). All personal information and records provided by participants remained confidential. When conducting interview, it should be made clear that confidentiality and anonymity will be safeguarded. The data gathered in this exercise was solely and strictly used for the purpose of this research study. During and after completion of the study, the raw data will be safely stored by the researcher in the University of Pretoria.

3.7 LIMITATIONS OF THE STUDY

This study was confined to Grade 6 Mathematics learners, teachers, HODs and principals and it does not include other grades. Therefore, intervention strategies that were explored would be those that affect the Grade 6 performance in ANA Mathematics in the schools found in the disadvantaged areas of Giyani only.

3.8 SIGNIFICANCE OF THE STUDY

The study aimed to explore post intervention strategies of Grade 6 Mathematics ANA in public primary schools. The study may create awareness of the use of schools' instructional strategies to improve Mathematics performance in schools. Curriculum advisors and district officials may also benefit from the study through support strategies that emanate from this study.

3.9 CONCLUSION

In Chapter 3, the researcher discussed the research design and methodologies used and justified the choices he made with regard to research instruments and strategies in terms of the research topic, purpose, questions and objectives.

CHAPTER 4
DATA ANALYSIS AND INTERPRETATION

4.1. INTRODUCTION

In the previous chapter the researcher presented the research approach and design used for the study. The research design and methodology used for selecting subjects, as well as the research site and data collection procedures needed to answer the research questions were described (McMillan & Schumacher, 2001). Accounts of how the issue of research quality and researcher role through ethical considerations, were addressed were given. In this chapter a description of the population is given, followed by an explanation of the processes used in identifying themes that provide answers to the research questions. The data collected during the semi-structured interviews with the Mathematics teachers, Heads of department and Principals is presented. This is followed by the presentation and analysis of data, linking the current findings with previous research in the area. The main aims of this chapter are the identification of challenges in the post intervention strategies of the Annual National Assessment of the Grade 6 learners in Man'ombe Circuit in the Limpopo Province and the presentation of themes that emerged from participant responses and verbatim quotations. The aim of this chapter is to answer the main research question and sub-questions formulated in Chapter 1.

4.2. BIOGRAPHICAL INFORMATION

Table 4.1: Biographical information of participants

Participant	Gender	Grade Teaching or Managing	Teaching Experience
Teacher 1	Male	Mathematics grade 6	09 years
Teacher 2	Male	Mathematics grade 6	11 years
Teacher 3	Female	Mathematics grade 6	12 years
Teacher 4	Female	Mathematics grade 6	10 years
HoD 1	Female	Managing intermediate and senior phase	15 years
HoD 2	Female	Managing intermediate phase	17 years
HoD 3	Male	Managing intermediate phase	14 years
HoD 4	Male	Managing intermediate and senior phase	19 years
Principal 1	Male	Teaching Natural Science grade 5	20 years
Principal 2	Male	Teaching EMS grade 7	23 years
Principal 3	Female	Teaching Mathematics Grade 4	21 years
Principal 4	Female	Teaching Mathematics Grade 5	25 years

4.3. DATA ANALYSIS PROCESS

The most common method of analysing qualitative data was the constant comparison thematic content analysis (coding) (Leech and Onwuegbuzie, 2007). Data analysis assisted in the identification of underlying themes presented through the data. The process used for the identification of themes was aided by the use of a code book (Kodish & Gittelsohn, 2011). Constant comparisons were made inductively (with codes emerging from the data). This involved the analysis of data with little or no predetermined theory, structure or framework (Burnard, Gill, Steward, Treasure and Chadwick, 2008). This approach was preferred for its comprehensiveness and its ability to create thick descriptions from data, a key characteristic of qualitative research. Though it is time-consuming, it was the most

suitable approach because little was known about the phenomenon which was the focus of the study.

During data analysis tape recorded interview data was first transcribed verbatim and then coded after being grouped into small meaningful and similar parts to build a theme or category. Examples of themes from the text were interpreted to provide descriptive accounts and explanations. The verbatim phrases and statements were then collected as evidence of participant responses. The process led to the identification of nine major themes. The themes were identified from the codes whereafter the full description of a code was taken as a theme. Care was taken to match the identified themes with the objectives of the research. The table 4.2 below presents the identified themes:

4.4. RESEARCH SCHEDULE AND THEMES

The research questions and themes are reflected in the following table and are followed by a detailed explanation.

Table 4.2.: Research Questions and Themes

Research questions	Themes
1. Tell me about your **experiences** of being a coordinator of Annual National Assessment (Principal); a Mathematics teacher (Intermediate phase Mathematics teacher); an HoD (Mathematics HoD)	**Barriers and successes** to learning that arise from different aspect of the curriculum
2. What in your opinion are the **reasons** for poor performance in Mathematics?	Lack of basic Mathematics **knowledge and support**
3. What can you say about **learner performance** in the Annual National Assessment in Mathematics?	**Contributory factors** to poor performance in ANA of mathematics
4. What **happens after** the Annual National	**Development** of post ANA

Assessment of Mathematics?	intervention strategies
5. What is **needed to improve** the Mathematics results in the Annual National Assessment?	**Adherence to FFLA and CAPS** during teaching and learning support
6. What are the roles of the different stakeholders (principal/teacher/HoD) with regard to the Annual National Assessment of Mathematics?	Instructional leadership role of HoD
7. What are the **challenges** experienced in improving learner performance?	**Non-alignment to policy** stipulations
8. What **works well** in improving learner performance in Mathematics?	**Strategy implementation** of mathematics teaching and learning
9. What else can you tell about the ANA of mathematics in schools?	**Use of English** in ANA for global competitiveness

4.5. DISCUSSION OF THE FINDINGS ACCORDING TO THEMES

Theme 1: Barriers for using post ANA intervention strategies

In this study twelve participants (4 Mathematics teachers, 4 HoDs and 4 Principals) were interviewed. All the participants revealed that they experienced barriers in using post ANA intervention strategies for the teaching and learning of Mathematics because of each person using his/her own different teaching approaches. The participants were not involved in the development of strategies for post ANA in Mathematics. This is how one HoD responded:

> *Teachers did not have a platform to discuss issues of poor performance. Teachers teaching Mathematics did not have a common and specific lesson plan for Mathematics and each teacher planned lesson interventions without consultation with the head of department (HoD 1).*

A response from a principal about barriers experienced was that Annual National Assessment, though a good project, was not sufficiently managed to include post intervention strategies aimed at improving learner performance. One principal felt that there was a need to improve efficiency and develop numeracy skills; this was the principal's comment:

> *Learners need to be highly motivated in preparation for this project (ANA),but I have realised that educator's lack determination in teaching the learning outcomes; Mathematics is being eradicated (Principal 2).*

One of the teachers who also indicated barriers to Mathematics teaching, said*:*

> *There is an improper foundation that learners got from early grades. And this is the reason for poor performance (Teacher 1).*

All participants felt that the development of Mathematics strategies after ANA requires a discussion about the poor performance of learners, learner motivation and a good background in the early stages of learning Mathematics. All participants indicated that barriers related to mathematics curriculum, such as the content, the language, classroom organisation, teaching methodologies, pace of teaching and time available to complete the curriculum, teaching and learning, support materials and assessment should be discussed by all (DoE, 2001).

Participants in the study revealed that there are teaching-related factors that serve as barriers to learning and result in learner poor performance in post ANA Mathematics. One principal stated that:

> *Poor performance is caused by teaching related factors such as lack of expertise and qualifications in mathematics and teaching strategies, planning and lesson presentation as well as, lack of content knowledge (Principal 4).*

One HoD indicated that some Mathematics teachers cannot plan for the diversity of learner needs in the classroom because of a lack of mathematics skills. Therefore differentiation in curriculum delivery is not ensured and access to learning by all learners is hampered. This is how one HoD responded:

> *Firstly learners in the lower grades are not provided with the necessary basic knowledge that would serve them as they learn Mathematics in later years. Their poor performance might be a result of lack of mathematics expertise and teaching approaches of the four basic operations: addition, subtraction, multiplication and division (HoD 1).*

Two teachers indicated that teachers are unable to teach Mathematics effectively due to a lack of understanding of the different teaching methods to be used in teaching Mathematics. This is how one teacher described this:

> *Teachers are teaching in the lower grades because of a scarcity of their learning area in the senior grades so they teach Mathematics without skills and cannot assist learners in the lower grades to master Mathematics. Learners cannot grasp English concepts (Teacher 2).*

The findings of this study indicate that poor performance of learners in Mathematics occur because of the application of wrong strategies by teachers leading to a lack of basic mathematical concepts and skills at an early age and the use of English in solving Maths problems.

All the participants mentioned a shortage of well-qualified Mathematics teachers as a barrier that hinders improvement in learner performance in post - ANA strategies in Mathematics. They further indicated that a shortage of qualified Mathematics teachers made it difficult to adequately cover the curriculum in overcrowded classes. This is what one teacher had to say:

> *A shortage of qualified teachers in lower grades is the factor that causes poor performance. Majority of teachers in the lower grades did not specialise in Mathematics in tertiary education. They use inappropriate strategies when assisting learners to solve mathematical problems (Teacher 4).*

This view is supported by Fennel (2010), whose explanations in support of incompetent Mathematics teachers affecting performance in Mathematics included teachers who do not have qualifications in the teaching of Mathematics and a re therefore unlikely to be aware of ways in which learners could be assisted in their attempts to solve problems in Mathematics.

The HoD mentioned the use of mother tongue in the foundation phase as a barrier that is causing poor learner performance in Annual National Assessment in Mathematics. The HoD noted:

> *The use of mother tongue in teaching Mathematics make it difficult for transition to another language when learners actually sit for examinations in Mathematics which in set in English in the higher grades (HoD 4).*

Theme 2: Lack of basic Mathematics knowledge and support

All participants in the study indicated that there is a lack of basic Mathematics knowledge and support from Mathematics specialists (curriculum advisors). Three Mathematics teachers indicated that a lack of Mathematics curriculum advisors is a cause of poor learner performance in Annual National Assessment in Mathematics. They further indicated that there is a shortage of Mathematics curriculum advisors and that Mathematics teachers do not get enough useful support on how to assist learners to perform better. This is the response from one teacher:

> *Shortage of Mathematics curriculum advisors is another challenge that causes poor performance, because it is difficult for us to get assistance in our school when we need curriculum support due to shortage of Mathematics curriculum advisors (Teacher 2).*

Three HoDs indicated that Mathematics curriculum advisors do not come to their schools to support them when there is a need for support. One Hod remarked:

> *The number of Mathematics curriculum advisors is low, and it is difficult for them to assist school teachers because the area where they are working is bigger (HoD 4).*

This is the response from one HoD:

> *Shortage of Mathematics curriculum advisors is another reason for poor performance (HoD 2).*

The DoE (2010) emphasises that curriculum advisors must visit schools for monitoring and support, monitor and support the curriculum implementation in the relevant subject (Mathematics), and provide relevant teaching and learning materials to improve learner performance in the subject (Mathematics). However, there are only a few mathematics subject advisors. De Clerq (2008) is of the view that supporting teachers in the effective delivery of the curriculum in the classroom improves performance in school.

