

Namibian Teachers' and Learners' Attitudes towards the
New Mathematics Promotion Requirements
for Grade 5-9: A Qualitative Case Study

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Abstract

Mathematics achievement has received much attention in recent years and results have been presented after examining results from different counties. This contribution deals with the implementation of new Mathematic promotion requirements in Namibia. The research was conducted in Shambyu circuit, Kavango region, within a selected combined public school situated fifteen kilometres from Rundu in the North-Eastern part of Kavango. Teachers and learners in Namibia have not performed well in the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) projects, especially in Mathematics. The implementation of new promotion requirements was inevitable for improving achievement levels.

The main aim of this study is to document the attitudes of teachers and learners towards the introduction of the new 2010 Mathematics promotion requirements. The complexity and the nature of attitudes are illustrated and some of the characteristics related to teaching and learning of Mathematics in the academic reform are presented. The researcher developed a conceptual framework to compare and contrast the theoretical positions on the topic. Attitude is defined from diverse perspectives, and relationships of attitudes pertaining to achievement to perform in Mathematics are argued.

A qualitative case study was the preferred method of choice. The participants were sampled according to a non-probability purposive sampling strategy. Five teachers, six grade 7 and six grade 9 learners participated in the study. The participants were interviewed to gain insight into how they formulated their attitudes towards the implementation of the academic reform. Focus group interviews were captured through audio recordings. Patterns, themes and categories emerged from the data analysis, suggesting that teachers and learners demonstrate positive and negative attitudes which affect their stance towards the new promotion requirements.

Research findings were compared with the relevant literature to identify strengths and weaknesses as extracted from the attitudes of the participating teachers and learners which confirm that attitudes of teachers and learners interrelate and affect teaching and learning of Mathematics. Strengths and weaknesses extracted from the attitudes of the teachers relate to teaching strategies, pedagogical content knowledge and practical application of the subject. A weakness of the policy change is that the Ministry of Education does not sustain involvement. Teachers need support through workshops to increase their pedagogical content knowledge and gain more information about the implementation of the new policy. Furthermore teachers expect educational support from the Ministry of Education through the provision of textbooks and teaching aids. Collaboration between teachers is crucial, as is

the significance thereof for developing pedagogical content knowledge for the implementation of the new Mathematical policy.

Strengths and weaknesses extracted from attitudes as viewed by learners in grade 9 are more related to their opinions about the teachers, their motivation and academic achievements. Learners' natural Mathematics skills should be developed to instill feelings of accomplishment. Grade 9 learners experience fear and insecurity in Mathematics because learners experience teachers as too strict, owing to the absence of pedagogical content knowledge. The grade 9 learners distinguish the importance of ICT use in Mathematics as part of a process to prepare them towards greater goals and practical application as a strength. Both advantages and disadvantages of beliefs regarding Mathematics amongst the teachers and the learners guide grade 7 learner towards achievement. Further expectations drive the grade 7 learners towards achievement in order to increase career opportunities and level of schooling.

In conclusion the in-depth qualitative exploration is summarized in order to investigate the phenomenon of attitudes towards Mathematics and academic reform.

Keywords

Mathematics promotion requirements

Namibia

Qualitative research

Beliefs

Motivation

Attitudes

Education reform

Opsomming

Prestasie in Wiskunde het die afgelope tyd baie aandag geniet, en nadat uitslae in verskeie lande bestudeer is, is resultate aangebied. Hierdie bydrae fokus op die implementering van nuwe Wiskunde bevorderingsvereistes in Namibië. Navorsing is gedoen in die Shambyukring, Kavangostreek in 'n geselekteerde publieke skool vyftien kilometers vanaf Rundu in die Noord-Oostelike deel van die Kavango. Onderwysers en leerders in Namibië het nie goed gedoen in die *Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ)* projekte nie, veral nie in Wiskunde nie. Dit het die implementering van nuwe slaagvereistes genoodsaak.

Die hoofdoel van die navorsing is om houdings van onderwysers en leerders teenoor die implementering van die nuwe 2010 Wiskunde slaagvereistes in Namibië, te dokumenteer. Oortuigings word gedefinieer en vanuit perspektiewe, die verband tussen verskillende houding en prestasie in Wiskunde word beredeneer. Die gekompliseerdheid en aard van Wiskunde word omskryf en sommige eienskappe wat verband hou met onderrig en leer van Wiskunde word as deel van die nuwe akademiese slaagsyfer beleidsverandering bespreek. Die navorser het 'n konseptuele raamwerk ontwikkel met die doel om teoretiese standpunte en aannames oor die onderwerp, te vergelyk.

Vir hierdie studie is gebruik gemaak van 'n kwalitatiewe gevallestudie. Die data is verkry deur gebruik van fokusgroep onderhoude. Vyf onderwysers, ses graad 7 en ses graad 9 leerders het aan die onderhoude deelgeneem. Die deelnemers is gekies met behulp van 'n nie-waarskynlikheid-steekproefneming strategie. Die deelnemers se houdings teenoor die implementering van die nuwe Wiskunde slaagvereistes is bepaal. Duidelike patrone, temas en kategorieë het vanuit die data tevoorskyn gekom, die inligting het aangedui dat positiewe asook negatiewe houdings 'n effek op die deelnemers se houdings het ten opsigte van die nuut aangepaste slaagsyfer beleidsverandering vereistes.

Navorsingsbevindinge is vergelyk met relevante teorie om sterkpunte en swakpunte uit te wys soos dit onttrek is vanuit resultate met betrekking tot die houdings van die deelnemers. Daar is verder gepoog om die houdings van die onderwysers en die leerders ten einde te bevestig dat daar 'n verband bestaan en dat dit 'n effek het op onderrig en leer van Wiskunde. Sterkpunte en swakpunte wat onttrek is uit die data betreffende die onderwysers se houdings fokus op onderrigstrategie, pedagogiese vakkennis en praktiese toepassing van Wiskunde. "n Swakpunt is dat die akademiese slaagsyfer beleidsverandering nie volhoubaar deur die Ministerie van Onderwys ondersteun word nie. Onderwysers het ondersteuning nodig deur middel van werkswinkels om hulle pedagogiese vakkennis te verbeter, en om meer inligting te bekom oor die implementering van die nuwe beleid. Onderwysers verwag ook ondersteuning van die Ministerie van Onderwys sover dit die voorsiening van handboeke en hulpmiddels betref. Samewerking tussen onderwysers is belangrik vir die implementering van die nuwe Wiskundebeleid, en so ook die sinvolheid daarvan.

Sterkpunte en swakhede onttrek vanuit houdings soos aangedui deur leerders in graad 9 hou verband met hul opinie oor die onderwysers, hulle motivering en akademiese prestasie. Die natuurlike aanleg wat leerders vir Wiskunde het moet ontwikkel word om sodoende by hulle 'n gevoel van bekwaamheid te vestig. Graad 9 leerders voel angstig en onseker in Wiskunde omdat hulle die onderwysers as te streng ervaar, waarskynlik te wyte aan ontoereikende pedagogiese vakkennis van die onderwysers. Graad 9 leerders bevestig die belangrikheid van Informasie en Kommunikasie Tegnologie gebruik in Wiskunde as deel van die proses om hulself voor te berei vir omvangryke doelwitte, en beskou die praktiese toepassing as 'n sterkpunt. Die voor- en nadele van onderwysers en leerders se beskouing oor Wiskunde lei graad 7 leerders tot prestasie. Verdere verwagtings dryf die graad 7 leerders ook tot prestasie ter wille van keuses wat verband hou met beter loopbaangeleenthede, en om hulle vlak van skoolopvoeding te verbeter.

Ter afsluiting word die in-diepte kwalitatiewe navorsing opgesom ten einde die fenomeen van gesindhede teenoor Wiskunde en akademiese beleidsverandering te ondersoek.

Sleutelwoorde

Wiskunde slaagsyfers vereistes

Namibië

Kwalitatiewe navorsing

Houdings

Motivering

Gesindhede

Onderwys beleidsverandering

Solemn Declaration

Certificate of Proofreading

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List of Acronyms

CPE	Certificate of Primary Education
EFA	Education for All
EMP	Education Master Plan
ETSIP	Education and Training Sector Improvement Programme
HE	Higher Education
HU	Hermeneutic Unit
ICT	Information and Communication Technology
IEA	Evaluation of Education Achievement
NCE	National Council of Education
PCK	Pedagogical content knowledge
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SAMDI	South African Management and Development Institute
SES	Social economic status
TIMSS	Trends in International Mathematics and Science Study
UNESCO	United Nations Educational, Scientific and Cultural Organization

Chapter One

Introduction to the Study

1.1 Introduction

Educational communities worldwide took note of the global Mathematics study, the Third International Mathematics and Science Study (TIMSS) that reported the extensive challenges various countries face with the teaching and learning of Mathematics curriculum across all grades (Mullis, Martin, Gonzales, & Chrostowski, 2003). Likewise the Ministry of Education in Namibia carried out studies and concluded that Mathematical performance at schools seem unsatisfactory due to poor mathematical foundation at primary level (Ministry of Education, 2006a). The Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) is concerned with primary level Mathematics learning and teaching in order to pave the way and assist learners to grow as Mathematicians at an early level. In Namibia, the main challenge of the Ministry of Education is to raise the pervasively low quality of learning achievement (Ministry of Education, 2006a). In order to achieve this outcome, the Namibian government promulgated the new Mathematics promotion requirements in 2010 (Ministry of Education, 2009).

This chapter describes the background and problem statement of the study. It also discusses the new promotion requirements for Mathematics in Namibia, and motivation as well as attitudes. Thereafter, the purpose, methodology, and the suggested research question are formulated, and an outline of the consecutive chapters follows.

1.2 Background

The education and educational research communities worldwide pay extensive attention to Mathematics Education. The most recent global Mathematics study, TIMSS (2003), presented relationships between constructs like learners' achievements, curricula and Mathematics instructional practices. Namibia took part in a large-scale cross-national research project that focuses on policy concerns of Ministries of Education called SACMEQ (Hungu et al., 2010). SACMEQ conducted three projects: (i) SACMEQ I (1995 - 1998) focused on the general conditions of assessment, allocation of resources to schools, teachers and learners; (ii) SACMEQ II (1998-2003) reported on the changes needed in conditions of schools and the quality of education in general for the participating states; and (iii) SACMEQ III (2005 - 2010) provided an overall summary about previous studies of SACMEQ by providing individual countries information regarding general school conditions, quality of education,

learners' achievement levels in Mathematics (Hung et al., 2010). Further details about SACMEQ will be discussed in Chapter Two.

Many countries experience problems regarding the successful teaching and learning of Mathematics curricula at all levels. In Namibia, low levels of Mathematics learning outcomes in the primary phase expand to secondary level. The Ministry of Education confirmed that new promotion requirements will be implemented in 2012 at all grades in Namibian schools. The new promotion requirements demand that learners in grades 5 - 7 should obtain a D-symbol or higher, and an E-symbol or higher in grades 8 - 9 before they can be promoted to the next grade (Ministry of Education, 2008). The new promotion requirements will alter the current requirements to the new educational requirements so as to increase the low success rate of Mathematics in Namibian schools. The objective of the Ministry of Education is that the new promotion requirements will encourage teachers and learners to work towards better achievement in Mathematics in grades 5 - 9. Wang and Lin (2009) are of the opinion that in order to positively elevate learners' Mathematics performance, curriculum standards, teachers' knowledge, and instructional practices should be centrally monitored. The compulsory introduction of the new requirements renews the awareness of Mathematics in Namibia as well as encourages productive teaching at schools. This study aims to capture the qualitative views of a small section of Mathematics teachers and learners.

1.3 Problem statement

In diverse cultures teaching is demanding, and what teachers and learners believe about their own capabilities cause their success in day to day teaching and learning challenges (Klassen et al., 2008). The introduction of the new requirements should be monitored in order to evaluate whether the reform in curriculum and the change in education requirements foresee challenges associated with the application of the new requirements (Lo, Hung, & Liu, 2002). Though change may be difficult, prior attitudes about concepts related to academic matters are in conflict with the existing attitudes and the present way of current teaching (Gill, Ashton, & Algina, 2004). However, the attitudes of teachers and learners towards the compulsory implementation of new Mathematics requirements for grades 5 - 9 may change. Gill and colleagues are of the opinion that in order to achieve goals related to change, such as the new promotion requirements, it is crucial that teachers and learners are dedicated to the subject (Gill et al., 2004).

With changes in the demographics of the teaching and learning environment, the school system in Namibia aims to elevate the low quality of learning achievements in Mathematics at all levels (NIED, 2009). With any new educational development change, the teacher's role becomes essential and vital to school-based aspects linked to learners' attitudes, since the effective learning of any subject is the result of effective teaching (Adeeba & Naoreena, 2010). Teachers are advised to move away from the traditional method of teaching where they encourage learners to memorise formulae towards an

understanding-based way of learning. In order to develop positive learners' attitudes, teachers should adopt strategies to keep the relation between the subject and real life situations intact.

This study aims to describe and explore teachers' and learners' attitudes towards the new promotion requirements for Mathematics. The research focuses on the grades 5 - 7 learners who should obtain at least a D-symbol, as well as on grades 8 - 9 learners who should obtain at least an E-symbol before they are promoted to the next grade. Teachers who are directly involved with the implementation of the new promotion requirements also participated in this study.

1.4 Review of literature

1.4.1 Namibian Mathematics promotion requirements

The Education and Training Sector Improvement Programme (ETSIP) document states that "Namibia has ranked the lowest of any country in the SACMEQ test in Mathematics and English reading at primary school level and it has been observed that the low pass rate in Mathematics at primary level continues to the higher levels. "The challenge is to raise the poor quality of learning achievement in Mathematics at all levels of education" (Ministry of Education, 2006a). Mathematics is an important learning area in the school curriculum and currently the move globally is towards compulsory Mathematics at both basic education and senior secondary levels (Ginsburg & Amit, 2008). The teaching and learning of Mathematics is challenging and demanding for teachers and learners. Therefore, Mathematics teachers should not only be well-trained and qualified, but especially be motivated to trigger positive attitudes among learners and deliver high-quality teaching (Adeeba & Naoreena, 2010). In order to attain this, the Ministry of Education introduced from January 2010 new promotion requirements for grades 5 - 9 learners in Namibia. The promotion requirement circular, Form Education 6/2009, states:

A learner in grade 5-7 shall be promoted if he/she has obtained a D-grade or better in each of English and Mathematics. A learner in grade 8-9 shall be promoted if he/she has obtained a E-grade or better in six subjects including Mathematics and English (Ministry of Education, 2009, pp. 3-4).

The previous promotion requirements introduced by the Ministry of Education in circular, Form Education 7/2006, stated:

A learner in grade 5-7 shall be promoted if the promotion requirements are met in five promotion subjects including: at least a D grade in any three subjects, including English and at least a C in any two subjects. A learner in grade 8-9 must be successful in 9 subjects. A learner shall be promoted if he/she obtains at least an E grade in five subjects including English and at least an F grade in the remaining four subjects (Ministry of Education, 2006c, pp. 4-5).

According to the preceding promotion requirements (Ministry of Education, 2006b), Mathematics is a non-compulsory subject and no minimum symbol was required for learners to achieve in Mathematics in order to be promoted. Learners at upper primary level (grades 5 - 7) had to obtain a D-symbol or

higher, in any five subjects, and an E-symbol or higher, in at least one subject, excluding English (Ministry of Education, 2006b). The new promotion requirements demand that each learner in grades 5 - 7 must pass all five promotion subjects of which Mathematics and English are compulsory, and every learner is expected to pass these controversial subjects at all school levels (Ministry of Education, 2009). For grades 8 - 9 learners were expected to pass any five subjects with an E-symbol or better and F-symbols in the remaining four, but with the new requirements this situation has changed. Now every learner should pass all nine subjects as well as obtain an E-symbol or better in six subjects, including Mathematics, and F-symbols in the remaining three subjects. Previously learners could work at their own pace in Mathematics, as this was not necessarily a promotional subject.

The national curriculum for basic education states that, "As from 2012 all learners will take Mathematics and English, choose a field of study consisting of three supportive subjects and take supplementary subjects for the Grade 12 examination" (Ministry of Education, 2008, p. 4). Also, "The curriculum identifies Mathematics as one of the key learning area among the other seven areas because Mathematics is a language on its own, a way of thinking and communicating which every person needs" (Ministry of Education, 2010, p. 12). These ministerial statements portray the standing towards Mathematics in Namibian. To successfully implement the new Mathematics promotion requirements, all stakeholders in education should take the responsibility to encourage teachers and learners to change their attitudes towards the subject. This can only be achieved through motivating learners, parents and teachers on the value of learning Mathematics at school level and beyond (Ministry of Education, 2010).

Taylor (1998) maintains that learning Mathematics will assist learners in the solving of problems as it exposes them to the same level of thinking skills across the curriculum. He continued saying that with an everyday use of Mathematics in mind it will increase confidence in learners' learning abilities, improve learners' self-esteem, their competence in the subject, as well as their social relationships with peers of diverse ethnicity and cultural backgrounds. Coombs explains that there is not only one way of teaching, and therefore teachers should experiment with the ideas they hear from colleagues and/or at conferences, that they read about, and also suggestions by experts to enhance their teaching methods (Coombs, 1995).

1.4.2 Motivation and attitudes

Motivation can be defined in diverse ways. All inner aspirations, wishes, desires, urges, as well as a person's interest in an activity are associated with motivation; it is therefore a condition that can stimulate and trigger the individual's behaviour (Berelson & Steiner, 1964). Motivation can be internal or external. Berelson and Steiner (1964) imply that motivation should come from teachers and learners within the school system. Insufficient motivation could obstruct performance causing stress, discontent and frustration, all of which would reduce classroom effectiveness and learners' quality

output. Weiner (1992, p. 4) defines motivation as, “an individual’s desire to act in particular ways.” This might indicate that the learners opt not to pass Mathematics because they do not desire to do well in the subject and not because they cannot solve mathematical problems. Teachers should understand why learners should succeed in Mathematics so that they will be able to explain the rationale to the learners, as learners generally do not have any idea why they should pass Mathematics. Consequently it is not easy for them to progress and do well in Mathematics. George (2010) explains that the methodology of teaching and learning styles may be factors that motivate learners to be interested in the compulsory curriculum change, hence motivation plays a role in the successful implementation of any new curriculum. Motivation is conceptualized to subsume two important constructs: the desire to learn Mathematics, attitude towards Mathematics and the attitude concreteness (Chalak & Kassaian, 2012). It can consequently be expected that attitudes and motivation may influence the success of the introduction of the new Mathematics promotion requirements in Namibia. Attitudes towards Mathematics are likely to be developed by the individuals’ experiences and the way these experiences motivate the individual (Aiken, 1970). George (2010) declares that learners and teachers with high motivation achieve better teaching and learning outcomes than those who are indifferent or compromised.

Learners are more likely to change their attitudes if their interest in the subject can be held. Quality teaching will promote interest and teachers should at all times be thoroughly prepared for each lesson. They should also be punctual, well-organized and care about learners’ needs. They will then earn the respect of the class and their endeavours to make the subject enjoyable to the learners will bear fruit (Coombs, 1995). Carr explains that when motivated, people do things better because they like the activities they are engaged in (Carr, 2004). Keeping the new promotion requirements in mind, all learners are challenged to become successful in Mathematics and progress to the next grade. As a result, teachers should discuss the new requirements with learners and persuade them to commit in order to effect a change of attitude towards Mathematics. Learners should understand that their career future and needs are addressed with these new requirements.

Teachers should always have goals to achieve. In this study these goals refer to having every learner in grades 5 - 9 pass Mathematics, as well as to succeed in making learners think mathematically. Southwood and Spanneberg (1999) explain the knowledge-in-practice view which involves making sense of Mathematics, developing meaningful and efficient methods and strategies, identifying errors, coping with difficulties and problems, and critical thinking. The development of learners does not only relate to developing mathematically, but also linguistically. Teachers should cultivate positive attitudes towards their learners to encourage learners to communicate, provide practical work, create and cultivate good classroom organization and management, create appropriate positive and patient teacher interventions, use cooperative learning situations, engage in stimulating mathematical experiences to actively involve learners in their learning (Southwood & Spanneberg, 1999).

To summarize, it became evident from the literature review that the new promotion requirements, and how these requirements can affect teachers' and learners' motivation and attitudes towards the new promotion requirements, underline the importance of effective teaching and learning of Mathematics in Namibia (Carr, 2004). This leads to the formulation of the following research question that guided this study:

- What are the Namibian teachers' and learners' attitudes towards the implementation of the new promotion requirements for grades 5 – 9?

In this problem, two perspectives for describing the attitudes towards the new Mathematics promotion requirements are embedded. The first is the perspective of the Namibian learners towards the implementation of the new promotion requirements and their attitudes towards the new attainment targets in Mathematics. The second perspective is that of the Namibian teachers and the attitude they show towards the new promotion requirements.

1.5 The purpose of the research

The purpose of this qualitative research study is to explore, describe and understand the teachers and learners attitudes towards the new promotion requirements for grade 5 – 9 Mathematics in Namibia.

1.6 Research design and methodology

This study followed a qualitative research methodology in the form of a qualitative case study. The case study followed an interpretative design where the researcher gathered information about teachers' and learners' perceptions towards the new promotion requirements that were introduced in 2010. Interpretivism deals with the theory and practice of interpretation and the researcher reconstructs the original intention of the participants (Nieuwenhuis, 2007b). This means that not merely a single correct interpretation of a phenomenon is possible, but an understanding of it according to a set of crystallised procedures. Generally interpretive studies start with an assumption that is supported through social constructions and shared meanings which lead to an understanding of the described situation (Nieuwenhuis, 2007a).

Babbie and Mouton (2001, p. 112) define qualitative research as, "a methodology that generates rich, detailed data that can contribute to in-depth description and understanding of the natural context of research." This qualitative research is designed as a case study that was conducted within a specific setting and timeframe (Strydom, 2005c). The case study provides information relating to exploring and describing the attitudes of teachers and learners towards the new Mathematics promotion requirements for grades 5 - 9. The unit of analysis was the attitudes of teachers and learners towards

the implementation of the new Mathematics promotion requirements for grades 5 - 9 in Namibian education system. Although the researcher obtained rich descriptions, the researcher is not able to generalize the findings to the Namibian situation as the research was confined to one school.

1.6.1 Site selection

Strydom (2005b) explains that the research question is directly linked to the research problem, therefore the researcher choose a site which is suitable for the problem identified. The investigation took place at a rural public school in Shambyu circuit, Kavango Education region in Namibia. The Mathematics learners and teachers directly involved with the implementation of the new promotional requirements were the participants in this study. Much of this region is rural and is inhabited by crop farmers. The urban centre is Rundu and the newly proclaimed town of Nkurenkuru. The region comprises 313 schools with 62 441 learners and 2 179 teachers spread over an area of 48 463 square kilometres.

1.6.2 Participant selection

The target participants of this study were five Mathematics teachers from selected schools in Shumbyu and learners from one selected rural school as recipients of the new promotion requirements in the selected circuit. These participants opted for participation as they are directly involved with the implementation of the promotion requirements at schools. To guarantee fairness, participants were selected through the use of purposive sampling strategy (Strydom, 2005c). The qualitative data were collected through focus group interviews until the point of data saturation (Merriam, 1998). The groups of individuals identified for inclusion in the study were six grades 7 and six 9 learners, as well as five Mathematics teachers.

1.6.3 Data collection

In qualitative research, the researcher becomes the main instrument (Merriam, 1998). The researcher decided on focus group interviews to illuminate key points about the topic so that the investigation is comprehensive enough (McMillan & Schumacher, 2010). Focus group interviews provide the participants the opportunity to build on each other responses and come up with answers they might not have thought of during an individual face-to-face interview (Babbie & Mouton, 2001). Focus group interviews were respectively conducted with grades 7 and 9 learners, as well as Mathematics teachers as they had experienced both the old and the new promotion requirements. The researcher selected boys and girls from the upper, middle and low achievement groups to ensure a maximum range of experience (McMillan & Schumacher, 2010). A focus group interview was also conducted with the grade 5-9 Mathematics teachers. The researcher made use of semi-structured interviews with a number of open-ended questions (Greef, 2005). The focus group interviews lasted forty to sixty minutes. Interviews were audio-taped and transcribed for analysis.

1.6.4 Data analysis

The researcher verbatim transcribed the focus group interviews. These provided detailed transcripts of the perceptions of the Mathematics teachers and learners concerning the new Mathematics promotion requirements. Data analysis involved scrutinizing of data from different viewpoints to understand and interpret the results (De Vos, 2005). The data were coded according to a process of open coding using Atlas.ti™. Co-coding was performed by the researcher and her supervisor.

1.6.5 Trustworthiness

The researcher should build trust with all the participants as it will contribute to a more effective process of data collection (Shenton, 2004). The four concepts: (i) credibility (internal validity), (ii) transferability (external validity), (iii) dependability (reliability) and (iv) confirmability (objectivity) were carefully considered during the process of this study as the researcher had to write the report regarding the well-being, confidentiality and safety of the participants is essential. The researcher also had to attain an accurate picture about the study in order to allow or create a platform for similar research to be carried out later and to provide enough information for other researchers to make meaningful conclusions from the study. This will show that the researcher did not report her own findings but that the data collected from various participants was reported (Shenton, 2004).

1.6.6 Ethical aspects of the research

The researcher applied for ethical clearance from the North-West University's Ethical Committee before the commencement of fieldwork. Ethical issues the researcher anticipates were: issues of personal disclosure, authenticity, credibility, the role of the researcher, protection for the research participants, developing trust with the participants, promoting the integrity of the research as well as guarding against misconducts that might occur while conducting the research (Creswell, 2009). Denzin and Lincoln (2005) are of the opinion that researchers of case studies often share personal views and circumstances of their participants; thus they should always keep to a strict code of ethical conduct.

Appointments were made with the participants through school managers, and permission from the relevant authorities (the Permanent Secretary of Education, the school management team and parents), was also acquired as interviews were conducted at the school premises. Participants were informed that their involvement was voluntary and that they might withdraw at any point during the research (Cohen, Manion, & Morrison, 2007). The responses and identities were not disclosed in any form during the research process (Cohen et al., 2007).

1.7 Contribution of the study

This research provides a platform for documenting the perceptions and attitudes of teachers and learners related to the new promotion requirements for grades 5 - 9. As Mathematics will be compulsory for grades 11 - 12 from 2012 in Namibia, teachers may express and share their views, ideas and understanding about how attitudes can contribute towards the effective teaching and learning of Mathematics. Policymakers and education administrators should take into consideration the perceptions of teachers and learners on the implementation of the promotion requirements policy to assist them in the implementation of this strategy, as well as other similar strategies in the near future. Principals in Namibia could use this knowledge to gain understanding of the situation of their staff members and assist them in terms of motivation and support for the teaching of Mathematics in grades 5 - 9.

1.8 Chapter outline

The study consists of five chapters:

Chapter One provides the introduction and orientation of the study. Chapter Two offers a literature review that focuses on Mathematics, motivation and attitudes towards the new promotional requirements in Namibia. The chapter concludes with a discussion of teachers' and learners' attitudes towards academic reform. Chapter Three concerns a discussion of the qualitative research design and methodology designed for this study. Important and relevant research findings were analysed and discussed in Chapter Four. The chapter includes the in-depth presentation of the data collected from transcribed interviews through analysis using Atlas.ti™. Finally, Chapter Five provides the implications of the research are considered; conclusions and recommendations are presented.

Chapter Two

Review of Literature

2.1 Introduction

According to the Ministry of Education, in Namibia, every learner has a fundamental right to education. It is the Ministry's primary responsibility to ensure that every learner has access to quality, equitable and democratic education from grades 0 – 12 (NIED, 2009). However, the Namibian government is concerned with learners' low achievement rate in Mathematics compared to other subjects. To address these concerns, the promotion requirements for Mathematics from grades 0 - 12 were adapted during 2010 (NIED, 2009).

The focus of this study is on attitudes of Namibian teachers and learners towards the new Mathematics promotion requirements for grades 5 - 9 and this chapter consequently defines and discusses the nature and philosophies of Mathematics, and compare Mathematics education in Namibia to three African countries. Furthermore, the challenges encountered during implementation, as well as the motivation and attitudes toward teaching and learning of Mathematics will be argued.

2.2 Defining Mathematics

Mathematics is derived from the Greek word *máthema* meaning science, knowledge or learning (Southwood & Spanneberg, 1999). The origin of Mathematics is conceptualized as conscious and subconscious meanings, rules, and preferences regarding the subject (Cai, Perry, Wong, & Wang, 2009). Different authors define Mathematics differently and some of these are discussed in this chapter. Mathematics is a powerful language which views the world through numbers, shapes, algebra, measures, and informative and creative statistics (NIED, 2009). Southwood and Spanneberg (1999) define Mathematics as an investigative process and creative activity in which learners can be involved, not an enforced body of knowledge immune to any change or development. From an African perspective, Mathematics can be describe as a specific body of knowledge that involves studying quantities, structures, space and change in an academic environment (South African Institute for Distance Education (SAIDI), 2008). The success of Mathematics depends on its nature and how the mathematical content is interpreted by learners and teachers (Ministry of Education, 2009). Therefore one should study the nature of Mathematics for better understanding as it will assist learners and teachers to change their views and attitudes about Mathematics (Thompson, 1988).