Three HoDs indicated poor supervision by School Management Teams (SMSTs) as a contributing factor to poor learner performance in Mathematics. They further indicated that there is a lack of supervision and support from SMT's and that this contributes to poor performance in ANA. One HoD suggested:

> *SMTs seem to lack strategy to monitor the implementation of curriculum policy at classroom level and to translate the importance of effective teaching and learning into classroom excellence (HoD 3).*

Three Mathematics teachers indicated that the role of SMTs is not clear to the members of the SMT. They further indicated that most of the Principals of schools are not fully playing their role of ensuring school functionality. The one teacher lamented:

> *Deputy Principals do not play their role of ensuring the functionality of departments. Heads of Departments are not effective in ensuring that the subject is fully functional within their departments (HoD 1).*

Another teacher responded:

> *Such weakness are serious when one considers that most of the SMT's do not frequently walk through classes for observation, conduct curriculum management and delivery meetings and periodically review curriculum related documents such as exercise books, teachers portfolios etc.(Teacher 4)*

Theme 3: Factors contributing to poor performance in ANA of Mathematics

All the participants highlighted the fact there are number of factors that contribute to poor performance in the ANA of Mathematics. The Mathematics teachers indicated that a lack of mathematics understanding by learners is a cause of poor learner performance in Annual National Assessment in Mathematics. One teacher pointed out that:

> *Some learners do not understand some basic mathematics concepts and therefore do not commit themselves when learning Mathematics, as a result, their performance is poor (Teacher 3)*

Another teacher responded:

> *Some learners are lazy, most learners are not able to answer past Mathematics question(s) simply because they do not revise at all, both at home or at school, and some learners think that Mathematics is difficult so they do not put any effort in it (Teacher 2).*

Four Hods indicated that overcrowded classrooms contribute to the need for intervention strategies to improve poor learner performance in Annual National Assessment in Mathematics. They further indicated that it is difficult to teach in overcrowded classes and that the overcrowding is caused by the shortage of teachers. One HoD said:

> *Overcrowded classes contribute to poor performance of learners in Annual National Assessment (ANA) because teachers do not get enough time to assist learners(HoD 2).*

Three HoDs indicated that when the class is overcrowded, most of the learners do not perform well. They are not free to ask questions when they do not understand what the teacher has taught and hide among the other learners. One HoD remarked that:

> *When the number of learners in a class is too large for the capacity of the classroom, it may be difficult for the Mathematics teachers to do individual attention to learners and make use of various teaching and learning intervention techniques (HoD 4).*

Three Mathematics teachers also indicated that overcrowding is a challenge to improving learner performance. According to them, this is the result of many schools having too many learners in the class, which contributes to poor improvement of learner performance. One teacher suggested that:

> *Classes in our school are overcrowded and this makes difficult for our teachers to teach effectively and meet the needs of individual. Some of the classes have more than 55 learners (Teacher 2).*

Another teacher added that:

> *In our school we have classes with too many learners in them and this is an obstacle to effectively teaching CAPS in preparation for ANA mathematics (Teacher 4).*

Mathematics is a subject that requires teachers to pay attention to all learners in the class and it is difficult for teachers to pay attention to all learners in an overcrowded class. This is a comment given by one teacher:

> *Teaching mathematics requires knowledge and passion. If you have the love for mathematics, you will give each learner the opportunity to learn, no matter how many hey are in class.*

Three Mathematics teachers commented that when the class is overcrowded most of the learners do not perform well because they are afraid to ask questions if they do not understand certain topics and teachers do not have enough time to do follow-ups. They further indicated that teachers do not have time to accommodate all learners in the class due to overcrowding. One teacher indicated that overcrowded schools and congested classrooms diminish teacher efficacy and negatively affect student performance.

> *As teachers, we all know too much that overcrowded schools make it more difficult for learners to get the education they deserve. When classes are too large and schools are filled past their capacity, we place children at a severe disadvantage (Teacher 3).*

Two principals indicated that Mathematics teachers may find it difficult to monitor learner behaviour and maintain high learner attention rate at the same time. One principal remarked that:

> *When the class is too large, that is above thirty – five per class, it becomes difficult for Mathematics teachers to give immediate feedback as they are faced with piles of books for marking (Principal 2).*

According to the DoE (2001), the teacher-learner ration of 1:35 must apply in schools. Some of the participants indicated that schools must ensure that they follow the post establishment and curriculum needs of the school when appointing teachers. This finding is supported by Mji and Makgato (2006) who comment that large sized and over populated schools have a direct impact on the quality of teaching and instruction delivery. They further state that overcrowded classrooms have increased the possibilities for mass failure and make learners lose interest in school. This is because large class sizes do not allow individual learners to get support from teachers. This invariably leads to low counting scores, frustration and poor academic performance (Mji and Makgato, 2006).

These views are supported by a study conducted by Keil and Partell (2009). They found that increasing class sizes have a negative effect on student achievement, that is, it lowers learners' achievement. Based on the findings of this study, it can be concluded that class size plays a crucial role in determining the academic performance in ANA Mathematics in Man'ombe Circuit. In a study conducted by Keil and Partell (2009), congestion and discomfort were found to hamper academic activity; overcrowded classes increase the workload of the teacher, make class management difficult, inhibit interaction between the teacher and the learner, and militate against teachers paying learners individual attention. Educators are unable to determine the strengths and weaknesses of learners to assist them accordingly; learners do not pay attention and are difficult to control.

Two principals indicated that a lack of team work between teachers is a cause of poor learner performance in ANA Mathematics. They further indicated that when teachers are not meeting with other teachers who teach Mathematics, it could be a reason for poor performance. When they meet they are able to share ideas on the improvement of learner performance. This is what one principal stated:

> *Teachers are not working as team; they do not even discuss the learning difficulties of the learners (Principal 2).*

Two HoDs indicated that Mathematics teachers do not come together to plan teaching and learning. One HoD pointed out:

> *I discovered that it was the first meeting held in the Mathematics department which meant that teachers teaching Mathematics did not have a platform on which to voice their challenges and successes in Mathematics (HoD 1).*

Three principals indicated that teachers did not have a platform to discuss intervention strategies for poor performance. They further indicated that teachers teaching Mathematics did not have a common and specific lesson plan for Mathematics and each teacher planned lesson without consultation with the head of department. The one principal responded:

> *I have learnt that teaching Mathematics should be a team effort, where teachers teaching different grades need to plan together for interventions and for continuation (Principal 1).*

The majority of participants in the study indicated that job vacancies have an impact on curriculum delivery and contribute to poor learner performance in the Annual National Assessment (ANA). Four Mathematics teachers indicated that teaching cannot take place when there are no teachers appointed to teach Mathematics in schools. One teacher indicated that:

> *According to my understanding, optimum curriculum delivery requires that teachers are appointed and the vacancy rates wherever they exist are addressed immediately (Teacher 3).*

Two principals indicated that a curriculum management strategy must refer to curriculum related job vacancies so that learners are not left without teachers, and teachers are not left without subject advisors, in the case of office based teaching work. One principal observed that:

> *The curriculum management strategy cannot work without the availability of teachers, subject advisors and other relevant experts to support teaching at school (Principal 4).*

My opinion is that essential subjects such as Mathematics, Sciences and English must not be without qualified teachers at any time during the year. According to a study conducted by Tella (2008), the provincial curriculum management strategy should seek to guide districts on how to deal with teaching vacancies created as a result of unexpected circumstances as well as those resulting from known and expected situations. This demonstrates the requirement for Human Resource Management at district and provincial head office to manage the process. He further states that it is equally important that Human Resource practices with regard to promotional posts are not implemented mid-term as this creates gaps in other schools (Tella, 2008).

Theme 4: Development of post ANA intervention strategies

Analysis of learners' scripts after Annual National Assessment (ANA)

The majority of participants in this study indicated that, after marking the scripts of learners, teachers analyse each learner's script, checking question by question in order to identify where learners have performed well and where they have

encountered problems, but no attention is paid to the development of intervention strategies. One HoD mentioned:

> *The item analysis reveals that learners are mostly exposed to knowledge and routine type question. Many learners struggled with the concepts that required deeper understanding (HoD 1).*

One teacher stated:

> *Analysis that we have done reveals that learners lack the ability to respond to complex and higher-order questions that require a deeper understanding (Teacher 2).*

The participants in this study indicated that teachers analyse learners' scripts to see whether the errors that learners made are the result of misunderstanding what teachers have taught or of ineffective methodologies used by the teacher. One principal suggested:

> *Analysis of learner's scripts helps the teachers to identify the areas of weakness that affect learners in Mathematics (Principal 1).*

Some of the participants indicated that analysis provides the teacher with rich information that they can use to improve the teaching methodologies. One teacher said:

> *The analysis is done in order to come out with intervention strategies to address the difficult that learners encountered in the ANA exam (Teacher 1).*

Some participants in this study indicated that after the analysis of results, teachers develop intervention strategies for improving learner performance in Mathematics. The intervention strategies used should be aligned with the Foundation For Learning Campaign (FFLC) and the Curriculum Assessment Policy statement

(CAPS). Intervention strategies are discussed in Theme 5 in terms of the responses by participants.

Theme 5: Adherence to FFLC and CAPS improves teaching and learning

Three HoDs indicated that the quality of Mathematics teaching in the classroom post ANA intervention strategies should improve learner performance in Annual National Assessment in Mathematics. They assumed that knowledge of weaknesses and strengths in learner performance would enable teachers to follow educational policies during teaching and learning. One Hod noted:

> *Teaching quality is a key determinant in improving the educational performance of learners in Mathematics, however there are no set strategies to be used by all (HoD 3).*

Two HoDs indicated that good teaching of Mathematics broadly consists of two mutually reinforcing aspects that teachers must possess namely pedagogy and subject (Mathematics) knowledge. This is what one HoD said:

> *A combination of deep subject knowledge and pedagogical skills is required to promote effective learning in Mathematics (HoD 4).*

Four principals stated that Mathematics knowledge and pedagogical skills can be achieved by encouraging Mathematics teachers to further their studies in Mathematics and by attending workshops organized by Mathematics specialists. This is what one principal had to say:

> *In workshops, teachers will get a chance to share information with colleagues and able to discuss challenges that they faced when teaching learners and this helps them to accumulate more skills and strategies to be used in the class which will improve learner performance (Principal 3).*

Two principals indicated that adequate pedagogical content knowledge is one of the requirements that Mathematics teachers must acquire in order to improve learner performance in ANA Mathematics. One principal suggested:

> *I think that relevant school-based and clustered workshops targeting Mathematics teachers should be conducted if the usefulness of pedagogical content knowledge is to be enhanced Principal 4.*

One HoD also indicated that workshops should be part of continuous professional development and should provide a platform where teachers share their knowledge, strategies that work, problems and frustrations, as well as bringing them up to date on innovations in education in general. One HoD said:

> *The Department of Education also needs to embark on serious in-service training of Mathematics teachers to equip them with skills for teaching Mathematics in schools. (HoD 2).*

Another HoD also indicated that content knowledge helps teachers to provide an adequate opportunity to learn to all learners and helps teachers to monitor the progress of each learner. According to the HoD, if learners do not show improvement, teachers must provide other intervention strategies. One HoD mentioned that:

> *Teachers with Mathematics content knowledge are able to use suitable teaching strategies for Mathematics (HoD 4).*

Three teachers also indicated that pedagogical content knowledge in the teaching of Mathematics will improve learner performance. According to these participants, teachers need to use teaching strategies that will make Mathematics accessible to learners. They further indicated that teachers must be able to use appropriate

activities in teaching and learning in order to improve learner performance in Mathematics. One teacher commented that:

> *Teachers must start teaching following the Foundation for Learning Campaigns as well as the content in Mathematics CAPS documents. Teaching of Mathematics topics and concepts must begin from simple to complex (Teacher 3).*

This is supported by Jacobson (2010), who points out that INSET adds an undeniable value to service delivery. He further indicates that INSET yields increased productivity, reduces costly mistakes, and increases job expertise and work standardisation. According to my understanding, a systematic approach to in-service training where there is needs analysis, consideration of different ways of learning, designing cost-effective inset programmes and assessing the effectiveness of inset is crucial.

The participants indicated that teachers need continuous professional development in Mathematics to enable them to develop intervention strategies for effective teaching. This is supported by Silva (2009), who argues that teacher quality and professional development systems recognise a teacher's need for deep content and pedagogical knowledge and include a broad set of recruitment, preparation, induction, professional growth, and retention policies. According to a study conducted by Tella (2008), teachers should embark on team-teaching in order to make Mathematics teaching/learning more enjoyable for learners. In addition to the training of teachers there is a need to provide guidance and counselling services to teachers who lack Mathematics knowledge.

Guidance and counselling services may also help to overcome some unprofessional behaviour such as late coming and absenteeism, both of which lead to poor learner performance (Tella, 2008). In order to improve learner achievement, teachers must have a deep and enduring knowledge of the components of good instruction, and school leaders must develop the support, coaching, feedback, momentum and

direction needed for teachers to consistently improve their practices toward great instruction (Bryk, Roderick and Jacob, 2005).

Three principals also indicated that teachers should be able to use different strategies in their lesson presentations and use representations, such as the use of concrete materials, in their teaching of Mathematics. According to a study conducted by Mbugua (2012), Mathematics teachers need to use different teaching techniques in order to accommodate all learners in the classroom, because some learners require special support to improve their performance in Mathematics. One principal remarked that:

> *Planning and teaching of Mathematics should be conducted according to the prescripts of CAPS. Teachers must make sure that they use different strategies to help learners understand what they are teaching, encourage learners to use the methods or strategies that they understand best and make sure that all learning outcomes and assessment standards are taught (Principal 4).*

Two HoDs indicated that teachers also need to have an idea of possible learner' conceptions about the topic in order to prepare explanations that will help to eliminate misconceptions. They indicated that teachers must be aware of the Mathematics curriculum, the range of instructional tools in the Mathematics curriculum, and how to use them. They further indicated that teachers need to have a good grasp of the subject matter before being able to transfer it and should also know their learners and their abilities. This is what one HoD said:

> *Content sharing between Mathematics teachers can help teachers to improve their teaching in the classroom (HoD 2).*

Four Mathematics teachers indicated that teachers should use strategies such as more regularly exposing learners to non-routine questions, starting from as far back as early grades. They further stated that this will help learners to realise that

successful problem solving requires a solid foundation in Mathematics. One teacher commented:

> *Participation in competition such as Mathematics challenges and Olympiads should be encouraged by all schools at all grades. Learners should be taught to analyse the questions carefully before rushing into answering them (Teacher 3).*

Three HoDs indicated that organizing Mathematics competitions in schools could improve learner performance because learners would be able to compete with one another. They further indicated that teachers must engage learners in Mathematics competition quizzes where best learners must be awarded trophies and certificates. This is what one HoD stated:

> *By doing so, learners will be motivated to do their best in the Annual National Assessment. This will promote the spirit of competing where learners will compete among themselves. This needs to be done on quarterly basis (HoD 4).*

Two Mathematics teachers indicated that learners should have more practice in basic operations, patterns, data handling and shapes. One teacher said:

> *Learners should also practice reading questions carefully and answering only what is required. Teachers should include higher-level-thinking questions regularly in their school-based-assessment (Teacher 1).*

Three principals indicated that teachers need to establish cluster groups to support one another in understanding and sharing teaching strategies for the solving of Mathematical problems. One principal pointed:

> *The teachers who understand certain topics better need to be given time to assist learners on how to solve problems using different strategies that they know (Principal 4).*

Another principal indicated that learners should be provided with sufficient opportunities to practice mathematical problems. By doing so, he claimed, they will improve the performance of learners. The principal further stated that a variety of problems set in the Annual National Assessment (ANA) should be set in school-based-assessment tasks as a form of preparatory ANA examinations. This is how he justified his position:

> *Learners should be exposed to higher order questions of Mathematics problems in the classroom situation in order for them to cope with such questions under the ANA examination conditions (Principal 2).*

According to three HoDs, dealing with higher order questions need to be an integral part of classroom teaching and should not be restricted to examination situations only. They further indicated that practice in higher order questions in the classroom could increase learners' proficiency in dealing with such questions in ANA examinations. They further indicated that learners need to be encouraged to read every word in a question in order to understand what the question needs them to do. This is how one HoD responded:

> T*eachers should allow learners to investigate concepts rather than to ask them to memorise a set of rules (HoD).*

Three principals indicated that providing extra lessons to learners is a good way to help improve learner performance in ANA Mathematics. According to the principals, Mathematics is a practical subject that needs more time in order to accommodate all learners. They further indicated that there are many topics that need to be handled before learners sit for the ANA exam. One principal suggested that:

> *Teachers need to provide more time to teach learners Mathematics and complete curriculum in time Principal 2).*

Another principal also indicated that teachers need to use afternoon times to teach learners in the class because some learners have special needs that need to be handled in order to improve their performance in Mathematics. One principal had this to say:

> *Mathematics needs to be allocated more time because it has many topics that need to be addressed (Principal 3).*

Four Mathematics teachers indicated that ANA is written during the 3rd quarter and that by that time the majority of teachers have not completed the curriculum. They further commented that teachers must provide more time to assist learners who are left behind in order to improve their performance in Mathematics. One teacher remarked:

> *Providing extra lessons to the learners by teachers will improve the performance of learners. Extra- effort by teachers can improve learner performance. They can do that by conducting morning and afternoon lessons to learners Teacher 2).*

Three HoDs indicated that learners should be given more exercises to write. This this is another post intervention strategy that Mathematics teachers could use with learners in order to improve their performance in ANA Mathematics. They further indicated that when learners are given lot of exercises to write on a daily basis, it could increase their performance in Mathematics. One HoD said:

> *I believe that when learners are provided with more work on mathematical problems chances are that they will do well in the test, because practice makes perfect. (HoD 1).*

Four Mathematics teachers also indicated that teachers must provide adequate exercises that would serve as practice for learners in order for them to become

familiar with using steps when calculating mathematical problems. This is what one teacher had to say:

> *Learners must be given a chance to talk through their mathematical thinking, including suggesting and explaining alternative methods of calculating or ways of solving the particular problem to improve learner performance (Teacher 4).*

This is supported by Silva (2009), who states that encouraging teachers to support continuous progress monitoring through formal and informal assessment will improve the achievement of learners. Lewis, Harris and Muoneke (2008) also state that using formal and informal assessments as post intervention strategies help teachers to identify learners who may be struggling and who may benefit from post intervention strategies of ANA in Mathematics.

Four Mathematics teachers indicated that grouping learners according to their abilities is one of the factors that can be used to improve learner performance in ANA Mathematics. They further indicated that when learners are grouped together, they are able to share information and help each other. One teacher responded:

> *Learners who are capable will assist other learners in the topics that they understand better and this will improve their level of understanding Teacher 4).*

Another teacher commented that:

> *Grouping learners according to their abilities enables learners to learn different strategies of handling Mathematics problems. Learners are free to participate when working with his / her peers (Teacher 3).*

The HoD indicated that:

> *By grouping learners, teachers will overcome the issue of overcrowding because learners will help each other in their group and these will improve Mathematics performance (HoD 2)*

This finding is supported by Harris et al. (2008), who indicate that grouping learners according to their abilities can help to improve learner performance in Mathematics. According to Tobia (2007), learners that stay together for years will help to improve learner performance in schools. He further stated that this approach allows teachers to become more familiar with learners' strengths, learning styles, and problem areas and thus also gives teachers enough time to help their learners to meet learning goals.

Four HoDs indicated that salary increases for teachers is an intervention strategy that could attract Mathematics teachers to stay in the teaching profession and this could improve learner performance. One HoD noted:

> *The majority of Mathematics teachers are leaving teaching profession and look for green pastures with reason that they are paid low salary in the teaching profession (HoD 3).*

Three Mathematics teachers indicated that teachers leave their teaching positions unoccupied. They indicated that the government needs to increase the salary of teachers with the aim of attracting young learners to pursue the teaching profession as their career. They further indicated that this will enable Mathematics specialized teachers not to leave the teaching profession and search for greener pastures. The teacher pointed out that:

> *The Department of Basic Education should award bursaries to teachers to further their mathematical studies. Bursaries should be awarded to teachers who are keen on*

> *becoming Mathematics teachers, and teachers who need to improve the performance in Mathematics (Teacher 4).*

Two principals also indicated that motivation and salary increases could improve learner performance in ANA Mathematics. One principal commented that:

> *Although, it is believed that the reward for the teachers is in heaven, but there is no doubt about the fact that if the limited or no motivation for the teachers in terms of incentives and innovation may drastically reduce their morale which may in turn have a negative impact on student performance in Mathematics (Principal 3)*

Theme 6: Instructional leadership role

The findings of this study revealed that different instructional leadership roles played by stakeholders within the school contribute to improved learner performance in ANA Mathematics. The participants indicated what they regarded as instructional leadership roles for principals, HoDs and Mathematics subject teachers.

Instructional leadership role of Principals

The four principals indicated that the role of principals in schools is to manage all the activities of the school. They indicated that principals are accountable and responsible for everything that happens in their schools. They also indicated that principals represent the DoE in school and must therefore make sure that all learners are registered to write ANA. They further indicated that principals must ensure that correct subject allocations are done in their schools. One principal remarked that:

> *Principals need to support teachers by ensuring that learning support materials are supplied in time at school. They must ensure that all learners have workbooks (Principal 4).*

Two principals also indicated that principals must make sure that a school Mathematics plan is developed and ensure that all aspects of employed strategies are implemented at the school level and with the parent community. They further indicated that this includes, amongst other things, identifying appropriate staff to attend the training programmes, providing opportunities for peer reflection with other teachers at school level, creating the environment for class support and monitoring and setting school targets for learner performance.

These views are supported by Cowan (2009), who states that principals must provide the necessary professional development for teachers, and that school-based intervention strategies which help struggling learners to become successful learners must be embedded in the general education curriculum. According to Holland (2005), the key role of the principals is to guide and support staff to provide opportunities that will help learners to develop relevant and motivating skills in accessible ways. Turney (2010) agrees, mooting that the principal of the school, as the change agent, is responsible for curriculum and instructional activities in the school.