2.3 Mathematical knowledge

In Mathematics there is a close relationship between *what* is taught and learned and *how* it is taught and learned in the classroom environment (Nieuwoudt, 1998). Individuals distinguish between different views on the nature of Mathematics which vary greatly due to the abstract knowledge system, motivation of the beliefs and attitude of the individuals taking part in it (Cai et al., 2009). Thus every individual experiences Mathematics differently depending on his/her self-confidence as well as prior Mathematics experiences (Cai et al., 2009). Teachers describe the teaching of Mathematics as complex, challenging, exciting, associated with strong logical procedures, theoretical understanding and precise results (Cai et al., 2009).

The content knowledge of the subject matter should be well understood by the teacher so that teachers will be able to share it with the learners. According to Shulman (1986) pedagogical knowledge for general teaching refers to the teaching strategies and method the teacher uses during the lesson presentation; knowledge of specific teaching strategies for specific subject matter are the specific teaching styles that are used when teaching Mathematics or any other subjects. Therefore teachers should realise how to present different content as they relate to unique and special pedagogical knowledge (Shulman & Grossman, 1988). Furthermore they state that the knowledge of the learning process is part of the pre-knowledge that learners bring to class which they have acquired from previous grades. Ball (1990) introduced the new phrase of knowledge *about* Mathematics rather than knowledge *of* Mathematics; she preferred to describe where Mathematics comes from, how it changes and how truth is established. "Knowing mathematics for teaching includes knowing and being able to do the mathematics that we would want any competent adult to know. But knowing mathematics for teaching also requires more, and this "more" is not merely skill in teaching the material" (Ball, 2008, p 3).

Shulman and Grossman (1988) suggest four factors that influence effective Mathematics teaching and learning: content knowledge, pedagogical knowledge, pedagogical content knowledge (PCK) and the knowledge of learners learning processes. Mathematics teachers should understand content knowledge and pedagogical knowledge deeply and flexible to be able to assist learners to see how ideas connect across different subject fields and to everyday life (Shulman, 2004). Content knowledge refers to the "amount of knowledge teachers possess whereas pedagogical knowledge goes beyond the knowledge of the subject into dimensions of content knowledge for teaching" (Shulman, 1987, p. 9). These elements are intertwined and therefore to be a successful teacher content knowledge and pedagogical knowledge should be used simultaneously. Shulman (1986) introduced the idea of PCK that focuses on the teachers subject and pedagogic knowledge as being related as mutually exclusive domains. Figure 2.1 presents the relationship between the two to introduce the notion of PCK.

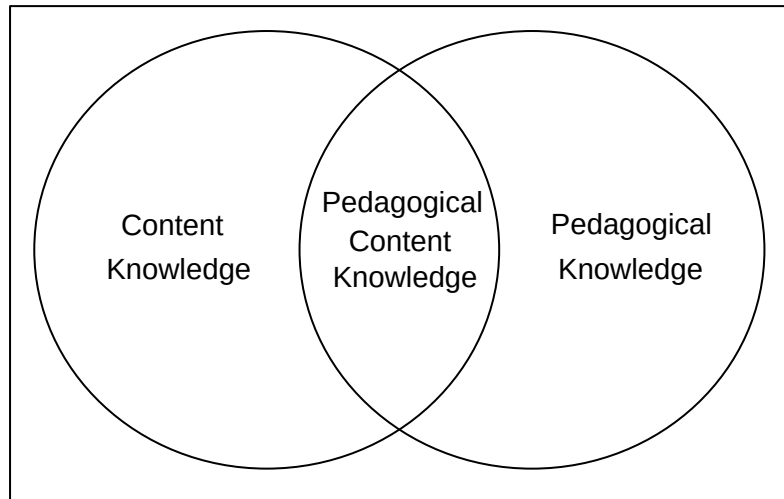


Figure 2.1 Interaction of content and pedagogy (Adopted from Shulman, 1986)

Shulman acknowledges that: “Pedagogical content knowledge is of special interest because it identifies the distinctive bodies of knowledge for teaching. I present a blending of content and knowledge into understanding of how particular topics, problems, or issues are organized, represented and adapted to the diverse interests and abilities of learners, and presented for instructions” (Shulman, 1986, p. 8).

Learners are affected by the way that teachers communicate Mathematics in the classroom because learners animate the view and attitude of the teachers. Teachers influence the views of their learners towards Mathematics and the way that they conceptualize the significance thereof within their environment (Dossey, 1992). Mathematics teachers should possess certain Mathematical qualities, they need to be able to work and reason with Mathematics and Mathematical concepts (Ball, 2008).

2.4 Philosophies of Mathematics

Mathematicians have different views about what Mathematics entails as teachers use their personal experience to describe Mathematics while philosophers view it as a set of rules applied deductively or inductively (Huetinck & Munshin, 2000). The realist formalists explain that Mathematical truths are not about numbers and sets of rules related to numbers (Dossey, 1992). *Relativists* believe that there is no absolute truth, therefore learners and teachers create subjective value according their differences in perceptions. Relativist perceptions refer to those who believe that Mathematics develops in the human mind through invention which is distilled into knowledge that learners can develop by engaging themselves in Mathematical problem solving activities. Learners gain the required Mathematical content when teachers provide learners with problems that they have to solve (Stumpf, 1993). Instrumentalists view Mathematics teaching as an organised hierarchy of skills and concepts where

the teacher's role is to demonstrate, explain and develop materials that learners will be able to use to gain knowledge of Mathematics (Thompson, 1988).

Different logical frameworks in which the content is conducted can be viewed as logical foundations in which Mathematics are widely discussed. The differences in these foundations are not represented as radical contradictory views, but as close relationships between the abstract matter of abstract ontology and logical consistency (Jones, 2000). Nieuwoudt and Golightly (2006) suggest that Mathematics teaching should be discussed from an ontological perspective with the following in mind: Intention refers to the purpose teaching has for the learners so that they gain the relevant knowledge to apply when performing Mathematics tasks. In simple terms, intention is a reason why teaching and learning should take place. Teachers should be there to guide, direct and advise the learners—they have the responsibility to have the command over valid and informative content knowledge in order to facilitate learning in the Mathematics classroom. Learners are individuals who are actively engaged and interact meaningfully with others for the effective teaching and learning occurrence. Guided by interaction the teachers and learners should create purposeful discussions that will help them relate the classroom situation to reality. Content knowledge has to be learned for the intention to be realised. Context is the whole set where the teaching and learning is administered, therefore the quality of teaching depends mainly on how the participants are attached to the context where learning takes place.

Teaching and learning of Mathematics is viewed from different perspectives by philosophers. Smith (1996, p. 390) explains the teacher's role in the traditional classroom as "to provide clear step-by step demonstrations of each procedure, results in response to learners questions. Provide adequate opportunities for learners to practice the procedures and offer specific corrective support when necessary and provide the ultimate mathematical power."

Ernest (1997) define Mathematics against the backdrop of social constructivism and in short replaces objectivity with negotiated inter-subjectivity. He presents the view that Mathematics can be perceived as a human construction rather than a given or in some way pre-designed composite of absolute truths. Furthermore, Mathematical knowledge is directly warranted as a wide range of types of tactic knowledge. Ernest (1999) explains that the practice of Mathematics depends on three key fundamentals:

- the teachers mental contents, specifically the structure of beliefs, concerning Mathematics, and teaching and learning of Mathematics
- the teachers level of assumed methods and thinking
- the social environment of the teaching circumstances, focussing on the constrains and opportunities that is provided for teaching

Nieuwoudt (2006) is of the opinion that the Mathematics teachers should teach the content knowledge to the learners as integral concepts. Realist formalists circumscribe Mathematics as a subject for gifted learners, thus teaching and learning should occur by traditional way where the teacher is the source of knowledge and the learners the recipients of knowledge (Nieuwoudt & Golightly, 2006).

2.5 Mathematics education in Southern Africa

Across Africa, Mathematics is regarded as one of the challenging subjects in a school curriculum, therefore the success of teachers to teach the subject effectively depends on individual approach from an integrated perspective (Nieuwoudt & Golightly, 2006). The different histories, cultures and societies of each of these four countries have all an impact on their respective education systems (Spaull, 2011). These factors contribute towards the way in which curriculum is structured and presented.

Next the education profiles of four participating SACMEQ countries are discussed. The four countries selected for the comparison are; Mauritius, Botswana, South Africa and Namibia (Figure 2.2). These countries were selected according to learners' achievement in Mathematics as reported level 1 in the SACMEQ III project. Level 1 is based on the pre-numeracy where learners need to apply four basic operations (Table 2.2). Furthermore, the four countries are geographically close to one other although the historical, economic and demographic there are differences between the countries (Spaull, 2011). These four countries' profiles, Mathematics achievement and challenges are discussed below.

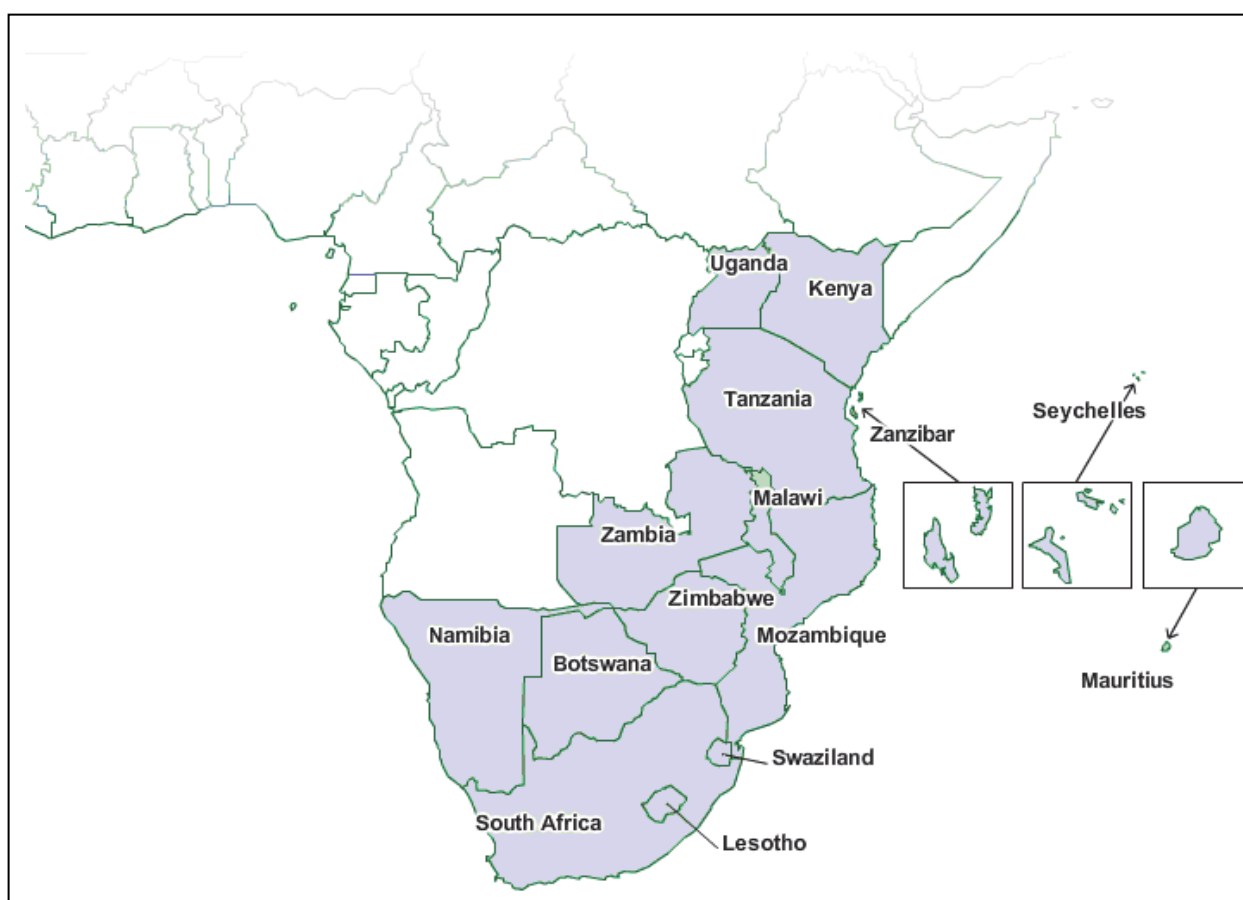


Figure 2.2 Geographical setting of participating SACMEQ countries

2.5.1 Mathematics education profile of Mauritius

The Republic of Mauritius is situated on the east of Madagascar, ringed to the north by smaller islands, namely Rodriguez, Agalega and St Brandon (Spaull, 2011). The island of Mauritius is located in the south-western part of the Indian Ocean and southeast of Madagascar with an estimated population of 1.3 million (Makuwa, 2005).

The country became independent on 12 March 1968 and declared a Republic in 1992. The official language is English, but French is widely spoken to keep the cultural diversity of the island. Ancestral languages are taught in primary and secondary schools alongside English and French. Mauritius' education structure comprises six years of free and compulsory primary schooling leading to the Certificate of Primary Education, followed by five years of secondary education leading to the Cambridge School Certificate and a further two years of higher secondary education ending with the Cambridge Higher School Certificate (Makuwa, 2005). At the primary level, promotion is compulsory until grade 6, when learners sit for the Certificate of Primary Education (CPE) which is used for the purpose of certification and selection for entry to secondary level. Unsuccessful learners at the CPE examination and under twelve years old may stay on at primary school in order to re-write the

examination. Those who fail after a second chance are provided with an alternative to join Pre-vocational Education Scheme (Makuwa, 2005).

The country is divided into five education regions and each region has a Regional Education Office headed by a Director of Education, and the Ministry of Education, through the Regional Directorates, administers the government schools. They are responsible for the school buildings, the supply of teachers, equipment and materials to the schools, while at the higher education level, councils and boards, set by government together with the Tertiary Education Commission coordinate the activities of the various tertiary (Makuwa, 2005).

An education reform known as Education Master Plan (EMP) was proposed in 1991 due to the fact that the Mathematics achievement of learners was unsatisfactory (Kulpoo, 1998). The EMP aims (i) to broaden access and equity for all learners to get access to higher quality at pre-primary and primary education in all regions; (ii) improve quality of education by upgrading teachers' skills, strengthening the Mathematics and Science by strict monitoring of the teaching and learning process; and (iii) training of managers at national, regional and school level with up-to-date management skills that enhance effective use of resources (Kulpoo, 1998).

Mathematics is an important subject area in Mauritius as it is regarded as one of the important content subjects at schools and Mathematics achievement is satisfactory compared to other African countries (Makuwa, 2005). This is due to the fact that the monitoring system towards education is firm and strong.

2.5.2 Mathematics education profile of Botswana

Botswana, formerly known as Bechuanaland, is situated on the southern part of Africa with a total surface area of about 582 000 square kilometres, estimated population of 2 million. The country is bordered by Namibia, Zambia, Zimbabwe and South Africa (Makuwa, 2005). It gained its independence on 30 September 1966. The official languages in Botswana are Setswana and English. The primary school system in Botswana is divided into lower primary (standards 1 - 4), and upper primary (standards 5 - 7), secondary level and senior secondary level (Spaull, 2011). The six administrative regions in Botswana are: Central North, Central South, North, South, South Central and West (Spaull, 2011).

The Education policy in Botswana was revised by the government with the assistance from the National Council of Education (NCE) in 2002 (Keitheile & Mokubung, 2005). The policy on education has changed, English is the medium of instruction from standard 2 and Mathematics is viewed as one of the compulsory subjects at all levels. Since the curriculum was revised education has been a priority when it comes to the government budget (SACMEQ, 2010). Proposals for changes were made and Vision 2016 was drafted with the aim are to provide quality education that adapts to the

changing needs of the country and those of the outside world. The Mathematics achievement is average, improvement remains a priority for the attainment of Vision 2016.

2.5.3 Mathematics education profile of South Africa

South Africa is situated on the south-eastern of the Indian Ocean and South-west of the Atlantic Ocean with an area of 1 228 376 sq. km and an estimated population of 50.6 million. The bordering countries are Botswana, Lesotho, Mozambique, Namibia, Swaziland and Zimbabwe. There are eleven officially recognised languages in the country, namely: English, Afrikaans, Zulu, Xhosa, Sepedi, Tsonga, Venda, Tswana, siSwati, Ndebele and SeSuthu (Spaull, 2011). South Africa is divided into nine provinces: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West, and Western Cape.

South African schools have compulsory education for learners 7 - 15 years old. According to Burger (2012) every child is guaranteed to receive quality education either at state or private schools. The South African education system implemented the National Curriculum Statement (NCS) which is divided into four phases: foundation phase (grades R - 3), intermediate phase (grades 4 - 6), senior (grades 7 - 9) and further education training (grades 10 - 12) (Moloi, 2005). In 2010, it was announced by the South African president that all grade 3, grade 6 and selected grade 9 learners will write assessment-based examinations. These Annual National Assessments are marked and moderated by different teachers for the Ministry of Education to evaluate the education level as well as note where improvement is necessary in order to meet the targets of 2014 (van Niekerk, 2012).

The NCS identified Mathematics as an important learning area in the curriculum, with the challenge of a shortage of skilled Mathematics teachers to help develop a mathematically skilled workforce in various fields remains a great concern to the government (Moloi, 2005). Due to a constant supply of incompetent and under-qualified Mathematics teachers, the subject is often taught by inadequately trained teachers (Ono & Ferreira, 2010). This leads to a cycle of poor teaching and poor learner achievement. South Africa is a member of SACMEQ that indicates the improvement of the Mathematics results as there is proof of result improvements in Mathematics from SACMEQ II and III Mathematics projects (Hungu et al., 2010).

2.5.4 Mathematics education profile of Namibia

The Republic of Namibia, situated on the south west coast of Africa attained national independence from the former South African government on 21 March 1990 after many years of political, diplomatic and armed national liberation struggle. Namibia is bordered by the Atlantic Ocean to the west, the Republics of Angola and Zambia to the north and north-east respectively and the republics of Botswana and South Africa to the east and south respectively (Spaull, 2011). Primary education comprises two phases, lower primary (pre-primary to grade 4) and upper primary (grades 5-7). The

medium of instruction at lower primary depends upon the region as well as the circuit the school is located in, and switches to English from grade 4 up to tertiary level (Spaull, 2011). There are thirteen regions in Namibia: Caprivi, Erongo, Hardap, Karas, Kavango, Khomas, Kunene, Oshana, Oshana, Omaheke, Omusati, Oshikoto, Otjozondjupa, and Oshana (Spaull, 2011).

The grade 7 examination for Mathematics, English and Science is National and compulsory for each learner in Namibia. Low achievement in Mathematics is a concern in comparison with neighbouring countries and Mathematics is globally regarded as one of the most challenging subjects in the school curriculum. Due to such beliefs learners developed a negative attitude towards the subject which leads to a low pass rate (South African Institute for Distance Education (SAIDI), 2008). In 2010, the Ministry of education decided to revise the promotion requirements in the Namibian Education system for grades 1 - 12. The revised promotion requirement circular, Form Education 6/2009, states:

A learner in grade 5-7 shall be promoted if he/she has obtained a D-grade or better in each of English and Mathematics. "A learner in grade 8-9 shall be promoted if he/she has obtained a E-grade or better in six subjects including Mathematics and English" (Ministry of Education, 2009, pp. 3-4).

The greatest challenge of the implementation of the new Mathematics promotion requirements for grades 1 - 12 at schools is the provision of adequate resources to teachers to interpret and deliver quality teaching to the learners as the recipients to achieve the basic competencies in the Mathematics syllabus (NIED, 2009). Since Mathematics is a compulsory subject throughout the school career, teachers should apply teaching strategies that are flexible and include a well-structured sequence of lessons for effective teaching and learning process to occur at schools and beyond (NIED, 2009). Therefore the level of Mathematics should be developed in order to reach the global standards and Namibia's Vision 2030 (Republic of Namibia, 2004).

2.6 Southern and Eastern Africa Consortium for Monitoring Education Quality

SACMEQ developed as a small research project that evolved into a powerful and important evaluation network for Ministries of Education in Southern and Eastern Africa (Spaull, 2011). SACMEQ was officially launched in 1995 as a professional evaluation body that started off with only seven participating countries that developed into an official, independent, non-governmental organization with a current membership of fifteen countries.

Learning Mathematics is a global problem which led to the formation of non-governmental organisations such as Education For All, SACMEQ and many more (Spaull, 2011). Education For All (EFA) was formed in Jomtien, Thailand in 1990, and reiterated in Dakar, Senegal in 2000 to facilitate and monitor the expansion of primary education in developing countries, which led to the formation of SACMEQ (Spaull, 2011). The fifteen members of SACMEQ are; Botswana, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Uganda, Zambia,

Zanzibar, and Zimbabwe. SACMEQ aims to facilitate the expansion of quality education in Sub-Saharan Africa by providing necessary data helping to monitor educational quality and improving the research capacity and technical skills of educational planners for the fifteen participating countries (Spaull, 2011). SACMEQ provides researchers and educational planners with adequate and reliable data about the quality of primary education in each of the fifteen participating countries.

To date SACMEQ has carried out three projects and each project targets specific challenges:

(i) SACMEQ I (1995-1998) was the first project mainly focused on the general conditions of assessment, allocation of resources to schools, sufficiency of teachers and learners. Mathematics competency level for both learners and teachers was not tested during the first project; (ii) SACMEQ II (1998-2003) project focussed on the improvements between conditions at schools as well as the quality of education of the SACMEQ member states. Recommendations were directed at the education planners to assist in curriculum planning and innovated with strategic plans that will enhance the provision of quality education; and (iii) SACMEQ III (2005-2010) the recent project was conducted in all fifteen member countries. The project provides participating countries with information about general school conditions in all the participating countries. All these projects have different aims related to the countries, making the project outcomes valuable and important to the educational planners and the curriculum committee. In addition to the benefits of measurement and monitoring the quality of education, SACMEQ III data compare the quality of education between countries since every grade 6 learner in each of the fifteen participating countries wrote the same numeracy and literacy test and completed the same survey questionnaire across countries (Spaull, 2011).

Teachers and learners were involved because teachers' mastery of Mathematics is crucial to promote learning achievement in all grades which they are qualified to teach (Ball, 1991). Teachers should learn from their own experience and ensure that learners benefit from the best practice; educational disadvantages should be addressed by developing, promoting and supporting a mastery approach to Mathematics teaching and learning. Learners from all backgrounds should gain a good understanding of Mathematics and develop Mathematical skills throughout their school career. SACMEQ projects focussed on the above-mentioned skills of teachers and learners aimed at the improvement of quality of primary education.

Table 2.1 presents the number of teachers, learners and schools that participated in SACMEQ III project for the four countries.

Table 2.1 **Number of grade 6 teachers, learners and schools the participated in the SACMEQ III**

Country	Grade 6 learners	Teachers	Number of schools
Botswana	3868	386	160
Mauritius	3524	408	152
Namibia	6398	865	183
South Africa	9071	1163	392

A Rasch scoring procedure was used to generate the Mathematics scores for the SACMEQ III project. A linear transformation of the Mathematics scores were undertaken to produce mean and standard deviation scores. From the pooled data equal weight was given to each country. The Mathematics test items were first arranged according to the level of difficulty and secondly examined item-by-item to determine the skills levels. The skills audit results identified the eight levels of competencies, as mentioned previously. Table 2.2 presents the results of the skills audit. The eight competence levels measured present concrete analysis of what the learners can actually do with Mathematics, and furthermore suggest teaching and learning strategies relevant to learners who are learning at the different identified levels of competency (Hungu et al., 2010)

The tabulations of the SACMEQ III project for this study show mean scores and percentages in each of the eight competency levels according to learners' school location (urban vs. rural) and socio-economic status (very low SES vs. very high SES).

Table 2.2 **Learners Mathematics SACMEQ III results (Hungu et al., 2010)**

Country	Sub-division	*M	Percentage of learners reaching Mathematics competency level							
			L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8
Botswana	Rural	501	2.1	2.6	37.1	25.1	6.4	2.6	0.1	0.0
Botswana	Urban	538	1.0	16.0	31.0	28.8	11.8	9.1	1.6	0.7
Botswana	Low SES	479	3.7	34.6	40.1	18.4	2.5	0.7	0.0	0.0
Botswana	High SES	553	0.3	11.4	28.3	31.7	14.3	11.4	1.9	0.6
Mauritius	Rural	613	1.2	10.7	16.8	18.1	13.3	19.9	16.1	9.8
Mauritius	Urban	634	1.0	9.5	14.1	17.7	12.2	19.8	11.2	14.8
Mauritius	Low SES	554	2.2	19.8	23.3	22.2	11.8	11.8	5.7	3.1
Mauritius	High SES	719	0.0	1.8	5.1	9.8	12.4	22.4	17.6	30.9
South Africa	Rural	456	8.1	47.1	30.1	10.1	2.3	0.9	0.9	0.0
South Africa	Urban	533	2.9	22.2	20.7	20.7	11.9	11.0	2.9	1.2
South Africa	Low SES	446	10.1	50.0	8.4	8.4	1.3	0.5	0.4	0.0
South Africa	High SES	578	1.1	13.1	22.6	22.6	18.1	18.9	5.6	2.2
Namibia	Rural	448	7.0	52.6	6.9	6.9	0.9	0.3	0.1	0.0
Namibia	Urban	506	2.8	26.3	20.4	20.4	7.3	5.1	1.1	0.2
Namibia	Low SES	443	8.1	53.3	6.2	6.2	0.5	0.1	0.0	0.0
Namibia	High SES	513	2.5	24.5	20.9	20.9	8.4	6.5	1.4	0.2

* Mean score of learners

Participants were evaluated at eight different levels:

Level 1: Pre-numeracy where participants needed to apply the four basic operations

Level 2: Emergent numeracy involves estimation of lengths and recognising shapes

- Level 3: Basic numeracy was about translating graphs or interpreting place values of numbers
- Level 4: Beginning Numeracy involves the translations of verbal into arithmetic meaning
- Level 5: Competent Numeracy was about conversion between units as well as solving calculation on fractions
- Level 6: Mathematically skilled is about solving multi-operations problems
- Level 7: Concrete problem solving involves interpretation of information from tables or groups
- Level 8: Abstract Problem Solving was to identify the nature of the given problems into Mathematical approach (Hungu et al., 2010).

The researcher only discusses results of 25% and higher. In relation with Mauritius, Namibia and South Africa, learners in Botswana achieve well in levels 3 and 4 of SACMEQ III project regardless of their location (rural vs. urban). The learners from Botswana attain better results in the low socio-economic in levels 2 and 3. They can carry out basic numeracy relating to graphs, interpretation of place values and understanding of arithmetic meaning irrespective of their setting and socio-economic status. Mauritius performed poorly, except in the high socio-economic group on level 8; suggesting that 31% of the learners can apply abstract problem solving in Mathematics activities. The results of the project indicated that South Africa performed well in the rural areas on levels 2 and 3 and on level 2 in the low socio-economic level. These levels respectively refer to the level 2: emergent numeracy with estimation of lengths and recognition of different shapes and level 3: basic numeracy of conversion of graphs and deducing place values of numbers. Namibian learners in rural areas and in low socio-economic circumstances achieve better scores on level 2; numeracy in terms of the estimation of lengths and recognition of shapes. There is great variation in the achievement of schools across the SACMEQ III school systems (Makuwa, 2010). Teaching and learning quality varies across the participating education systems as result of different historical background and education policy rooted in the countries.

2.6.1 Teaching and learning

Hungu et al. (2010) further indicate that education authorities should ensure that there is a balance between subject knowledge of the teachers and their teaching and learning qualities to ensure achievement in Mathematics. One of the various tasks of teachers is to motivate learners so that they can understand and excel in Mathematics, providing them with a wide range of work-related opportunities (Nieuwoudt, 2006). Teaching and learning of Mathematics is a way to create information that links activities and in addition supplies the individual with valuable knowledge that may be usefully applied in various everyday tasks. The teacher's responsibility includes knowledge about a range of teaching strategies, information on when to teach, awareness about time allocated to teach, order in which the subject content is taught and on what standard they ought to offer learners opportunities to achieve (Nieuwoudt, 2006). Although several factors contribute to the achievement level of learners it is arguable that the above mentioned issues are useful in the teaching and learning of Mathematics (Porter, 1989). Positive attitude in Mathematics and pedagogical practice can increase the

achievement of the learners in Mathematics (Aiken, 1970). There is a close relationship between content and the way the teachers teach and respond towards the learners (Nieuwoudt & Golightly, 2006). Teachers should show learners that they add value to the teaching of Mathematics as well as to the teaching and learning situation in the classroom. Mathematics teachers who believe that learners can succeed will guide the Mathematics learners towards accomplishing their goals. Learners can be made aware of Mathematical relevance in their home and community, illustrate the value in their direct environment assisting parents and community leaders to recognise Mathematics as a subject to apply in everyday activities (Blum & Niss, 1991).

Being one of the member states of SACMEQ, Namibian results show that there are reasons for concern in regard with Mathematics teaching and learning policies across socio-economic status, including rural as well as urban areas. Results confirm that there is room for improvement in Mathematics achievement, educational quality and general education conditions (Hungu et al., 2010). It is realised that education reform in Namibia is necessary. Standardised exams at the end of primary education (grade 7) were introduced to prepare learners for secondary level, create opportunities for teachers and learners to identify areas that need attention. The Ministry of Education in Namibia utilized the results of the standardized exams on how to review the curriculum to equip learners with adequate skills that can prepare them for tertiary education. Building a learning nation, providing education through non-formal education to teachers, upgrading qualifications to empower teachers, and increasing competencies of learners about Mathematics content could support the purpose to keep up with the ever changing world (Mutorwa, 2004).