Instructional leadership role of Mathematics Heads of department

The HoDs participating in the study indicated that the instructional management of schools is in the hands of HoDs because they are subject specialists. They further indicated that HoDs are responsible for managing the curriculum in schools. Three HoDs indicated that Heads of department must work hand in hand with teachers in schools. They further indicated that HoDs must have knowledge of all aspects of instructional activities that happen in the classroom situation. One HoD summarized it as follows:

> *As HoDs, we have the responsibility to ensure collaborative curriculum planning within their scope of operation. We need to organize and hold regular subject meetings with teachers who belong to Mathematics departments (HoD 2).*

Three HoDs indicated that HoDs should respond to the professional development needs of subject teachers as indicated in the feedback from their Integrated Quality Management System (IQMS). They further indicated that HoDs should oversee a process of developing subject improvement plans by all Mathematics teachers especially those whose subjects are underperforming. One HoD pointed:

> *HoDs should ensure that all teachers in their departments are in possession of all required policy documents (HoD 3).*

Two HoDs also indicated that it is the responsibility of Mathematics Heads of Department (HoDs) to manage the curriculum in school because they are subject specialists and need to make sure that teaching and learning take place in school. They further noted that close monitoring by HoDs contributes to improved learner performance in Mathematics. According to these participants HoDs need to check that quality teaching and learning are taking place on a daily basis. The four HoDs illustrated that HoDs need to ensure that teachers adhere to the first 10 minutes of mental reading which, they claim, help to develop learner's ability to do quick calculations They further indicated that the role of the HoD is to ensure that teachers go to class being prepared and that their preparation is in line with relevant policies such as CAPS. One HoD commented:

> *I have to monitor and control what teachers teach, what they assess as well how they mark the assessment tasks (HoD 4).*

Four HoDs in this study indicated that the performance of learners could improve only if HoDs provide enough support to Mathematics teachers. They further indicated that HoDs need to conduct class visits with the aim of providing support not to find fault. Another HoD noted that:

> *HoDs ensure that teachers are teaching according to the pace setters and the correct standard of work is maintained. They need to check if teachers have enough resources and if there is a shortage they need to provide (HoD 2).*

Three HoDs indicated that HoDs must ensure that school-based meetings and workshops are conducted. They also indicated that in these meetings, HoDs are able to discuss the progress and challenges they encountered while teaching learners. The four HoDs indicated that HoDs must ensure that post intervention strategies are implemented in the classroom by teachers. They further indicated that HoDs must encourage teachers to analyse the work of learners in order to check whether or not they are experiencing challenges. They further commented that if challenges are there, teachers need to address them as soon as possible. One HoD mentioned that:

> *Departmental Heads for Mathematics must sit down with Mathematics educators and discuss the question papers and learner performance. HoDs and Mathematics educators need to develop intervention strategies for improving learner performance. (HoD 3).*

Four HoDs indicated that HoDs must encourage teachers to use ANA exemplars and previous question papers to train learners. They further indicated that HoDs must encourage teachers to give learners more work to write and to complete all activities in the workbooks because these help learners to perform better in Mathematics. Three HoDs commented that HoDs need to make sure that Mathematics competitions are organized at school. They further indicated that HoDs must encourage teachers to use English when teaching Mathematics in order to overcome language barriers experienced by learners when they are writing ANA. According to the participants, this will enable them to interpret questions correctly during ANA tests. One HoD said:

> *Teachers must use ANA previous question papers to train learners. All assessment tasks must be in line with ANA style of setting to familiarize learners with ANA setting (HoD 3).*

According to Turney (2010), HoDs in schools are subject leaders, have the knowledge of the subject area, and are responsible for the management of subjects in grades and across the phase. The researcher indicated that HoDs should coordinate the approach of post intervention strategies within a subject department to ensure that teachers teach according to the policy document provided by DOE.

Instructional leadership role of Mathematics teachers

Four Mathematics teachers indicated that Mathematics teachers have an instructional leadership role. Therefore they have to ensure that teaching and learning take place in the classroom. They further indicated that the main business of teachers in school is to manage instructional activities. They further indicated that teachers need to ensure that instructional activities take place in school in order to help learners to perform better. One teacher mentioned that:

> *Teachers must make sure that effective teaching and learning take place on daily basis. They need to plan their lessons according to CAPS and pace setters provided by the DoE (Teacher 1)*

Three Mathematics teachers indicated that teachers must be aware of the fact that learners learn in different ways and must therefore take cognizance of this fact when they plan their teaching activities. They further indicated that teachers need to use different strategies to assist learners to respond to different questions in ANA Mathematics. One teacher suggested that:

> *Teachers need to introduce a variety of strategies and methods and encourage learners to use strategies and methods that that they best understand (Teacher 2).*

Three Mathematics teachers commented that teachers need to go the extra mile to assist learners to complete the curriculum in time so that they will have enough time to do revision. They further indicated that teachers need to make sure that they use ANA exemplars and previous question papers to train learners with the aim of assisting them to respond to different questions in ANA. One teacher remarked:

> *I set our school-based assessment according to the standard of ANA in order to help learners to familiarize themselves with questions that are asked in ANA (Teacher 3).*

The four Mathematics teachers indicated that teachers need to involve learners in Mathematics concerts, symposia, and inter-school Mathematics quizzes with the aim of improving their performance. They further stated that teachers need to use the formation of groups when teaching, grouping learners according to their abilities because this increases student learning in Mathematics instruction.

Three Mathematics teachers commented that teachers need to create a supportive environment and implement approaches and methods that improve learner performance. They further mentioned that teachers need to manage learners with learning barriers and involve them in different kinds of activities that will help them to improve their performance. This is supported by Silva (2009), who encourages teachers to offer support, and to do continuous progress monitoring through formal and informal assessment. This, he argues, will improve the achievement of learners in Mathematics. Two Mathematics teachers indicated that teachers must analyse the work of learners continuously in order to identify learners who are struggling and provide necessary support to them. The teacher said:

> *Teachers need to form Mathematics clustering committees and meet once per fortnight to discuss the challenges and successes they face when teaching learners (Teacher 4).*

Theme 7: Non alignment to education policy stipulations

Participants in this study indicated that there are many challenges hindering learner performance in schools, such as a lack of parental involvement, overcrowded classes, shortage of qualified Mathematics educators, inadequate content knowledge in Mathematics, lack of teaching and learning support materials, a lack of learner supervision, inadequate syllabus coverage, a shortage of curriculum advisors, etc. They further indicated that these challenges violate the education policies provided by Department of Education.

Three HoDs indicated that the most challenging aspect facing them is poor parental involvement in the education of their children. They further indicated that most parents are reluctant to involve themselves in the education of their children. One HoD commented:

> *Our learners are performing badly because their parents do not support them at home. (HoD 1).*

Three Mathematics teachers indicated that when teachers request parents to visit the school because their children have learning problems, they do not come. They further indicated that many parents in the community do not concern themselves with the education of their children.

This is what one teacher has to say:

> *When parents failed to come to school in order to support the education of their children, it became a recipe for poor learner performance (Teacher 3).*

Another teacher noted:

> *Most parents do not concern themselves about whether a child completes homework or not. This situation is exasperated by the fact that when we invite parents to come to the school to discuss their children's learning problem, the majority of these parents never come (Teacher 1).*

This is supported by Mji and Makgato (2006), who claim that a lack of parental support and a lack of motivation in both teachers and learners contribute to poor learner performance. According to the South African Schools Act of 1996, parents have the right to visit the public school where their children have been admitted but such visits may not disrupt any of the school activities.

Three principals indicated that a shortage of well-qualified Mathematics teachers is also a challenge that hinders improvement in learner performance in post ANA Mathematics. Some of the participants indicated that most schools do not have teachers who have a qualification in Mathematics. This is what one principal had to say:

> *We have to allocate Mathematics to teachers who do not have adequate knowledge on the subject (Principal 1).*

Two HoDs mentioned that this shortage of qualified Mathematics teachers contribute to poor performance in Mathematics because teachers teaching Mathematics lack pedagogical content knowledge in Mathematics. One Hod said:

> *Shortage of qualified Mathematics teachers is a challenge in our school. The pool of qualified Mathematics teachers in primary school is small. In most schools including ours, there are very few teachers who have a qualification in Mathematics (HoD 3).*

Three HoDs indicated that inadequate content knowledge of Mathematics teachers has been identified as a factor contributing to poor teaching practices because the majority of teachers teaching Mathematic are unqualified. Consequently, they fail to complete the syllabus. One HoD remarked:

> *ANA is written on the third term of the year during September and the work of four terms is included in ANA exam, so by the time ANA is written teachers failed to cover the work of term 4 due to Mathematics teacher' workload (HoD 2).*

This view is supported by Adler (2006), who relates the poor mathematical performance of South African learners to inadequate teaching practices, identifying it as one of the major factors that impact on learners' performance.

The majority of the participants in this study indicated that learner inability to read, write and understand questions contribute to a high failure rate. Some of the participants indicated that learners are unable to understand questions, resulting in their inability to answer questions correctly.

Three HoDs indicated that poor comprehension of Mathematical language is another challenge undermining performance in Mathematics. They further mentioned that learners do not comprehend word problems, hence they fail to fully address the questions. This is what one HoD had to say:

> *Language barrier makes our learners to fail to understanding what is needed from them in the examination. Our learners fail to respond to questions in the examination because they do not know on how to interpret questions (HoD 4).*

One principal stated:

> *Mathematics teachers must use English as medium of instruction when teaching learners in order to help learners to understand questions in the ANA examination (Principal 1).*

This is supported by the South African School's Act of 1996, which stipulates that the language of learning and teaching in a public school must be an official language.

All participants mentioned a shortage of learning support materials as a challenge that many schools faced and which contributes to poor learner performance. They indicated that learning support materials are not supplied in time to schools, resulting in some of learners spending long periods of time without textbooks. This makes it difficult for them to write activities when given tasks by teachers. Some of the participants indicated that it is difficult to assist learners if there are no resources such as textbooks, and that the shortage of textbooks affects the performance of learners in Mathematics. One teacher lamented:

> *Our learners need to have textbooks and workbooks so that they can keep on practicing on daily basis and use them at home when given work to do (Teacher 4).*

Four principals indicated that the shortage or lack of textbooks means that learners are handicapped with respect to grasping the content taught and completing class exercises and assignments given by the teachers. One principal commented:

> *Shortage of learning materials hinders the progress of our learners. Learning support materials are essential for achieving high learner performance (Principal 4).*

Theme 8: Implementation of Mathematics teaching and learning strategies

Three Mathematics teachers indicated that rewarding schools which work well is a post intervention strategy that can improve learner performance in ANA Mathematics. The participants indicated that schools need to be rewarded for the good work they have done. One teacher noted:

> *Good performance needs to be rewarded and each school that is doing well academically and otherwise needs recognition and appreciation as a primary source of motivation (Teacher 4).*

Two principals indicated that rewarding schools would encourage them to work harder in order to improve the performance of learners in ANA. They further indicated that best performing schools should be rewarded by giving them trophies and certificates. One principal responded:

> *Schools must acknowledge learners who do well in assemblies, prize-giving days, weekly newsletters etc. with meaningful awards like scholarships, discount on school fees, merit points etc. (Principal 2).*

This is supported by Dedering and Muller (2010) who, on the basis of their study, argued that improving the effectiveness of teachers would have a major impact on the performance of the country's schools, increasing the achievement of children across the education system.

The majority of participants in this study indicated that parent involvement is a post intervention strategy that could be used to improve learner performance in ANA Mathematics. Three principals indicated that parent involvement is needed in order to improve learner performance. One principal pointed out that:

> *Parents should be encouraged to participate in their children's learning of Mathematics (Principal 3).*

Four HoDs said that parents need to assist their children with school activities at home. They further indicated that parents need to encourage learners to write assignments and homework given by teachers. One HoD remarked:

> *When parents participate in the education of their children, performance of learners improves (HoD 4).*

Three HoDs indicated that it was the responsibility of parents to ensure that their children are doing school work at home. They further stated that parents need to have regular discussions with their children about general school matters.