Through policy changes quality education prepares learners to become critical thinkers, scientifically as well as technologically literate to meet the global world (Sahlberg, 2007a). Academic restructuring through policy changes should relate to the value and attitudes of the society. It is observed globally that for the standardization of education, increased focus on literacy and responsibility should be regarded as the main features to assist to improve the quality of education (Sahlberg, 2007b). Policy regulations focus on how to improve learners' performance which will lead to higher achievement of learners in schools (Pajares & Graham, 1999).

The International Association for the Evaluation of Educational Achievement (IEA) is an independent international initiative of national research institutional and governmental research agencies. The IEA's aim is to provide international benchmarks and quality data that will increase policy makers' understanding of key factors that influence teaching and learning; through initiatives from the IEA a large scale global Mathematics and Science testing took place in 2003 (IEA, 2011). The Trends in Mathematics and Science Study (TIMSS) 2003 report evaluated different aspects of education systems. The purpose of the testing is to improve teaching and learning in schools, ranging from education policies and their implementation in schools and ultimately to learner achievement. The information obtained is critically important for Ministries of Education as they are alerted to the current problem areas in the education system.

Reports from well-designed studies like SACMEQ and TIMSS provide information about curriculum designs and resources required for improving teaching and learning. With SACMEQ III recommendation as support, and knowledge of the TIMSS 2003 report the Namibian government in conjunction with relevant stakeholders initiated the review of the promotion requirements which was implemented in January 2010. Currently Mathematics holds a prominent place in the academic curriculum of Namibia as it was made a compulsory subject at schools, as well as a requirement for entrance at colleges, universities or technical colleges in Namibia.

2.7 Integrated dimensions of conceptual framework

Meaningful subject content for teaching and learning requires knowing the subject in detail. Mathematics and the beliefs of all stakeholders are fundamental to transformation in the school curriculum. This aspect involves a kind of unpacking about what is difficult and multifaceted. New policy changes that involve complex challenges and management of various factors are considered when academic restructuring takes place (Diaz & Poblete, 2003). The introduction of new promotion requirements for Mathematics in Namibia ought to address implementation thereof at all levels. Mathematics involves skills regarding subject knowledge of teachers and learners, teaching and training strategies to model principles, and pedagogical strategies to support learners during the policy change. Furthermore psychological knowledge needs to address motivation and attitudes of the implementation of new Mathematics promotion requirements. To place the study in context of the existing literature the researcher developed a conceptual framework to guide this study. Figure 2.2 presents the conceptual framework. Hereafter the different aspects of the conceptual framework are discussed in sequential order as it appears in the framework. Firstly the challenges towards effective implementation of the new promotion requirements will be discussed; this is followed by a short discussion on PCK. The influences of beliefs about Mathematics on the both learners and teachers will be presented. The researcher then focusses on motivation and the three different theories of motivation. Attitudes as the core of the study are discussed with reference to theories that demonstrate the development and influences of attitudes. Lastly, the researcher gives a stance on education reform and policy changes.

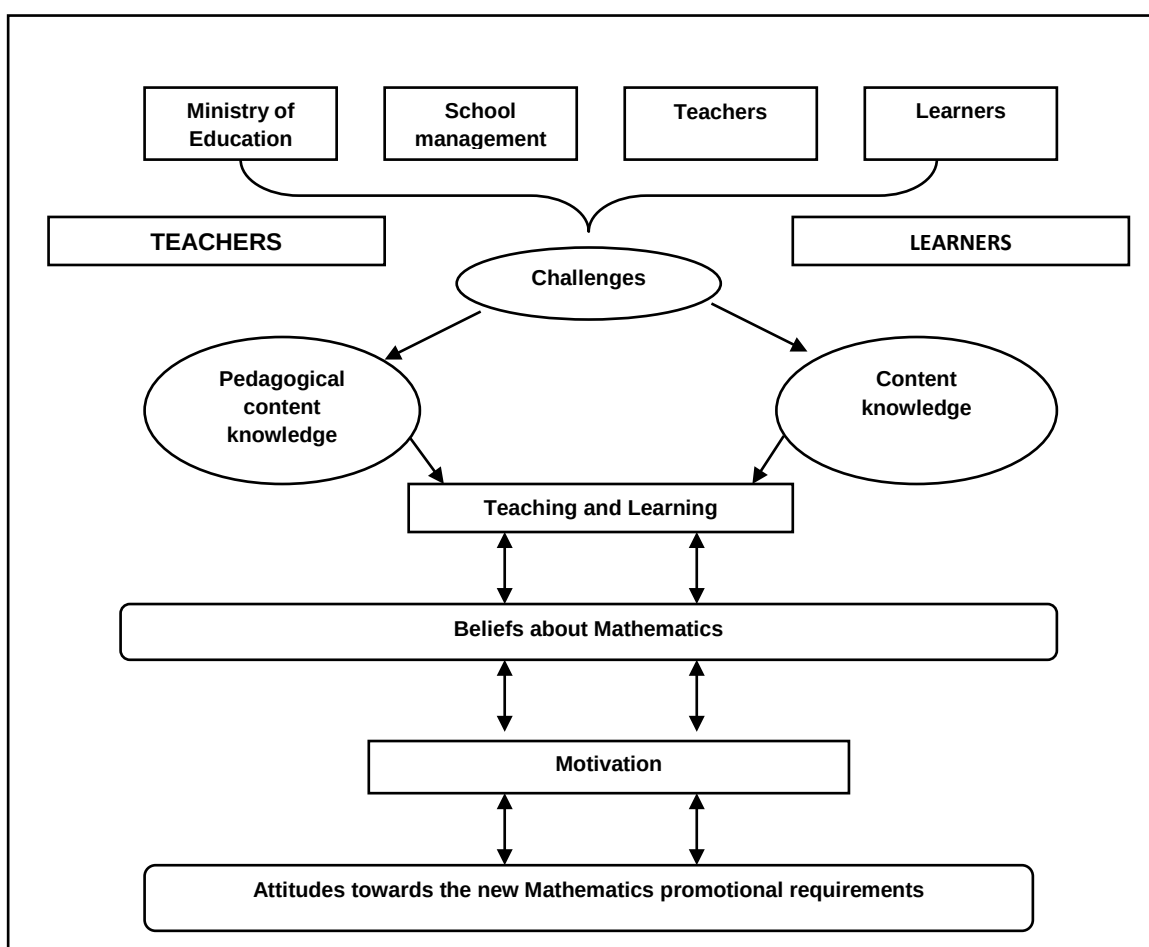


Figure 2.3 Conceptual model

2.8 Challenges towards effective implementation of the new promotion requirements

Mathematics teacher training is considered a very significant investment for improving the quality of education in the society (Shimizu, 1999). Teacher training includes how to teach and kindle the initiative to keep interest in the subject alive by creating a positive attitude towards Mathematics education (Adeeba & Naoreena, 2010). Teachers should not only be well-trained and qualified, they must be able to motivate and guide learners to deliver high-quality teaching. Namibia like many other developing countries is confronted with challenges to expand and improve the level of Mathematics teaching and learning. The Ministry of Education restructured the Mathematics promotion requirements policy in January 2010. The aim of the new policy is to attain high-quality education and increase the achievement of learners to be competitive with international countries. The new promotion requirements for grades 5 - 9 learners in Namibia are motivated by recommendation and outcomes of SACMEQ projects. Although Namibia never took part in TIMSS, the outcomes of the study also influenced the reconstruction of promotion requirements as presented in circular Form Education 6/2009 (§ 1.4.1). The new requirements increase the promotion marks causing difficulties for the at-risk learners. The researcher identified four aspects that initially directed the study, the four

aspects included education systems, school-related management, teachers' and learners' contributions.

2.8.1 Education system aspects

From his investigation into the Nigerian education system Taiwo (1980) describes system level as aspects that is deeply rooted in the government of a country. Education government systems place high premiums on education and the people involved. Teachers and learners are essential instruments in education. Education contributes towards the development of human capital of countries. Although teachers and learners accept changes in the education policy they sometimes show resistance towards these change. The most successful changes have been those which were "discussed and agreed in many forums before they were implemented"(Taiwo, 1980) .

The Ministry of Education has a responsibility to provide the physical support to teachers and learners. Mathematics learning materials need to be developed, together with enrichment materials to improve the prospect of the learners to excel in Mathematics through hard work. The Mathematics promotion requirements for grades 1 - 12 may have changed, the question remains: how is the government committed to improve teaching and learning of Mathematics for better academic achievement and achievement at schools? This question needs to be addressed (NIED, 2009). Therefore, these are monitored by the Ministry of Education to evaluate whether teaching and learning are on track to achieve its goals or not to apply strategies that will help to improve low academic achievement in Mathematics at the primary phase through to secondary level. One of the ways of improving is reforming promotion requirements. Implementation of new promotion requirements is confronted by numerous problems such as lack of infrastructure, insufficient funding, lack of trained personnel and the high failure rate in Mathematics at primary as well as secondary level. Consequently the implementation of professional development through training and education will help to achieve the targeted goals as stipulated in the Namibian document Vision 2030 (Ministry of Education, 2006a). To keep learners and teachers motivated might be a challenge, therefore the help of the Minister of Education, teachers' unions, and other stakeholders in education can organise workshops and training sessions for teachers to discuss how to support and maintain positive attitudes towards Mathematics (Yara, 2009). These interventions by the Ministry of Education are important to experienced and inexperienced teachers as professional development opportunities might be one way to develop interest about new practices, improved teaching activities and development of peer networks.

2.8.2 School management aspects

Management refers to a process that includes the reaching of goals by including people and other organization resources (Van der Westhuizen, Mosoge, Swanepoel, & Coetsee, 2005). A well-managed school is characterized by a series of continuing and relative management activities. According to Van der Westhuizen *et al.* (2005), teachers and learners react positively when school

managers provide support and safety in order to collaborate in teaching and learning. Yu and Yeung (2003) identify shared values and commitment from school management towards effective teaching as significant factors that have a positive outcome on the motivation of teachers and learners and their attitude towards the implementation of changes in education systems. Furthermore management boosts the achievement of learners when they demonstrate interest in Mathematics. Effective school management promotes greater teacher and learner motivation, attitude and achievement (Van der Westhuizen et al., 2005). Studies indicate that management contributes to a reduction of failure rates as school discipline, attendance, respect amongst management, teachers and learners and provision of opportunities for personal development are visibly demonstrated (Van der Westhuizen, 2007).

At school level examination is used to assess the success in Mathematics (Yara, 2009). Analysis of the examination statistical information helps management to identify factors that are responsible for poor achievement of learners and indicates possible solutions to the situation (Adeeba & Naoreena, 2010). School management is accountable to ensure that the promotion requirements are implemented correctly by monitoring the teaching and learning process. Teachers are instructionally good if the approaches are responsive to the learners' needs, such as classroom practice, class sizes, grade level, standard of teaching, language of instruction, achievement levels, job opportunities and social background (Snow & Lohman, 1989).

2.8.3 Teacher contribution towards teaching and learning

A teacher is not only a source of pedagogical subject knowledge in Mathematics; a teacher is a guide, an enabler, challenger, mentor, and tutor to the learners placed in his/her care (Ball & McDiarmid, 1990; Nieuwoudt & Golightly, 2006). Nieuwoudt (2006) states that every Mathematics learner depends on qualified teachers to unlock subject knowledge. One factor that causes an impact on learners' performance is teacher content knowledge related to Mathematics. Teachers cannot teach what they do not know; they only know or do what they have learned (Spaull, 2011).

Like the Namibian learners, the teachers performed poorly in SACMEQ III project (the latter results were not published in the public domain). The project required all participants to apply higher order thinking skills and apply Mathematics content knowledge. Sufficient content knowledge for Mathematics is very important. Teachers with higher qualifications provide high-quality learning (Brown, 2003). Therefore teachers are encouraged to study further to gain teaching strategies that will inspire learners' motivation and attitude towards Mathematics (Spaull, 2011). Spaull explains that this is one of challenges for the Ministry of Education, to provide opportunities for continuous teacher education.

For effective teaching and learning of Mathematics to take place teachers are encouraged to teach Mathematics as an instrument used for higher order thinking and not only as sets of operations and rules that need to be learned and not applied (Stipek, Givvin, Salmon, & MacGyvers, 2001).

Mathematics is a multifaceted and sometimes difficult subject. Subsequently Mathematics teachers should demonstrate an array of characteristics. Mathematics teachers are expected to be approachable and patient for learners to feel free to ask for assistance for better understanding (Brown, Mcnamara, Hanley, & Jones, 1999). Teachers play a great role in lesson presentation, it is the teacher's responsibility to see that mathematical knowledge is generated rather than administered in the classroom. According to Wilson, Cooney, and Stinton (2005) a comprehensive Mathematics pedagogical knowledge can promote understanding of Mathematics. Mathematics should not only be classroom-oriented but it should be taught by using real-life practical situations so that learners will realise that Mathematical content is not only theoretical but needed for problem solving situations in everyday life. The teachers who manage the teaching and learning process effectively will be able to engage learners and guide them to ensure good Mathematics competencies through education, and will adhere to the new policy requirements. A well-developed Mathematics curriculum ensures that learners obtain appropriate knowledge and skills and guidance.

Positive relationships between the teachers and the learners enhance attitude and recognition of Mathematics as a compulsory subject for future careers (Nieuwoudt & Golightly, 2006). Teachers have valuable content knowledge to share with learners. Responsibility lies with the teacher to show learners the significance of Mathematics but also to prepare their teaching and learning activities with the awareness that the lessons can influence the motivation and the attitude of the learners. With time teachers will accept the value of high-quality preparation and teaching, motivating them to invest great effort and hard work in the compulsory subject (EducationBug, 2011).

2.8.4 Learners contribution towards teaching and learning

Learners are persons who engage in the teaching and learning process, interact with others and take part in purposeful and meaningful decision-making with subject content (Nieuwoudt & Golightly, 2006). Learners' attitudes towards Mathematics is greatly influenced by the teachers' teaching methods or personality (Yara, 2009). Learners should have a clear understanding of why learning Mathematics is necessary as this will drive them to work towards the achievement of positive results. If they believe their Mathematical ability is limited it originates from a low self-esteem which is caused by lack of motivation (Kloosterman & Cougan, 1994). This is the common problem with Mathematics: learners think that they are poor in Mathematical problem solving or that Mathematics is too difficult to comprehend, therefore negative attitudes grow and influence the level of achievement or success (Kloosterman & Cougan, 1994). In Mathematics classrooms learning is guided by experience and norms acquired so that they can be applied towards effective learning in the classroom by teachers who are able to manage the teaching and learning process effectively (Nieuwoudt & Golightly, 2006). Therefore learners who grow up with such beliefs tend to avoid challenges as they fear failure or being singled out as incompetent.