Two principals indicated that parents need to cultivate healthy, open and cooperative relationships with their children's teachers. They further indicated that parents need to create a home environment conducive to study and should assist in the protection of educational resources such as textbooks. One principal responded:

> *When parents support the education of their children, there will be an improvement in learner performance (Principal 3).*

Three HoDs indicated that education is a social phenomenon that needs different stakeholders to generate maximum participation. They further indicated that teachers alone cannot make it: they need to work hand in hand with parents. One HoD said:

> *Parent and community involvement are needed to participate in the education of their children because they play a vital role to learners' academic success (HoD 3).*

This is supported by Mji and Makgato (2006) when they claim that a shared responsibility translates into a child who is holistically developed, has a good character, good marks, good morals, healthy ambitions, etc. They argue, moreover, that school have a particular responsibility to engage parents and communities in the improvement of learners' performance.

Two principals indicated that high standards and expectations for learner success should be set at school level. They indicated that learners need to be motivated to

take the Annual National Assessment seriously and, by doing so, the level of their performance will be better in the Mathematics ANA. One principal indicated that learners must be made to believe that they are capable of achieving high content and performance standards. This is what one principal had to say:

> *Learners need to be offered an ambitious goal and be assisted to overcome significant barriers that stand on their way (Principal 4).*

Three HoDs indicated that this factor requires that teachers need to change perceptions about their learners' current levels of achievement to enable learners to conform to the standards and expectations. One HoD pointed out:

> *Teachers must set high standards and expectations for learner success and hold learners accountable for completion of work within the established quality standards on a consistent basis. Teachers must set challenging assignments that are appropriate to the subject (HoD 2).*

Three Mathematics teachers indicated that teachers must reflect on classroom practices in relation to standards and expectations. They further indicated that teachers must give all the learners constructive feedback regardless of the learners' level of achievement and that remedial lesson must form part of the teachers' schedule. One teacher remarked:

> *Schools must communicate the highest academic standards to all learners (Teacher 4).*

This is supported by William and Thomson (2005) in the Project Good Start. According to them, effective teachers have high expectations for all learners and set challenging tasks and goals appropriate to each learner with the purpose of helping them achieve better results. According to Schmidt and Wang (2005), teachers must set challenging assignments that are appropriate to the subject and must maintain high standards for learner's behaviour in class.

Theme 9: Use of English in ANA for global competitiveness

The participants in this study indicated that the DoE is using ANA with the aim of determining the standard of reading, writing and counting in learners in South Africa. One HOD said:

> *If the performance of learners reaches the desired levels in Mathematics and English, South Africa would be proud with standard of education and would compete successfully with other countries on a global level (HoD 1).*

Two principals indicated that using English helps to promote the development and application of mathematical skills in interpreting the world and solving problems in daily life. They further indicated that using English helps to provide learners with mathematical tools and logical thinking, which they can apply in understanding other subjects better. One principal commented:

> *Using English helps to develop a foundation of mathematical knowledge, techniques and skills for studying Mathematics and related subjects at higher levels of education (Principal 1).*

The Mathematics teachers indicated that the teaching of Mathematics strictly in English should be de-emphasised to enable Mathematics teachers to explain in the mother tongue whenever they are teaching. One teacher mentioned:

> *The use of the national language in our primary schools should be encouraged; this will help to preserve our national culture and heritage (Teacher 4).*

This is supported by standardised assessment theory used in this study. According to Woessmann (2007), standardised assessment is a management tool that measures both the action of the implementing agents and the provision of information on improved performance to superiors. Standardised assessment is expected to provide

information for people outside the school in general and for parents in particular with the aim of developing post intervention strategies that improve learner performance (Mons, 2009)

4.6. CONCLUSION

In this chapter the researcher summarised the findings of the study in terms of post intervention strategies of the ANA for Grade 6 learners in Manómbe Circuit, Limpopo Province. This chapter revealed that learner performance in the ANA of Grade 6 is not pleasing and that there are a number of factors that contribute to this poor performance. According to the findings from the study, poor learner performance in Mathematics is caused by the following factors: teacher-related factors, instructional leadership-related factors, learner-related factors and parent - related factors. The chapter revealed that there is a need for intervention strategies in schools in order to improve learner performance.

The participants in this study indicated that the following intervention strategies need to be taken into consideration to improve learner performance in ANA Mathematics: teachers should provide quality Mathematics teaching; teachers should acquire adequate Mathematics content knowledge; teachers should provide extra lessons to learners; teachers should give learners more challenging exercises to write; learners should be grouped according to their abilities; schools should organize Mathematics competition; parents should be involved in the education of their children; the DoE should provide learning support materials to school on time; schools should set high standards and expectations for learner success; appropriate teacher development should be provided; government should increase the salaries of teachers; government should open educational colleges to train future teachers and introduction of Mathematics centres.

CHAPTER 5
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1. INTRODUCTION

The purpose of this study was to explore the post intervention strategies used to support the teaching of Mathematics as well as to improve learner performance in public primary schools. To this purpose the study interviewed Mathematics teachers, Mathematics Heads of Departments and Principals of primary schools in order to explore the post intervention strategies that they use in order to improve learner performance in the Mathematics ANA. The rationale for the study was to explore post intervention strategies that would assist in the improvement of teachers' Mathematics teaching skills as well as to improve learner performance in the Mathematics Grade 6 ANA at primary school level.

Chapter 1 provided an overview of the study, including the research topic, research questions, background, statement of the research problem, purpose of the study, literature review, research methodology, significance of the study, and limitation of the study.

Chapter 2 presented a literature review on how poor performance is handled in schools and on which post intervention strategies are used to address the issue of learner performance in Mathematics.

Chapter 3 discussed the research methodology used in the study. It concluded methods of data collection, data analysis strategies to enhance credibility of the study and ethical considerations.

In Chapter 4 the researcher presented the themes that emerged from participant responses and verbatim quotations.
In chapter 5 the researcher summarises the research findings, draws conclusions, and makes recommendations based on the findings that emerged in his research of post intervention strategies to improve the performance in the Mathematics ANA of Grade 6 learners' in Manómbe Circuit.

The aim of this chapter is to answer the main research question and sub questions formulated in Chapter 1.

5.2. SUMMARY OF RESEARCH FINDINGS AND DISCUSSIONS

The following paragraphs provide a summary of the research findings as revealed by the collected data.

5.2.1 Barriers and successes to learning that arise from different aspect of the curriculum

The study revealed various factors that contribute to poor learner performance in ANA Mathematics, such as content related factors, teaching related factors, teacher related factors, learner related factors, and parent related factors.

The participants mentioned that barriers to learning arise from aspects of the curriculum such as the content, the language, classroom organisation, teaching methodologies, pace of teaching, time available to complete the curriculum, teaching and learning support materials, and assessment.

The participants also revealed that teaching-related factors, such as the diversity of learner needs in the classroom, delivery of the curriculum, access to learning by all learners, application of the wrong strategies by learners, language barriers, lack of

basic mathematical concept and skills in an early age, all contribute to poor learner performance in the Mathematics component of ANA..

The participants mentioned that teacher-related factors such as a lack of knowledge of basic mathematical concepts and skills make it impossible for teachers to complete the curriculum in the Mathematics pace setter and that this contributes to poor learner performance in ANA in Mathematics.

Learner-related factors were also revealed as contributing to poor learner performance. Participants mentioned that learners were not performing in ANA because they did not have a proper foundation in Mathematics.

The participants indicated, moreover, that parents were not coming to schools to discuss the performance of their children in schools. When parents do not support the education of their children it may be regarded as another factor that contributes to poor performance.

5.2.2 Lack of basic Mathematics knowledge and support

The participants mentioned that a lack of Mathematics curriculum advisors was regarded as a cause for poor learner performance in ANA in Mathematics. They also indicated that poor supervision by School Management Teams (SMTs) contributes to poor learner performance, and that SMTs seem not to have a strategy to monitor the implementation of curriculum policy at classroom level and / or to translate the importance of effective teaching and learning into classroom excellence.

5.2.3 Factors contributing to poor performance in ANA of Mathematics

The study revealed various factors that contribute to poor learner performance in the ANA of Mathematics. These include a lack of commitment by learners, overcrowded

classes, lack of team work, a shortage of learning support materials, and job vacancies that impact on curriculum delivery.

The participants mentioned a lack of commitment by learners as a factor that contributes to poor learner performance in the ANA of Mathematics. According to the participants some of the learners are lazy to do school work, some are unable to answer easy questions in the examination, and some do not practice Mathematics at home. Consequently, they perform badly in ANA.

Participants also identified overcrowded classes as a factor that contributes to poor learner performance in ANA in Mathematics. They mentioned that their classes are overcrowded and that this makes it difficult for them to teach. They claimed that classes are overcrowded due to a shortage of Mathematics teachers. According to them, overcrowded classes contribute to poor learner performance in ANA because teachers do not get enough time to assist learners.

Participants also indicated that a lack of team work was a factor that contributes to poor learner performance in ANA. They mentioned that teachers do not meet with other teachers who teach Mathematics, do not work as a team and do not even discuss the learning difficulties that learners encounter while learning.

Participants also raised the shortage of learning support materials as an issue, claiming that it contributes to poor learner performance in ANA in Mathematics. They indicated that learning support materials are not supplied in time to schools and that some of the learners spend long periods of time without textbooks, something which makes it difficult for them to do the activities given by teachers.

Another probable cause for poor learner performance highlighted by the participants was job vacancies which, so they claimed, negatively impact on curriculum delivery. According to them, many schools have classes that are overcrowded because, due to

a shortage of teachers, schools address the problem by combining classes. In the end this results in large numbers of learners being squashed into a single classroom.

5.2.4 Development of post ANA intervention strategies

Participants in the study mentioned that the analysis of learners' scripts after the writing of ANA is regarded as their first priority since the results of the analysis were used to develop intervention strategies aimed at addressing the problem of poor performance. They also mentioned that teachers had to analyse the script of each learner, checking it question by question in order to determine in which areas the learner performed well and in which ones they encountered problems or difficulties. The analysis of learners' scripts helps the teachers to identify the areas of weaknesses that affect learners in Mathematics and these provides teachers with rich information that can be used to improve the teaching methodologies. Also, according to participants, the item analysis conducted after ANA indicates that learners lack the ability to respond to complex and higher-order questions which require a deeper understanding.

5.2.5 Adherence to FFLA and CAPS during teaching and learning support

Research participants argued that teachers need to adhere to the FFLC and CAPS in order to improve learner performance in schools. They highlighted the following activities as ones that have the potential to improve learner performance in ANA Mathematics: teachers providing quality of teaching of Mathematics in the classroom, adequate pedagogical content knowledge by teachers, providing extra lessons to learners, giving learners more exercises to write, homogeneous grouping of learners, increasing salaries of teachers, opening educational colleges to train future teachers and introduction of Mathematics centres.

The participants revealed that quality teaching is a key determinant in improving the educational performance of learners in Mathematics. The participants also

mentioned that Mathematics teachers must have pedagogy and Mathematics knowledge because a combination of deep subject knowledge and pedagogical skills is important and promote effective learning in Mathematics.

The participants revealed that teachers need to be encouraged to further their studies in Mathematics and attend workshops organized by Mathematics specialists in order to acquire Mathematics knowledge and pedagogical skills.

The participants revealed that adequate pedagogical content knowledge by Mathematics teachers is an intervention strategy that can improve learner performance in ANA Mathematics. The participants mentioned that Mathematics teachers need to attend school-based and clustered workshops in order to acquire adequate pedagogical content knowledge in Mathematics and teachers in these workshops will be able to share their knowledge, strategies that work, problems or frustrations and allow them to be up to date with innovation in education in general.