The attitudes of the learners regarding Mathematics learning is one of the contributing factors underlying learners' Mathematics achievement. Attitudes determine the way learners approach Mathematics tasks (Ponte, Matos, Guimarães, Leal, & Canavarro, 1994). This is due to the fact that learners believe their role in the classroom is to receive mathematical knowledge and demonstrate the knowledge through application to the teacher. They believe that they need more practical activities provided by the teacher. Such perceptions cause learners not to be motivated to try alternative strategies and approach mathematical problems differently in order to develop confidence in dealing with Mathematics related problems (Ponte, Matos, Guimarães, et al., 1994).

2.9 Pedagogical content knowledge

Historically teachers based their Mathematics teaching and learning on content knowledge (Shulman, 1986). Later the focus shifted to the application of the knowledge in the classroom, the application of general pedagogical approaches, without the relevant content knowledge (Ball & McDiarmid, 1990). Shulman (1986) introduced the concept of PCK that identifies teaching and learning from a perspective of content and pedagogical content. He believed that if these two concepts are combined teachers will be more effective in Mathematics (Figure 2.1). The epistemological concept of PCK links the traditionally separated content knowledge and pedagogical knowledge.

A condensed definition of PCK includes integrated teacher understanding that combines subject matter, instructional methods and characteristics of learners within a pedagogical context (Joubert, 2008; Shulman, 1987). PCK focuses on traits supporting teachers to transfer the subject matter to the learner (Geddis, 1993). Globally there is agreement that effective teachers have unique knowledge of learners and their Mathematics thinking and understanding. To transfer knowledge to learners, the focus on content knowledge is adequate but Adeeb and Naoreena (2010) are of the opinion that the teaching and learning of Mathematics is more than the transfer of content knowledge: it includes knowledge about the different types of background, also their prior knowledge of the learning strategies they apply. Mathematics teacher training should be driven by constructive ideas about representation of content, information about analogies, explanations, examples, and demonstration in ways that the subject makes comprehensive sense to learners (Shulman, 1987).

Mathematics is more than memorization of basic facts and mastering of step-by-step Mathematical content knowledge by studying examples and much practice. Mathematics is more than using one standard method, it identifies a body of knowledge through blending the subject matter content and pedagogy into understanding of the distinctive Mathematics concepts (Adeeba & Naoreena, 2010). Mathematics teaching and learning therefore encompasses the understanding of common difficulties and pre-perception of teachers and learners.

2.10 Beliefs about Mathematics

There is consensus in the academic world that beliefs, motivation and attitudes are the result of a process that involves the teacher and learner experiences in Mathematics throughout their lives (Maaß & Schlöglmann, 2009). Researchers define beliefs from different perspectives, but in the Mathematics domain there is not one clear definition of beliefs (Adediwura & Tayo, 2007). For the purpose of this study, beliefs are limited to the affective scope of understanding, stating that beliefs are interwoven with emotional feelings, motivation and attitudes. This perspective holds affective aspects like the degree of acceptance, approval, disapproval, favour or disfavour as significant elements of belief (Donaghue, 2003).

Beliefs are highly subjective; therefore it is difficult if teachers' and learners' prior beliefs diverge with the nature of Mathematics content knowledge and the teaching and learning of the subject matter. Maaß, et al., (2009, p. 145) states that individuals' behaviour is predicted from their beliefs more than from the actual consequences of their actions. While beliefs are defined in different ways, it is necessary for teachers to understand the psychology of Mathematics, as it influences the pedagogical approach of the teachers and the attitude of the learner towards learning. Teachers and learners who hold beliefs in Mathematics facts as undemanding and plain are less engaged in deep thinking about the content of the subject, and are likely to display unsophisticated beliefs about how Mathematics is developed and what the nature of Mathematics is (Gill et al., 2004). The progress of Mathematics teaching and learning depends on the improvement of the teacher and learner understanding of the nature and demands of the subject, guided by their beliefs.

Goldin, Epstein and Schorr (2007) explain that beliefs form part of recent-developed archetypal affective structures. These archetypal affective structures occur when teachers and learners are engaged in Mathematics situations and confronted with challenging Mathematics activities.

Archetypal affective structures are:

- Teacher's and learners' experience of perceived threats to status or dignity. The experience can occur when ideas are challenged during a Mathematics discussion—*do not disrespect me*.
- Teacher and learners comprehend successful engagement with the Mathematics and have a pay-off (intrinsic or extrinsic) leading to increased intrinsic interest in the activity—*check this out*.
- Teacher and learners avoid interaction that leads to emotional distress and conflict and lose interest—*stay out of trouble*.
- Teachers and learners experience a sense of unfairness within the teaching and learning situation during problem-solving and they disinvest in the activities—*this is not fair to me*.

Beliefs about an individual's Mathematics ability are fixed at a low level and may encourage attitudes that reinforce avoidance behaviour towards Mathematics. Learners (as well as teachers) might experience that "they are not clever enough for Mathematics" and feel that "Mathematics is just not for me." (Goldin et al., 2007). Consequently the belief may be consonant with the teacher's or learners' personal value system in which success through hard work is considered meritorious (Bandura, 2010). This belief provides a self-regulating reason why hard work and internal motivation in Mathematics cannot produce high quality achievement of the teacher and the learner without it being the fault of the individual (Goldin et al., 2007).

Beliefs influence both individual Mathematics learners and the classroom teachers to succeed or fail in the teaching or learning of the subject matter. Furthermore it is fair to say that beliefs therefore also will affect the teacher and learners attitude towards education reform. According to Gill, Ashton, and Algina, (2004) teachers and learners with traditional beliefs claim to enjoy Mathematics less and show less enthusiasm in the education environment. Perhaps they themselves have assumed that extrinsic motivation is important to contribute towards their approach and attitude towards the subject and teaching and learning practice.

2.11 Motivation

Motivation is the concept most used in explaining the success or failure in a subject field (Chalak & Kassaian, 2012). Motivation is derived from the Latin verb *movere* which means "to move" (Schunk, Pintrick, & Meece, 2010). The idea of movement reflects motivation as something that gets us going, keeps us working, and helps us complete a task. (Schunk et al., 2010, p. 219) define motivation "as the process whereby goal-directed activity is instigated and sustained." There are two types of motivation, intrinsic and extrinsic motivation. Intrinsic motivation is defined by Ames as doing something for satisfaction rather than consequences (Ryan & Deci, 2000), thus learners can perform even without reinforcements or rewards as long as the experiences are positive (Ryan & Deci, 2000). Intrinsic motivation in humans exists and differs from individual to individual, as what works for one might not be effective for everyone. Individuals with intrinsic motivation respond to internal needs such as personal interest, satisfaction and enjoyment (Githua & Mwangi, 2003a). Intrinsic motivation helps learners to achieve self-control in the class and increase their interest in learning (Ames, 1990). Extrinsic motivation is a construct of doing something in order to receive reward or praise (Ryan & Deci, 2000). For example, in classes teachers have learners who do activities to be praised but they don't know why they have to do it (extrinsically motivated), while others need to do it as it is important for them to complete their task because it is interesting (intrinsically motivated). Extrinsic motivation responds to external rewards such as teachers' praise, encouragement or positive feedback from task performance (Githua & Mwangi, 2003a). Extrinsic rewards cannot be effective for every child in the classroom as there are those who believe in themselves, but for the least attentive learners or those

who perform poorly it is usually intended as it will increase their self-confidence which means they will be motivated to learn (Ames, 1990).

Therefore motivation can be interpreted as an interactive construct that directs an individual in a specific direction. The intrinsic and extrinsic motivation provides emotional energy to the teacher and learner and supports or inhibits the affectively experienced movement towards a selected direction. Individuals have different expectations about reaching their destination or reaching the set goal and different theoretical perspectives drive the teachers' and learners' motivation:

- Behaviourism: motivation is the expectation by the individual of positive reinforcement and is based on prior experiences
- Constructivism: Teachers and learners are motivated differently and the motivation depends on the social context they function within and personal choices they make
- Cognitivism: This perspective explains motivation as the choices each individual makes are based on their needs and the goal they want to achieve (Chalak & Kassaian, 2012).

In order to learn learners should be motivated; those who are motivated respond to personal needs and goals in the Mathematics, while some learners do their best to get praised by the teacher or rewarded for good performance (Githua & Mwangi, 2003b). Learning is mostly the teacher's influence on the learners; if the teacher shows interest in the learners' learning they will be more motivated to work hard (Cooper & Petrosky, 1979). Motivation to learn involves interest and relevance of success. Interest refers to a learner's curiosity to learn the subject matter, while relevance is how far learners perceive subject matter, make it valuable to them and how it will motivate them to learn that particular content (Githua & Mwangi, 2003a). This means that a learner who has an interest in Mathematics will always attempt to make it relevant for themselves to master the necessary skills to experience the success attached to the subject content. Motivated learners always perceive learning as a critical or form of attributions such as failure or success, academic achievement, completion of high school, or qualifying for university attendance (Githua & Mwangi, 2003a). Learning requires motivation as low motivation will always be a problem to the learners' progress or success, therefore positive attitudes towards learning are encouraged at all times.

The quality of instruction given by teachers at lower grades plays an important role in teaching Mathematics, because it is where the foundation of the subject is laid (Jackson & Leffingwell, 1999). If teachers give poor explanations or rush through explanations to learners during the Mathematics lesson, not all learners will understand the content (Jackson & Leffingwell, 1999). It is best if the teacher tries to accommodate all learners and does not rely on assumed prerequisite knowledge. Teachers often give excuses such as there is no time to revise past work which is not fair to the learners. This indicates that teachers show no concern for the learners' progress and needs (Jackson & Leffingwell, 1999). The earlier learners experience positive teaching and learning in Mathematics the sooner it provides foundational skills for later academic achievements (Brown, 2003).

In order for teachers to deliver quality teaching, professional development is needed. Therefore it is advisable that Mathematics teachers need to seek professional development opportunities to help them to improve their qualifications and to gain more knowledge about their subject. Sufficient Mathematics instructional practices that are effective enhance quality teaching which improves the output (Brown, 2003). Teachers guide learners to use a variety of approaches when solving Mathematical problems. Motivation depends greatly on the quality of tasks given to the learners. The increase in the level of motivation increases the interest in the subject, because if the teacher has self-confidence, learners enjoy Mathematics. If the teachers have low motivation it will be tough for the learners to be convinced and engage themselves in Mathematics activities (Stipek et al., 2001).

Throughout history theories to explain motivation and the effect thereof on individuals were developed. The following motivation theories are discussed in this section: Maslow's hierarchy of needs, Locke's goal-setting theory, Motivational system theory and the Goal-orientation theory to name but a few (Schunk et al., 2010). Teaching and learning are effective only if motivation and attitudes towards teaching and learning receive attention (Schunk et al., 2010).

2.11.1 Maslow's hierarchy of needs

Maslow self-actualisation model (Fig. 2.4) is a humanistic approach to motivation. Maslow distinguishes the needs of a person in a hierarchy model of needs. These needs are made up of physiological needs, safety needs, belonging needs, esteem needs and self-actualisation needs (Maslow, 1943). Most teachers advocate a humanistic approach in education. Humanistic education teaches a variety of skills that learners need in the modern world, deep-thinking skills, problem-solving skills and decision-making skills. It is a humane approach that guides teachers and learners to believe in themselves and their abilities. Furthermore it deals with aspects that focus on the factors that can improve the individual's quality of life, to provide the teacher and learner with a drive toward enhanced motivation and high-quality achievement (Maslow, 1943).

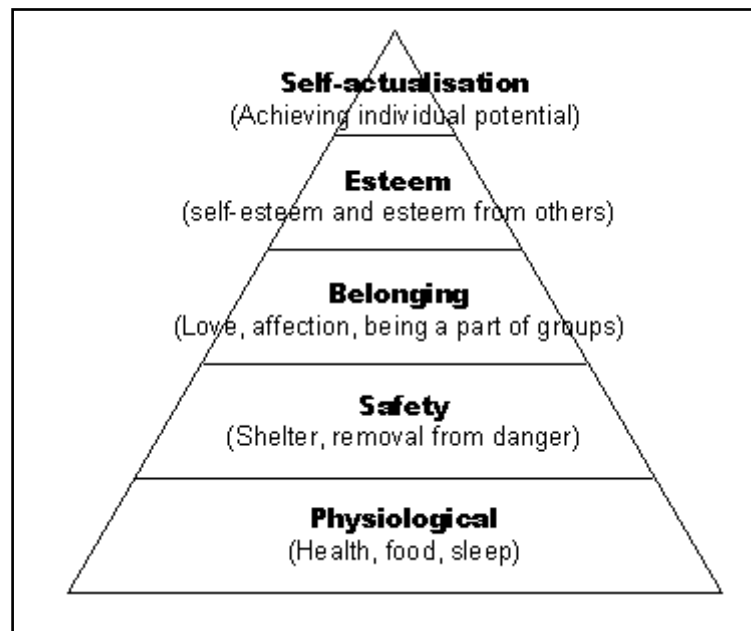


Figure 2.4 Maslow's hierarchy of needs (Maslow, 1943)

From an educational perspective Maslow's hierarchy emphasises that no teaching or learning can take place if basic needs are not satisfied. These basic needs can structure Mathematics development of the teacher and the learner and involve subject and personal growth that will lead to self-actualisation (EducationBug, 2011). It can therefore be deduced that motivation provides energy, direction for action and in this case effective learning and teaching of Mathematics. According to Schunk *et al.*, (2010) Maslow's hierarchy can be applied in the Mathematics teaching and learning context:

- Physiological needs comprise food, clothing and shelter. An individual who experiences hunger, and does not have a place to sleep, will not be able to advance to the next level of needs. Some schools offer low-cost meals and clothes at the school for needy individuals.
- Personal safety issues include the physical and mental safety of the person. It is not easy for learners to concentrate on theoretical Mathematics concepts when they know they will be bullied during recess. It is important to be aware of these situations, and create a safe and secure environment for the learner.
- Learners need to feel that they belong to a group; they need to feel that they are accepted by the group for them to be motivated to reach the next level. Group work activities in the Mathematics classroom can increase the social interaction and the learner will feel involved in a group from grades 0 - 12.
- Making learners feel that they contribute towards application and explanation of Mathematics can promote their self-esteem and let them feel valuable as learners in the Mathematics classroom. Learners on this level have mastered their goals and demonstrate positive motivation towards high-quality achievement in Mathematics.

- This level is deceptive as it limits the learning process. The learner should apply the Mathematics knowledge attained in the greater social context. They can help their parents to budget, show them easy Mathematics calculations, increase their own opportunities to find a good job and assist other learners who struggle with the subject.

Inspiring teachers and learners to meet these needs of motivation is to make need visible. All individuals are capable and have the desire to reach self-actualization. Progress to higher levels in the hierarchy is often disrupted by failure to reach the lower levels of motivation and needs. Prior experiences and negative incidents may cause individuals to fluctuate between the different levels of the hierarchy influencing their motivation towards achievement in Mathematics. To motivate the teachers and learners to progress to higher levels, show them what is available and how to reach the resources, and specify what the future holds (Qian, 2008).