The participants agreed that providing extra lessons to learners is a good way that will help to improve learner performance in ANA Mathematics. The participants mentioned that teachers need to use afternoon times to teach learners Mathematics because some of the learners have special needs that need attention in order to improve their performance.

The participants revealed that giving learners more exercises to write is another way that should be used to improve learner performance in ANA Mathematics. The participants mentioned that teachers should provide learners with adequate exercises that would serve as practice for learners in order for them to get familiar with working or steps to be used when calculating mathematical problems.

The participants mentioned that learners should also be given a chance to talk through their mathematical thinking, including suggesting and explaining

alternative methods of calculating or ways of solving the particular problem to improve learner performance.

The participants revealed that grouping of learners according their abilities is one of the requirements that can be used to improve learner performance in ANA Mathematics. The participants mentioned that learners who are capable will assist other learners in the topic that they understand better and this will improve their level of understanding.

The participants revealed that grouping of learners helps teachers to overcome the issue of overcrowding because learners are able to help one another in their group and these will improve learner performance in Mathematics.

The participants mentioned that increasing salaries of teachers is another way that can improve learner performance in ANA Mathematics. They indicated that increasing salaries can attract Mathematics teachers to stay in the teaching profession. Increasing the salaries of teachers will attract young learners to pursue teaching profession as their career and the issue of shortage of qualified Mathematics teachers will be solved.

5.2.6 Instructional leadership role of Mathematics teachers, HoDs and principals

The participants mentioned instructional leadership as an intervention strategy that could be used to improve learner performance in ANA Mathematics. According to them, the school curriculum must be managed by principals, HoDs and Mathematics teachers in order to improve learner performance.

In addition, according to the participants, principals should provide support to teachers by ensuring that learning support materials are supplied to schools on time, ensuring that the school Mathematics plan is developed and that all aspects of intervention strategies are implemented at school level and with the parent community. Also, they argued, the principals should identify appropriate staff to

attend the training programmes which provide them with opportunities for peer reflection with other teachers at school level. Finally, according to participants, the principal is responsible for the creation of an environment that is conducive to teaching and learning by monitoring and setting school targets for learner performance.

According to the participants, the instructional management of the schools is, however, in the hands of HoDs because they are the subject specialists at schools. They suggested that HoDs should work closely with teachers to make sure that teaching and learning take place as stipulated in policy, and to ensure that there is collaborative curriculum planning in their subject area/s.

The participants revealed that close monitoring by HoDs contributes to improving learner performance in Mathematics. The participants mentioned that HoDs should conduct class visits with the aim of providing support to teachers. HoDs should ensure that teachers are teaching according to the pace setters and the correct standards of work is maintained. They need to check if teachers have enough resources and if there is a shortage they need to provide.

Participants were also of the opinion that Mathematics teachers have an instructional leadership role to perform in ensuring that teaching and learning take place in the classroom. With regard to mathematics teachers they argued that the main business of Mathematics teachers at schools is to manage the instructional activities in such a way that they help learners to perform better. To ensure that performance does improve, according to participants, teachers should use multiple strategies to train learners in the appropriate responses to different questions in ANA Mathematics. In conclusion, participants mentioned that Mathematics teachers should go the extra mile to help learners complete the curriculum in the time allocated to it.

5.2.7 Alignment with education policy stipulations

Participants mentioned various challenging aspects that hinder learner performance such as poor parental involvement, overcrowded classes, a shortage of qualified Mathematics teachers, inadequate content knowledge in Mathematics, a lack of learner supervision, inadequate syllabus coverage and a shortage of curriculum supervisors. According to the participants, these challenging aspects violate education policies like the South African Schools Act, the Employment of Educators Act and the SA Constitution.

Participants also mentioned a lack of parental involvement in the education of their children as a challenge that hinders learner performance in ANA Mathematics. They argued that the South African Schools Act of 1996 gave parents the right to visit public schools where their children have been admitted to support them hence their lack of involvement in their children's education is a violation of government policies.

Another problem highlighted by participants is the issue of overcrowded classes which, according to them, hinder progress towards better learner performance in ANA Mathematics. Citing the 1:35 ratio stipulated by the Department of Education as evidence, participants argued that the overcrowding of classroom is a violation of departmental policies.

The shortage of qualified Mathematics teachers, combined with the fact that many Mathematics teachers are not qualified to teach Mathematics, was regarded as a serious obstacle to the improvement of learner performance in Mathematics by participants. According to them, unqualified Mathematics teachers lack the content and pedagogical knowledge to adequately teach Mathematics and that this is a violation of learners' right to education of high quality.

In conclusion, participants mentioned that the lack of teaching and learning support materials posed a challenge to the improvement of learner performance in the

Mathematics ANA. According to them, the shortage of textbooks at schools handicaps learners in their attempts to grasping the content taught and to complete class exercises and assignments given by their teachers.

5.2.8 Implementation of mathematics teaching and learning strategies

With regard to Mathematics teaching and learning strategies, participants argued for the inclusion of a whole range of activities that would, according to them, create an interest in and enthusiasm for Mathematics in learners. Activities mentioned include organizing Mathematics competitions at schools; rewarding schools that work, encouraging parental involvement in the education of their children, providing learner support materials, setting high standards and expectations for learner success, and frequent but appropriate teacher development.

In addition to the impact that activities like these would have on learner' attitudes to Mathematics, according to participants, they would contribute to the improvement of the Mathematics ANA performance of learners. The reason, participants claim, is that events like Mathematics competitions will give learners the chance of competing with one another and, perhaps winning a prize. It will also create opportunities for schools to compete against each other, thereby motivating them to work harder so as to win some or other award.

Parental involvement in the education of their children was again mentioned as important to the improvement of learner performance, with participants emphasizing the fact that parents have the responsibility to ensure that their children are doing school work at home.

Another intervention strategy which, according to participants, could improve learner performance in ANA Mathematics was the provision of good learning materials and text-rich school environments that will encourage children to perform better. Participants claimed that the success of the Mathematics strategy depended

on improved access to sufficient and appropriate high quality Mathematics resources for both learners and teachers.

Also related to quality were participant arguments for the setting of high standards and learner expectations by teachers, teachers consistently holding learners accountable for the completion of work that is up to standard, and frequent and appropriate teacher development aimed at the improvement of learner performance in ANA Mathematics.

5.2.9 Use of English in ANA for global competitiveness

Participants mentioned their perception that ANA is used to gauge the standard of reading, writing and counting of learners in South Africa. According to most of them the use of English helps to promote the development and application of mathematical skills in interpreting the world and solving problems in daily life, thus providing learners with mathematical tools and logical thinking which they can apply in other subjects as well. Participants indicated that they were of the opinion that South Africa would be proud of its standard of education, and would be able to compete successfully with other countries at a global level once the performance of learners satisfies the desired levels in Mathematics and English,.

5.3. CONCLUSIONS

Based on the literature review and the findings of the study on post intervention strategies of Annual National Assessment of Grade 6 learners, the study presents the following conclusions:

5.3.1 There are factors that contribute to poor learner performance in ANA in Mathematics: these include content related factors; teaching related factors; teacher related factors; learner related factors, and parent related factors.

5.3.2 Various challenging aspects hinder learner performance in ANA in Mathematics, namely: poor parental involvement; overcrowded classes; shortage of qualified Mathematics teachers; inadequate content knowledge in Mathematics; lack of learner supervision; inadequate syllabus coverage, and shortage of curriculum advisors. All of these seem to be violating educational policies such as SASA and the Constitution of South Africa.

5.3.3 Mathematics teachers lack basic Mathematics knowledge and they do not get the necessary support from Mathematics curriculum advisors. School Management Teams (SMTs) seem to lack strategies to monitor the implementation of curriculum in schools.

5.3.4 Item analysis needs to be the top priority for schools. Item analysis serves as basis for the development of appropriate intervention strategies that could address the issue of learner performance in ANA in Mathematics. Mathematics teachers need to analyse learners' scripts to identify the areas of weaknesses that affect learner performance in ANA.

5.3.5 Teachers need to use a range of intervention strategies in the classroom with a view to improving learner performance. The following strategies in particular need to be utilized to improve learner performance in Mathematics: teachers need to provide quality teaching of Mathematics; teachers need to acquire adequate pedagogical content knowledge; teachers need to provide extra lesson to learners with learning difficulties; learners need to be grouped according to their abilities, and parents need to support the education of their children.

5.4. RECOMMENDATIONS

5.4.1 Participants emphasized the lack of Mathematics curriculum advisors as a cause of poor learner performance in ANA in Mathematics. The DoE therefore needs

to increase the number of curriculum advisors who can coach and mentor Mathematics teachers in the teaching of Mathematics in schools.

5.4.2 Participants indicated that not all the teachers who are currently teaching Mathematics have the requisite content knowledge to do so effectively and this is a challenge. Participants were adamant that learners should be taught by teachers who are qualified. The DBE therefore needs to award bursaries to current Mathematics teachers to further their mathematical studies and/or to other teachers who are keen to become Mathematics teachers.

5.4.3 Participants highlighted the shortage of qualified Mathematics teachers as a challenge that hinders learner performance in schools. The DoE needs to re-open educational colleges where future Mathematics and other teachers may be trained.

5.4.4 Participants were of the opinion that teaching related factors, such as the diversity of learner needs in the classroom, curriculum delivery, access to learning by all learners, application of incorrect strategies by learners, language barriers, and a lack of basic mathematical concepts and skills at an early age contribute to poor learner performance in ANA in Mathematics. The DoE needs to introduce Mathematics centres where Mathematics experts could be employed to assist schools with mathematical problems. These centres need to be introduced at the cluster level and all learners should be able to go there to learn aspects of Mathematics with which they are experiencing problems.

5.4.5 The study revealed a shortage of learning support materials as one of the factors that contribute to poor learner performance in ANA in Mathematics. Participants indicated that learning support materials are not supplied to schools on time and that some of the learners spend long periods without textbooks. Consequently, these learners find it difficult to write activities given by teachers. It follows, according to participants, that this problem affects learner performance in Mathematics. The DoE needs to supply adequate material resources such as

Mathematics textbooks and other learning support materials on time in order to meet the needs of learners at schools.

5.4.7 The study also revealed that poor supervision by SMTs contributes to poor learner performance. Participants mentioned that SMTs do not seem to have the any strategies in place to monitor the implementation of curriculum policy at classroom level and/or to translate the importance of effective teaching and learning into classroom excellence. Since SMTs need to ensure that effective teaching and learning take place in school they need to closely monitor curriculum implementation. The DoE needs to workshop SMT members, especially HoD's, on this aspect to ensure that curriculum monitoring and control contributes to improved learner performance in Mathematics.

5.4.8 Schools must ensure that teachers who are appointed to teach Mathematics have the prescribed qualifications and satisfy the requirements of the post.

5.4.9 Participants mentioned that teachers must follow the FFLC as well as content in the Mathematics CAPS documents in their teaching of Mathematics. They recommended that the DoE could assist teachers by employing more subject advisors to coach and mentor them in the teaching of Mathematics as prescribed in the National Mathematics policy.

5.5. DELIMITATIONS

This study was limited to selected principals of primary schools, Grade 6 Mathematics teachers and Mathematics HoDs in the Manómbe Circuit, Limpopo Province. Teachers teaching other subjects were not included in this study.