2.11.2 Locke's goal-setting theory of motivation model

Goal-setting in education is a powerful way of motivating as it aims at goals that are determined and achieved by the teacher or learner who plans to present and achieve self-satisfactory performance (Locke & Latham, 2006). They explain that the goal-setting theory assumes that goal-setting should be specific, measurable, attainable, relevant, and time-bound (Figure 2.5). Goals differ from each other; hard goals need more motivation than easy goals. It a great accomplishment to achieve something that you have worked hard for.

There is a definite need for setting easy and hard goals, but there are five principles of goal-setting that the teacher and learner need to adhere to:

- Beliefs and assumptions: It is necessary to believe in one's own abilities and take responsibility for the teaching and learning process. Motivation can be described as the action of taking command of a situation.
- Self-dialogue: Each individual's content of Mathematics and teaching and learning processes can only be directly observed, but he/she can also observe the same beliefs, assumptions, desires, purpose, memory and more as everybody else.
- Visionary thinking: It refers to the ability of the individual to provide meaning and understanding to knowledge. It is the basis through which teachers and learners make sense of the world and it plays a key role in the teaching and learning process
- Thought pattern: In education the motivational thought pattern is the habit of thinking in a particular way that can be positive or negative
- Individual goal performance: Goals should be clear, measurable, specific and attainable within a set time frame. The teacher and learners focus on the set goal and try to achieve it in as short a time as possible (Locke & Latham, 2006).

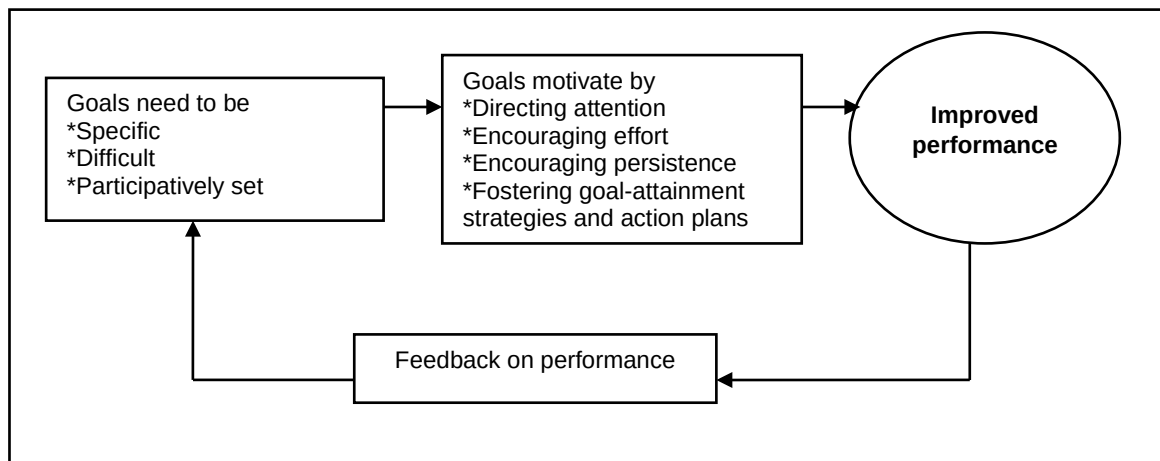


Figure 2.5 Locke's goal-setting model of motivation (Locke and Latham, 2006)

The goal-setting model of motivation distilled by Locke and Latham (2006) focuses on interactive steps towards motivation. Goals are identified and need to be specific, difficult and participative. These goals represent the centre of motivation in this model. Motivation is reached by teachers and learners through directing attention towards the aim of achievement. The attempts and persistence to reach the goals need to be encouraged by each other and the procedure toward goal attainment needs to be promoted. The teachers and learners can expect improved or high-quality achievement simply following the motivation objective. At this stage the individual needs feedback on the achievement as motivation to tackle a new Mathematics activity.

Latham (2004) explains the implementation of the goal-motivation theory in an educational context in a logical manner. A teacher provides learners with a task, a simple addition task or activity; the teacher assigns various performance goals to the learner to attain in a specific time frame. Learners attempt to solve the task in the available time. Teachers now provide the feedback on the performance of the learner showing the progress achieved in relation to the goals. Research suggests that individual differences play a role in determining goal effectiveness. Goal-setting theory focuses on specific goals in Mathematics, for example a learner's goal is to be promoted to the next grade.

Furthermore, individuals who perform well always set challengeable goals, unlike those who choose easy tasks as they tend to avoid making errors. In terms of teaching and learning perspective both learners and teachers should set goals to guide them to make meaningful decisions as well as to help them monitor their progress. Without goals it will be difficult to do follow-up on progress.

2.11.3 Goal-orientation theory

Goal-orientation can be defined as the knowledge and control over the individual's own cognitions (VandeWalle, 2003). Kaplan and Maehr (2007) describe goal-orientation theory as directive for action related to an achievement task and the way the individuals try to perform the task set as goals. Goals

are the tools that direct in which way an individual should act while goal-orientation refers to the performance goal to attain a positive judgement of ability (Schunk et al., 2010). There are various ways to work towards attainment of an education task in order to reach a desired goal. Goal-orientation is mostly relevant to understanding, developing and improving the teaching and learning process, and explains changes in behaviour of learners to increased academic level in the school context.

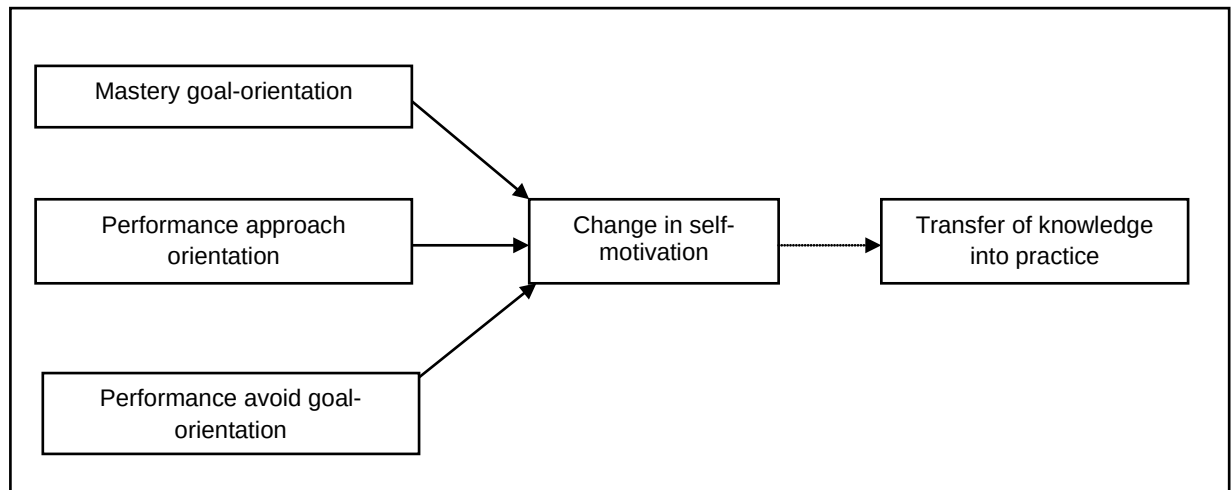


Figure 2.6 Goal-orientation model (Fried & Slowik, 2004)

Goal-orientation is divided into three main groups; mastery goal-orientation, performance approach goal-orientation and performance avoid goal-orientation (Fried & Slowik, 2004). These divisions of mastery and performance goals are regarded to have a positive influence on the learners' cognitive effect and behaviour, because its context can change depending on the situation or environment (Yeo, Sorbello, Koy, & Smillie, 2008). If properly applied the goals will help to maintain learners' interest and help them see the relevance or meaningfulness of the compulsory learning of Mathematics. With changes in curriculum design, learning context and promotion requirements, one could argue that there is a considerable association between motivation and the ideal teaching and learning context including a need for a learner- centred approach, something that will have a direct influence on the motivation levels of teachers and learners (Fried & Slowik, 2004). VandeWalle (1997) summarizes goal-orientation using five aspects:

- Teachers and learners need to be aware of the strengths, skills, attitudes and knowledge that they bring with them when they enter school. This includes creating a place for the inclusion of their everyday lived experiences in the classroom.
- The emphasis should be placed on learning with understanding, why Mathematics is taught, how it is taught and what competence or mastery looks like. One way learners can demonstrate this understanding is by successfully transferring content and skills to new tasks, activities and subject related problems. This includes meta-cognitive skills that have been linked to learning goal-orientation.

- It is important to remember that formative on-going assessments allow teachers to assess where learners are and then design their instruction accordingly. Individuals high in meta-cognitive awareness are skilled at monitoring their progress towards goals, identifying their strengths and weaknesses, and adjusting their learning strategies accordingly to achieve favourable outcomes.
- Lastly the teaching and learning context of learners must nurture the learner's education.

Motivation is complex, intertwined and related to goals. Individuals, who are high in self-efficacy set more difficult goals, exert more effort to achieve those goals, and seek to learn from the processes of pursuing those goals. Teachers and learners with a learning orientation desire to acquire knowledge and skills, whereas those with a performance goal-orientation focus on the outcome rather than the achievement process. While individuals with a learning goal-orientation view goals as a challenge, those with a performance goal-orientation may view goals as a threat. Positive motivation and outcomes will help individuals to master desired activities and achieve aims by focusing on meaningful aspect of teaching and learning. Both teachers and learners will be capable to develop positive motivation and cognitive outputs that can assist them to master desired tasks and attain their set objectives in Mathematics if they adhere to the following aspects and focus on:

- meaningful issues of the teaching and learning of Mathematics
- activities that fit the cognitive level of all involved
- providing opportunities to make choices and have control over the activities
- individual improvement, teaching, learning, progress and mastery
- privacy of the learners marks
- recognition of a learner's effort
- learner's attempt to achieve
- assisting learners to see their own mistakes and motivate them to see that mistakes are learning opportunities and not failure (Schunk et al., 2010).

Ames (1990) is of the opinion that goal-orientation theories are developed specifically for explaining achievement behaviour as they are mostly relevant for understanding and/or improving learning and instructions. Goal-orientation is concerned with the engagement of individuals in different ways to approach and respond to achievements. For teachers this signifies the motivation related to their own achievement of reaching their own teaching goals in an attempt to motivate the learners, while for the learners this indicates that they have reached their goals by being promoted to the next grade (Schunk et al., 2010).

The goal-orientation model (Figure 2.6) shows a distinct parallel link between mastery, performance approach and performance avoid goals leading to intrinsic and extrinsic motivation to a change in self-motivation (Schunk et al., 2010). Mastery orientation sets goals and aims to accomplish these goals through paying attention in class and trying to display a noticeable perceptive of Mathematics by

transferring the attained knowledge into everyday tasks; thus change in motivation due to a more intrinsic process. The performance goal approach and performance avoid approach are about the individual's ability and how it is judged. These goal-orientations are both depending on the acknowledgement of others to be motivated, therefore mostly extrinsically driven (Schunk et al., 2010). The performance goal-orientation will focus on an opportunity to gain acknowledgment from others to achieve, while those who depend on performance avoid approach will rather avoid reaction than to compromise themselves (Schunk et al., 2010). A study conducted by Wolters, Yu and Puntrich (1996) explains that the adoption of an extrinsic goal-orientation by individuals leads to more maladaptive motivation and cognitive outcomes.

Changes in self-motivation are related to expectations of the individual. Self-motivation relates to judgement of own abilities to perform, awareness of success and how to reach high-quality results, type of feedback and the emotional effect, the willingness to engage in cognitive tasks and to determine their own drive towards teaching and learning (Yeo et al., 2008). The nature of motivation helps individuals to understand why certain situations occur, for example learners will possibly understand why they pass or fail a test (Ames, 1990). Teachers who are motivated to progress to changes in self-motivation have to effectively re-examine how they teach, evaluate tasks and recognise good efforts and reward them. Changes in self-motivation can inspire the individual to apply the knowledge of Mathematics in activities and everyday situations, even help their peers to understand the subject better (Ames, 1990).

Finally, for the purpose of this study a goal can be described as an object or aim for an action or activity. The teachers and learners, who demonstrate high motivation due to constant commitment and engagement in Mathematics, have better outcomes and achievements than those whose involvement is compromised. Intrinsic and extrinsic motivations are intertwined and act as parallel factors influencing the teachers' and learners' challenges. These challenges can be viewed exclusively within the context of pedagogical content, methodology and style; factors that motivate teachers and learners by interesting application (George, 2010).

2.12 Attitudes

The term attitude is widely used to indicate the influence on an individual to act positively or negatively to a context or an experience. Allport (1935) explains that attitude is like a mental or neural state of readiness, shaped through experience or dynamic influence on the response provided by an individual through situations and objects. High motivation and positive attitudes are based on the individual and contribute towards achieving a certain goal (Ushida, 2005). The concept attitude is defined by Lopez as "a lasting evaluation of people's ideas which may be positive, negative, or neutral" (Lopez, 1966, p. 1). Attitudes may be considered either as propensity toward certain patterns of behaviour, or tendency toward certain kinds of emotional feelings in particular domains, e.g. in relation to

Mathematics. Attitudes are not subject to inheritance because they are internalized predisposition (Aiken, 1970). Attitudes towards Mathematics are likely to have been developed by teachers and learners' experiences. They may change during the passage of time. It could refer to both attitudes towards Mathematics learning and attitudes towards the members of a particular educational context. For the aim of this study an attitude is defined as a disposition to respond positively or negatively to Mathematics, teacher and learner's behaviour in school context, attitudes towards the subject or change in policy due to reform and other related issues. Figure 2.7 displays a simple way of the intertwined influence in a cyclic relationship with each other. As a result it is realistic to view the motivation, behaviour and teaching and learning of Mathematics as related components of positive or negative cycles of change in attitudes, behaviour and teaching and learning. All these changes occur towards the development of teachers' and learners' attitudes (Preston & Feinstein, 2004).