5.6. LIMITATIONS

The study used qualitative methods of research and focused on the use of a few cases in this research design. The sample was small and consisted of four principals, four Mathematics HoD's and four Mathematics Grade 6 teachers. As such the findings cannot be generalised to include the whole population.

5.6. FUTURE STUDY

Even though this study has achieved its aim and objectives, the researcher suggests that further studies be conducted on at least the following: the principals' influence on teaching practices for student achievement, and the effect that teachers' Mathematical subject knowledge, or lack thereof, influences learner achievement.

5.7. CONCLUSION

This research conducted for this study concentrated on a small number of primary school principals, Mathematics Heads of departments and Mathematics teachers on post intervention strategies of ANA for Grade 6 learners in the Manómbe Circuit, Limpopo. Due to the small sample, the findings of the study cannot be generalized. Nonetheless, the study collected important data on factors that contribute to poor performance as well as on post intervention strategies that could be used to improve learner performance in Mathematics.

In particular, the research findings indicate that the implementation of the following post intervention strategies could lead to better learner performance in Mathematics: the employment of well-qualified Mathematics teachers – teacher who specialized in or had Mathematics as their major at a tertiary institutions; regular updating of Mathematics teachers' subject content knowledge in addition to the formal training they received at tertiary institutions; offering Mathematics teachers effective and future professional development initiatives of high quality; curriculum specialists providing Mathematics teachers with regular support; Mathematics teachers being closely monitored and supported by their SMTs; Mathematics teachers using different teaching techniques to accommodate all the learners in their classrooms; Mathematics teachers doing continuous progress monitoring through formal and informal assessment, and the use of English as language of teaching and learning when teaching Mathematics. Finally, the recommendations to the DoE regarding future curriculum management at schools that emerged from this study are also deemed to be of great value and should be seriously considered by the DoE.

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APPENDIX A: REQUEST FOR PERMISSION: MOPANI DISTRICT.

Universiteit van Pretoria

Pretoria 0002,

Republiek van SuidAfrika.

http://www.up.ac.za

Department Education

Management Law and Policy

Study

P. O. BOX 81

GIYANI

0826

18 MAY 2014

THE SUPERINTENDENT GENERAL

DEPARTMENT OF EDUCATION

PRIVATE BAG X9489

POLOKWANE

0700

Dear Sir

REQUEST FOR PERMISSION TO CONDUCT EDUCATIONAL RESEARCH IN LIMPOPO: MAN'OMBE CIRCUIT, MOPANI DISTRICT.

I, Baloyi Dingani Graham, a Master in Education candidate in Education Management, Law and Policy study at the University of Pretoria (27595278) hereby request your permission to conduct research interviews with the school principals, Head of departments and Educators in Limpopo Province. My Research Topic is: "P***ost intervention strategies of Annual National Assessment of grade 6 learners in Manómbe Circuit, Limpopo".***My supervisor is Dr. Sharon Mampane. In line with my research design and methodology, I would like to be given permission to conduct interviews with school principals, Heads of Department and educators from primary schools in Man'ombe Circuit regarding post intervention strategies of annual national assessment of grade 6 learners in Manómbe Circuit, Limpopo.

Confidentiality will be ensured. Information obtained will be used for the purposes of the study only and I undertake to ensure that the information will be used in such a way that the respondents cannot be identified. Therefore the final report will not include identifying information.The research findings will be disseminated to the Department of Education and schools which will participate in the study.

The research period for the study will be conducted from 01 May to 30 October 2014. Your co-operation in the regard will be highly appreciated.

Yours sincerely
Mr. Baloyi D.G.

Enquiries : Baloyi D.G.
Contacts : 0732856296
E-mail address: dgbaloyi@gmail.com

APPENDIX B: PERMISSION LETTER FROM MOPANI DISTRICT.

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

Enquiries: Dr. Makola MC, Tel No: 015 290 9448. E-mail: MakolaMC@edu.limpopo.gov.za

P O BOX 81

GIYANI

0826

BALOYI DG

RE: Request for permission to Conduct Research

1. The above bears reference.
2. The Department wishes to inform you that your request to conduct a research has been approved- **TOPIC: POST INTERVENTION STRATEGIES OF ANNUAL NATIONAL ASSESSMENT OF GRADE 6 LEARNERS IN MANOMBE CIRCUIT,LIMPOPO**
3. The following conditions should be considered

   3.1 The research should not have any financial implications for Limpopo Department of Education.

   3.2 Arrangements should be made with both the Circuit Offices and the schools concerned.

   3.3 The conduct of research should not anyhow disrupt the academic programs at the schools.

   3.4 The research should not be conducted during the time of Examinations especially the forth term.

   3.5 During the study, the research ethics should be practiced, in particular the principle of voluntary participation (the people involved should be respected).

   3.6 Upon completion of research study, the researcher shall share the final product of the research with the Department.

4. Furthermore, you are expected to produce this letter at Schools/ Offices where you intend conducting your research as an evidence that you are permitted to conduct the research.

Page 1 of 2

Cnr. 113 Biccard & 24 Excelsior Street, POLOKWANE, 0700, Private Bag X9489, POLOKWANE, 0700
Tel: 015 290 7600, Fax: 015 297 6920/4220/4494

The heartland of southern Africa - development is about people!

5. The department appreciates the contribution that you wish to make and wishes you success in your investigation.

Best wishes.

Dederen

31/03/2014

Dederen K.O

Date

Acting Head of Department

APPENDIX C: REQUEST FOR PERMISSION: MANOMBE CIRCUIT.

Universiteit van Pretoria

Pretoria 0002 Republiek van Suid Afrika
http://www.up.ac.za

Department Education Management Law and Policy

P. O. BOX 81
GIYANI
0826
18 MAY 2014

THE CIRCUIT MANAGER
MAN'OMBE CIRCUIT
DEPARTMENT OF EDUCATION
PRIVATE BAG X9654
GIYANI
0826

Dear Sir

REQUEST FOR PERMISSION TO CONDUCT EDUCATIONAL RESEARCH IN LIMPOPO: MAN'OMBE CIRCUIT, MOPANI DISTRICT.

I, Baloyi Dingani Graham, a Master in Education candidate in Education Management, Law and Policy study at the University of Pretoria (27595278) hereby request your permission to conduct research interviews with the school principals, Head of departments and Educators in Limpopo Province. My Research Topic is: "P***ost intervention strategies of annual national assessment of grade 6 learners in Manómbe Circuit, Limpopo".***My supervisor is Dr. Sharon Mampane. In line with my research design and methodology, I would like to be given permission to conduct interviews with school principals, Heads of Department and educators from primary schools in Man'ombe Circuit regarding post intervention strategies of annual national assessment of grade 6 learners in Manómbe Circuit, Limpopo.

Confidentiality will be ensured. Information obtained will be used for the purposes of the study only and I undertake to ensure that the information will be used in such a way that the respondents cannot be identified. Therefore the final report will not include identifying information.
The research findings will be disseminated to the Department of Education and schools which will participate in the study.

The research period for the study will be conducted from 01 May to 30 October 2014.

Your co-operation in the regard will be highly appreciated.

Yours in education
Mr. Baloyi D.G.

Enquiries : Baloyi D.G.
Contacts : 0732856296
E-mail address: dgbaloyi@gmail.com

APPENDIX D: PERMISSION LETTER FROM MANOMBE CIRCUIT.

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF
EDUCATION

MOPANI DISTRICT – MAN'OMBE CIRCUIT

Enq : MR. Maringa S.S
Tel : 015 812 0637

Date: 25 June 2014

TO: MR. BALOYI D.G
P.O. Box 81
GIYANI
0826

CONSENT TO CONDUCT RESEARCH IN MAN'OMBE PRIMARY SCHOOLS: YOURSELF.

1. The above matter bears reference.
2. The Circuit Manager wishes to inform you that your request to interview Grade 6 Mathematics teachers, Mathematics HODs and Primary Schools' Principals in Man'ombe Circuit has been granted.
3. When conducting interviews with the above participants, the following conditions must be adhered to:
   3.1 No person may be forced to participate in the study.
   3.2 No disruption of the normal teaching and learning programme in schools.
4. This letter may serve as proof of permission to conduct research when visiting Grade 6 Mathematics Educators, Mathematics HODs and principals in primary schools.
5. Your co-operation in this regard will be highly appreciated.

Makwena A.T
CIRCUIT MANAGER

DEPARTMENT OF EDUCATION
MOPANI DISTRICT, Man'ombe Circuit, Private Bag X 9654 GIYANI, 0826
Tel 015 812 0637 Fax No. 015 812 4421 or 015 812 1689
The heartland of Southern Africa – development is about people

APPENDIXE: REQUEST FOR PERMISSION: SGB.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Education

THE SCHOOL GOVERNING BODY

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN SCHOOLS IN MAN'OMBE CIRCUIT OF THE LIMPOPO PROVINCE

My name is Mr Graham Dingani Baloyi and I am a student at the University of Pretoria, Faculty of Education, and Department of Education Management. I hereby request permission to conduct research in the school. The research I wish to conduct for my Master's dissertation is titled "Post intervention strategies of the Annual National Assessment of grade 6 learners in the Man'ombe Circuit, Limpopo Province". The study aims to address the concerns raised about the poor assessment results in ANA as well as explore strategies used post ANA to support teachers' and learners' performance in schools. The study critiques the standardised national and international assessments as a criteria with which the quality of educational assessments are judged in the different contexts. The knowledge and information obtained from the study will be relevant and valuable to the principals, HoDs, and policy makers with regard to the strategies to be used in improving the ANA Mathematics results in schools.

Participation in this is voluntary and the participants have the right to withdraw at any stage of the study with no negative consequences to them. All the participants will sign the letter of informed consent which will explain the nature, purpose and objectives of the study. The letter will also include the title of the study as well the details of the researcher. Confidentiality and anonymity of all participants is guaranteed as no participant will be required to provide their names, names of the

school or any personal details that could identify them or be traced back to them. There are no known risks to participants resulting from their participation in this study.

This project will be conducted under the supervision of DR S.T. Mampane (University of Pretoria).

Yours sincerely,

Mr D.G. Baloyi

Student number: 27595278

Enquiries : Baloyi D.G.

Contacts : 0732856296

E-mail address: dgbaloyi@gmail.com

APPENDIX F: REQUEST FOR CONSENT: PRINCIPAL

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Education

DEAR PARTICIPANT (Principal)

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN SCHOOLS IN MAN'OMBE CIRCUIT OF THE LIMPOPO PROVINCE

My name is Mr Graham Dingani Baloyi and I am a student at the University of Pretoria, Faculty of Education, and Department of Education Management. I hereby request permission to conduct research in the school. The research I wish to conduct for my Master's dissertation is titled "Post intervention strategies of the Annual National Assessment of grade 6 learners in the Man'ombe Circuit, Limpopo Province". The study aims to address the concerns raised about the poor assessment results in ANA as well as explore strategies used post ANA to support teachers' and learners' performance in schools. The study critiques the standardised national and international assessments as a criteria with which the quality of educational assessments are judged in the different contexts. The knowledge and information obtained from the study will be relevant and valuable to the principals, HoDs, and policy makers with regard to the strategies to be used in improving the ANA Mathematics results in schools.

Participation in this is voluntary and the participants have the right to withdraw at any stage of the study with no negative consequences to them. All the participants will sign the letter of informed consent which will explain the nature, purpose and objectives of the study. The letter will also include the title of the study as well the details of the researcher. Confidentiality and anonymity of all participants is guaranteed as no participant will be required to provide their names, names of the

school or any personal details that could identify them or be traced back to them. There are no known risks to participants resulting from their participation in this study. The identity of the participants will be protected at all times (during interview processes) and not be left around in notebooks or unprotected computer. Participants' identities will not be revealed in the dissertation of the research.

Interview will last between 45 minutes and one hour at your school. The interview processes will be conducted after school hours with the aim of avoiding disturbance of smooth running of school activities. All interview processes will be recorded on tape recorder to save time and to ensure that I do not miss useful information during our conversations. Participant is free to choose a time that suit him or her, but the time must be after school hours.

This project will be conducted under the supervision of DR S.T. Mampane (University of Pretoria). I hereby request for your consent to be interviewed.

Yours sincerely
Mr D.G. Baloyi
Student number: 27595278

PARTICIPANT CONSENT

I ……..…… hereby give consent to Mr D.G. Baloyi to involve me as a participant in his research on "Post intervention strategies of the Annual National Assessment of grade 6 learners in Man'ombe Circuit, Limpopo Province". I understand that participation in this study is voluntary and that I have the right to withdraw at any stage of the study with no negative consequences to me. The nature, purpose and objectives of the study, the title of the study as well the details of the researcher were explained to me. My confidentiality and anonymity is guaranteed as I will not be required to provide my name, the name of my school or

to give any personal details that could identify me or be traced back to me. There will be no risks to me as a participant in this study.

PARTICIPANT SIGNATURE : ……..

RESEARCHER'S SIGNATURE : ……..

SUPERVISOR'S SIGNATURE : …….

APPENDIX G: REQUEST FOR CONSENT: MATHEMATICS HoD.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Education

DEAR PARTICIPANT (Mathematics HoD)

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN SCHOOLS IN MAN'OMBE CIRCUIT OF THE LIMPOPO PROVINCE

My name is Mr Graham Dingani Baloyi and I am a student at the University of Pretoria, Faculty of Education, and Department of Education Management. I hereby request permission to conduct research in the school. The research I wish to conduct for my Master's dissertation is titled "Post intervention strategies of the Annual National Assessment of grade 6 learners in the Man'ombe Circuit, Limpopo Province". The study aims to address the concerns raised about the poor assessment results in ANA as well as explore strategies used post ANA to support teachers' and learners' performance in schools. The study critiques the standardised national and international assessments as a criteria with which the quality of educational assessments are judged in the different contexts. The knowledge and information obtained from the study will be relevant and valuable to the principals, HoDs, and policy makers with regard to the strategies to be used in improving the ANA Mathematics results in schools.

Participation in this is voluntary and the participants have the right to withdraw at any stage of the study with no negative consequences to them. All the participants will sign the letter of informed consent which will explain the nature, purpose and objectives of the study. The letter will also include the title of the study as well the details of the researcher. Confidentiality and anonymity of all participants is guaranteed as no participant will be required to provide their names, names of the school or any personal details that could identify them or be traced back to them.

There are no known risks to participants resulting from their participation in this study.

Interview will last between 45 minutes and one hour at your school. The interview processes will be conducted after school hours with the aim of avoiding disturbance of smooth running of school activities. All interview processes will be recorded on tape recorder to save time and to ensure that I do not miss useful information during our conversations. Participant is free to choose a time that suit him or her, but the time must be after school hours. There are no known risks to participants resulting from their participation in this study. The identity of the participants will be protected at all times (during interview processes) and not be left around in notebooks or unprotected computer. Participants' identities will not be revealed in the dissertation of the research.

This project will be conducted under the supervision of DR S.T. Mampane (University of Pretoria). I hereby request for your consent to be interviewed.

Yours sincerely
Mr D.G. Baloyi
Student number: 27595278

PARTICIPANT CONSENT

I ……..…… hereby give consent to Mr D.G. Baloyi to involve me as a participant in his research on "Post intervention strategies of the Annual National Assessment of grade 6 learners in Man'ombe Circuit, Limpopo Province". I understand that participation in this study is voluntary and that I have the right to withdraw at any stage of the study with no negative consequences to me. The nature, purpose and objectives of the study, the title of the study as well the details of the researcher were explained to me. My confidentiality and anonymity is guaranteed as I will not be required to provide my name, the name of my school or

to give any personal details that could identify me or be traced back to me. There will be no risks to me as a participant in this study.

PARTICIPANT SIGNATURE : ……..

RESEARCHER'S SIGNATURE : ……..

SUPERVISOR'S SIGNATURE : …….

APPENDIX H: REQUEST FOR CONSENT: MATHEMATICS TEACHER

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Education

DEAR PARTICIPANT (Mathematic teacher)

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN SCHOOLS IN MAN'OMBE CIRCUIT OF THE LIMPOPO PROVINCE

My name is Mr Graham Dingani Baloyi and I am a student at the University of Pretoria, Faculty of Education, and Department of Education Management. I hereby request permission to conduct research in the school. The research I wish to conduct for my Master's dissertation is titled "Post intervention strategies of the Annual National Assessment of grade 6 learners in the Man'ombe Circuit, Limpopo Province". The study aims to address the concerns raised about the poor assessment results in ANA as well as explore strategies used post ANA to support teachers' and learners' performance in schools. The study critiques the standardised national and international assessments as a criteria with which the quality of educational assessments are judged in the different contexts. The knowledge and information obtained from the study will be relevant and valuable to the principals, HoDs, and policy makers with regard to the strategies to be used in improving the ANA Mathematics results in schools.

Participation in this is voluntary and the participants have the right to withdraw at any stage of the study with no negative consequences to them. All the participants will sign the letter of informed consent which will explain the nature, purpose and objectives of the study. The letter will also include the title of the study as well the details of the researcher. Confidentiality and anonymity of all participants is

guaranteed as no participant will be required to provide their names, names of the school or any personal details that could identify them or be traced back to them. There are no known risks to participants resulting from their participation in this study. There are no known risks to participants resulting from their participation in this study. The identity of the participants will be protected at all times (during interview processes) and not be left around in notebooks or unprotected computer. Participants' identities will not be revealed in the dissertation of the research.

Interview will last between 45 minutes and one hour at your school. The interview processes will be conducted after school hours with the aim of avoiding disturbance of smooth running of school activities. All interview processes will be recorded on tape recorder to save time and to ensure that I do not miss useful information during our conversations. Participant is free to choose a time that suit him or her, but the time must be after school hours.

This project will be conducted under the supervision of DR S.T. Mampane (University of Pretoria). I hereby request for your consent to be interviewed.

Yours sincerely
Mr D.G. Baloyi
Student number: 27595278

PARTICIPANT CONSENT

I ……..…… hereby give consent to Mr D.G. Baloyi to involve me as a participant in his research on "Post intervention strategies of the Annual National Assessment of grade 6 learners in Man'ombe Circuit, Limpopo Province". I understand that participation in this study is voluntary and that I have the right to withdraw at any stage of the study with no negative consequences to me. The nature, purpose and objectives of the study, the title of the study as well the details of the researcher were explained to me. My confidentiality and anonymity is

guaranteed as I will not be required to provide my name, the name of my school or to give any personal details that could identify me or be traced back to me. There will be no risks to me as a participant in this study.

PARTICIPANT SIGNATURE : ……..

RESEARCHER'S SIGNATURE : ……..

SUPERVISOR'S SIGNATURE : …….

APPENDIX I: INTERVIEW SCHEDULE: PRINCIPAL

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Education

PURPOSE OF THE STUDY

The purpose of this interview is to elicit your responses regarding how post intervention strategies of the Annual National Assessment of the grade 6 learners are used in the Man'ombe Circuit, Limpopo Province. Your participation in this study is completely voluntary and you are free to withdraw at any stage of the study. Any information provided by you will be kept anonymous.

INTERVIEW QUESTIONS

1. Tell me about your experiences of being a coordinator for the ANA of Mathematics in the school.
2. What in your opinion are the reasons for poor performance in Mathematics?
3. What can you say about learner performance in the Annual National Assessment of Mathematics?
4. What happens after the Annual National Assessment of Mathematics?
5. What is needed to improve the Mathematics results in the Annual National Assessment?
6. What do you as a principal do with regard to the Annual National Assessment in Mathematics?
7. What are some of the challenges you experience in improving learner performance?
8. What works well in improving learner performance in Mathematics?
9. What else can you tell me about the Annual National Assessment of Mathematics?

APPENDIX J: INTERVIEW SCHEDULE: MATHEMATICS HoDS.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Education

PURPOSE OF THE STUDY

The purpose of this interview is to elicit your responses regarding how post intervention strategies of the Annual National Assessment of the grade 6 learners are used in the Man'ombe Circuit, Limpopo Province. Your participation in this study is completely voluntary and you are free to withdraw at any stage of the study. Any information provided by you will be kept anonymous.

INTERVIEW QUESTIONS

1. Tell me about your experiences of being a Mathematics HoD.
2. What in your opinion are the reasons for poor performance in Mathematics?
3. What can you say about learner performance in the Annual National Assessment of Mathematics?
4. What happens after the Annual National Assessment of Mathematics?
5. What is needed to improve the Mathematics results in the Annual National Assessment?
6. What do you as a HoD do with regard to the Annual National Assessment in Mathematics?
7. What are some of the challenges you experience in improving learner performance?
8. What works well in improving learner performance in Mathematics?
9. What else can you tell me about the Annual National Assessment of Mathematics?

APPENDIX K: INTERVIEW SCHEDULE: MATHEMATICS TEACHERS.

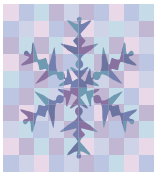
UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Education

PURPOSE OF THE STUDY

The purpose of this interview is to elicit your responses regarding how post intervention strategies of the Annual National Assessment of the grade 6 learners are used in the Man'ombe Circuit, Limpopo Province. Your participation in this study is completely voluntary and you are free to withdraw at any stage of the study. Any information provided by you will be kept anonymous.

INTERVIEW QUESTIONS

1. Tell me about your experiences of being a Mathematics teacher.
2. What in your opinion are the reasons for poor performance in Mathematics?
3. What can you say about learner performance in the Annual National Assessment of Mathematics?
4. What happens after the Annual National Assessment of Mathematics?
5. What is needed to improve the Mathematics results in the Annual National Assessment?
6. What do you as a teacher do in class with regard to the Annual National Assessment in Mathematics?
7. What are some of the challenges you experience in improving learner performance?
8. What works well in improving learner performance in Mathematics?
9. What else can you tell me about the Annual National Assessment of Mathematics?



Sanctum

Independent Research Consultancy

Cell : 084 440 2828

7 Edward Street, Anzac, Brakpan,

RSA

2 September 2015

To whom it may concern

Certificate of language editing

This is to certify that I have edited the thesis, "Post intervention Strategies of Annual National Assessment of Grade 6 Learners in Manombe Circuit, Limpopo" by Dingane Graham Baloyi, in terms of language usage, style, tenses, expression and consistency.

I focused on grammar, tenses, consistency of terminology, and sentence construction. I did not make any changes to the actual content of the thesis.

The List of References was checked for formatting and was cross checked with the sources cited in the body of the thesis.

I wish the candidate success with his final submission and future career.

Beverley Malan (electronically signed)

Beverley M. Malan (Dr)

beverley.malan1@gmail.com