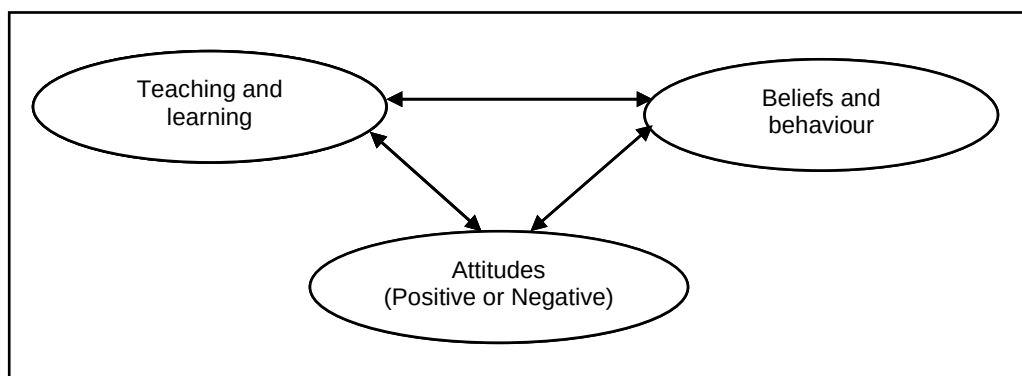


Figure 2.7 Relationship leading to positive and negative attitude (Preston & Feinstein, 2004)

The definition of attitude for this study is evaluative in nature, and reports explicit evaluative hidden responses of cognitive, affective and behavioural reactions of the Mathematics teachers and learners (Eagly & Chaiken, 1993). Attitudes are considered to be cognitive, affective or behavioural, due to the fact that attitude is regarded as a great concept that is used to obtain appropriate responses from both teachers and learners (Callahan, 1971). Wentzel indicates that attitudes of teachers and learners are central to understanding behaviour towards Mathematics in the classroom (Wentzel, 1998), therefore deeper discussion on the components is relevant. The cognitive component involves thoughts, beliefs and ideas about Mathematics teaching and learning. When a human being is the object of an attitude, the cognitive component is frequently a stereotype, e.g. teachers are negative towards the new Mathematics promotion requirements. The behavioural component involves the reaction on positive and negative rewards. Teachers with positive attitudes towards the implementation of the new promotion requirements might express intentions to attend workshops that might increase their knowledge about teaching strategies used in Mathematics (Simunovic et al., 2007).

Positive attitudes create a feeling of happiness and acceptance amongst teachers and learners, but when they come across negative attitudes the action becomes inconsistent due to the result they want to accomplish, therefore it encourages teachers and learners to avoid negative attitudes and thoughts and replace them with positive ones. Lopez is of the opinion that attitudes influence an individual's

choice of action and responses to challenges, incentives and rewards (Lopez, 1966). It is easy to change how someone thinks or behaves as it is formed through experiences in a social context process (Lopez, 1966). However, attitude depends on the emotions that attract our attention about the change, meaning that if someone thinks that they are not able to solve Mathematics problems, their reaction towards Mathematics will not be positive and lead to emotions such as dislike in the subject or laziness. High motivation and positive attitude contribute to the process of learning. Setting goals for themselves and learners, the attitude of teachers towards Mathematics can be changed. They furthermore have to build fun and pleasure into the Mathematics teaching and learning. Encouraging constructive interaction and cooperation in the process of teaching and learning can help them learn better. New teaching and learning strategies, techniques and procedures of problem solving engage both teacher and learner and contribute to positive experiences.

It is suggested that to change attitudes one has to change one's state of mind (Lopez, 1966). This means that teachers and learners have to change their thinking and avoid negative thoughts, because the inner dialogue is very important as it makes things worse if someone concentrates on the expression of negativity rather than inner instincts (Maaß & Schlöglmann, 2009). Some teachers and learners avoid mistakes thinking that they are bad. In reality mistakes can be seen as positive input because they are part of the process of learning; therefore without mistakes, less learning would take place and there will be no new knowledge to gain (Lopez, 1966).

As previously mentioned learners' and teachers' beliefs and motivation and attitude are intertwined and contribute towards mastering of goals to reach high-quality results. Attitudes, motivation and beliefs are visible in the achievement of learners. Those who have poor attitudes towards Mathematics, and do not attain high-quality results will have a negative attitude towards the Mathematics and the new promotional requirements (Van Erk, 2006). He explains that attitudes have a very important role in education as attitude stands on three pillars: what you think, what you do, and what you feel. If teachers' and learners' attitudes change towards the new Mathematics promotion requirement; it will be assumed that thinking changes, the belief towards the subject changes and increased motivation will contribute towards proper teaching and learning of Mathematics (Van Erk, 2006). Mathematics teachers' attitudes can easily influence learners as they regard them as their role models for the subject, therefore how the teachers act or view Mathematics learning will have a great impact on the learners' performance. Teachers should always display positive attitudes and encourage learners to follow suit (Ponte, Matos, Guimaraes, Leal, & Canavarro, 1994). Teachers should change the way they teach Mathematics in order for the learners to develop positive attitudes as well as the will and interest to learn more about Mathematics (Stipek et al., 2001). These include situations whereby learners are given platform to solve Mathematical problems applying their own strategies that they can later share with their peers in the classroom. By so doing learners' attitudes of depending on teachers will be changed as everyone will always attempt to find various ways of solving Mathematical problems, and during that process learning will be taking place effectively and attitudes towards the subject are also improved (Stipek et al., 2001).

Positive attitudes towards Mathematics are also associated with the level of achievement as well as with the extent to which the teacher is willing to challenge him/herself during lesson delivery (Stipek et al., 2001). Teachers should be knowledgeable, creative enough as well as enjoy teaching Mathematics so that they do not only depend on textbooks when giving classroom activities. When learners' achievement is increased it will also help teachers to evaluate their own teaching as well as learners' performance (Githua & Mwangi, 2003a). Teachers should try by all means to know their learners (those who like Mathematics as well as those who do not enjoy it) so that they can pair or group them accordingly. Most learners do not want to sit next to those who know more than they do, as they are afraid of making mistakes. Therefore rotation of learners in the classroom is recommended so that learners get to know one another as well as share and learn to solve problems together, and not only associate themselves with the few learners who they are always together with.

Attitudes of learners can be influenced by the teaching of the teacher and the method of teaching. The teachers' method of Mathematics teaching and the personality of the teacher greatly account for the learners' positive attitudes towards a specific subject (Randel, Stevenson, & Witruk, 2000). Without interest and personal effort in learning and teaching, learners won't be able to perform well in a given task (Randel et al., 2000). Teachers should develop positive relationship with the learners and stress classroom activities that involve active teaching-learning processes and the learners' participation in the class (Van Erk, 2006). Van Erk furthermore states that most teachers and learners who believe in the successful introduction of Mathematics promotion requirements demonstrate positive attitudes and are confident of their individual Mathematics ability. As they advance in the higher grades their attitudes will become even more positive toward the subject (Kloosterman & Cougan, 1994). There is a defined relationship between the interactions of the teachers' attitudes and the learners' attitudes (Aiken, 1970). Aiken (1970, p. 573) concludes that there is an interaction between teachers' attitude and understanding "Teachers with an average attitude and a high understanding of the Mathematics had learners with high-quality scores, but teachers with low attitudes and high understanding of Mathematics had learners with poor achievements." Attitude is not set in stone and the same things that lead to attitude formation also create attitude change. Obviously what is needed is to understand the formation and relationship of attitude with regard to achievement and the new promotion requirements as implemented by the Ministry of Education. Three theories are discussed to demonstrate the formation and relationships of attitudes: learning, functionalist and cognitive dissonance theories.

2.12.1 Learning theory

Learning is a process of acquiring an ability to act in a specific way and is defined as a "process or reaction as change in behaviour partly or totally as result of experience" (Kara, 2009, p. 100). Learning can also be defined as a "positive change" of the teachers' and learners' emotional and cognitive perspectives. Successful Mathematics learners exhibit positive attitudes and are

enthusiastic toward teaching and learning and even toward change; they have positive expectations of the subject and will motivate each other to perform better in Mathematics, although the change will have an effect on all stakeholders in education (Duarte, 2007). Learning theory of attitude focuses mainly on attitude formation and can more accurately be called behavioural theory of attitude change (Williams, 2006). It involves classical conditioning, instrumental condition and observational learning. In the Mathematics classroom classical conditioning is used to create positive emotional feelings towards Mathematics and teachers try to associate positive feelings towards the subject and the change in promotion requirements. It is imperative that the teacher experiences the same conditioning to stay focussed and keep a positive attitude towards the change in the promotion requirements. The Ministry of Education, school management, colleagues and learners can contribute towards this positive attitude of the teachers. Instrumental conditions determine and influence how attitudes develop; therefore positive conditioning can strengthen desirable attitudes. Behaviours or attitudes followed by constructive actions or appraisal are strengthened and will easily be repeated due to the positive consequences (Eagly & Chaiken, 1993), while individuals who experience negative consequences associated with behaviour and attitudes will avoid the instrumental conditioning (Williams, 2006). During observational learning learners watch the teachers in the learning context and then imitate the teachers. This brings about a change in the attitude of the learner towards Mathematics (Bandura, 1986). Suppose a learner in Mathematics always fails class tests and friends in the group pester the learner about the low achievement. The learner may develop an unfavourable opinion about the low results and start to work hard. Finally learners learn attitudes by observing teachers, peers or parents. Bandura (1986) refers to the attitude learning theory as a range of actions that arise when learners take on observed motivation, beliefs, behaviour and attitudes of the individuals that surround them.

Teachers and learners with positive attitudes towards Mathematics will ensure that they acquire lifelong learning skills, skills that have driven the Ministry of Education towards changing the promotion requirements for Mathematics. Teachers and learners need to internalise the changes that were introduced by the Ministry of Education. If the rationale of the change to new promotion requirements for Mathematic is understood it will reduce the incidence of frustration (Eagly & Chaiken, 1993).

2.12.2 Functionalist theory

Daniel Katz (1960) proposed a functionalist theory of attitudes. He takes the view that attitudes are determined by the functions they serve for us, and are determined by our motives. Attitudes help people to achieve their basic goals (McLeod, 2009). Katz (1971) distinguishes between these four functions of attitudes: (i) instrumental view refers to situations in which we develop favourable attitudes towards things that rewards us or aids us what we want to achieve. We develop attitudes that will maximize rewards and minimize penalties. Teachers and learners are more likely to change their attitudes to fulfil their goals. Katz points out that (ii) knowledge characteristics refer to the meaningful and structured context that attitude can provide to the teacher and the learners. These attitudes

provide order and structure in the complexity of the context in which the individual functions. This trait can be seen in the application of classroom discipline and set rules to provide a stable environment to teach in. Next, (iii) the value of beliefs reinforce self-esteem of both teacher and learner. Therefore we cultivate our own attitudes to increase our self-esteem and influence motivation. Lastly, some (iv) attitudes serve to protect us from the realities of life and basic truths of ourselves; it serves as a defensive aptitude.

Furthermore, the functionalist theory of attitude describes why our attitudes change in certain situation. Attitudes change when a situation has no need or function for the attitude; when teachers or learners realize that they feel uncreative and frustrated with the Mathematics, the promotion requirements and the value thereof in everyday life (Wentzel, 1998). It can be assumed that individuals should change their basic motivational and personal desires and not so much the perceptions and knowledge about Mathematics. The better the teachers' and learners' attitude and the realization of the functionality of Mathematics, the more it will serve as a constructive capacity to address the uncertainty of changes in the promotion requirements (Zan & Di Mortino, 2007).

2.12.3. Cognitive dissonance theory

Cognition can be described as the individual's perception of his/her own attitudes influenced by beliefs, motivation and behaviour (Williams, 2006). Therefore changes of attitude are determined by how individuals perceive their own attitudes, beliefs, motivation and behaviour. Cognitive dissonances are feelings of tension that arise when one is concurrently aware of cognitions (McLeod, 2009). For example, we make decisions favouring one alternative over another. In his classic cognitive dissonance theory Festinger (1957) states that cognitive inconsistency results in dissonance which is assertive and motivating. Feelings of tension arise when individuals are aware of two inconsistent cognitions. In the Mathematics classroom a teacher can act contrary to his/her attitude; a decision can be made to favour specific cognition despite reasons to favour another decision. Individuals are motivated to restore harmony but cognitive dissonance is a noxious state that produces discord, irrelevance, inconsonance. The positive or negative attitude of the individual will determine the way in which dissonance is addressed. It can either be reduced or eliminated by adding new cognitions or changing the existing ones. Williams (2006) offers four main sources of dissonance that apply in educational situations:

- Teachers or learners already know or believe in the positive value of the new promotion requirements but there is a challenge in the new promotion marks (informational inconsistency)
- Learners prepare for test and expect to pass but don't (disconfirmed expectations)
- Teachers are not positive towards the new promotion requirements and then share this attitude with colleagues who transfer this attitude to learners (post-decision dissonance)

- Learners avoid doing homework; copy it from their friends, but lack sufficient explanation for their behaviour (insufficient justification of behaviour).

Teachers experience tension and end up confusing learners (McLeod, 2009). From an educational point of view when Mathematics is favoured by the Ministry of Education over other content subjects it creates tension among teachers as it produces dissonance. Furthermore cognitive dissonance theory explains that the way we act clearly defines attitude. We feel tension, so we adjust our attitudes to reduce it, and that leads to attitude change. When attitudes aren't well-formed there will be no change, therefore the beliefs, attitudes, and intentions directly determine behaviour (Wentzel, 1998).

Behavioural intentions determine affective attitudes and norms, and affective attitudes are beliefs depending on the intention. For example if a Mathematics learner believes studying leads to higher grades, but does not care about the results, this reflects a negative attitude toward studying and such learner will perform inadequately (Lopez, 1966). From his study amongst Latin American learners Aiken (1970) concludes that there is a relationship between a teacher's background in Mathematics and the learner's achievement in Mathematics; the teacher's attitude towards Mathematics and learners' attitudes; teacher's and learners' judgements concerning the practical value of Mathematics, and teacher's attitudes and changes in attitudes towards Mathematics.

Finally it can be said that the definition of positive and negative attitude towards Mathematics depends on the definition of attitude. An uncomplicated definition might be that a positive attitude is a positive emotional disposition towards Mathematics and a negative attitude is a negative emotional disposition towards Mathematics. The relationship of attitudes to performance appears to be especially important in Mathematics teaching and learning. These are integrally related to expectations of teachers and learners (Aiken, 1970). Globally there are reservations about the role of teachers as instrument to change attitude of learners. Research furthermore indicates that attitude may change if there is new education reform or policy changes (Hyden, 2010). The focus is now turn to a discussion of education reform and the effect of policy changes.

2.13 Education reform and policy changes

In the modern world, economic growth and the spread of democracy have raised the value of education and increased the importance of ensuring that all children and adults have access to high quality and effective education. Modern education reforms are increasingly driven by a growing understanding of what works in education and how to go about successfully improving teaching and learning in schools (Kasule & Mapolelo, 2005). Education reform can be defined as the process of improving education at all levels and assisting educational stakeholders to improve the quality of education globally. According to research by Diaz and Poblete (2004) reform focuses on improving the pedagogical quality of Mathematics in general. Ministries of Educations attempt to identify how to

best create conditions to enhance the teaching environment in schools and education achievement, offering stable, effective and lasting transformation that can enrich and reform pedagogical practices. In a pilot study Fetler (1989) found that educational policy makers have questioned the effect of education reform and curriculum changes on at-risk learners, especially in rural and remote areas. Academic reform may have positive effects for at-risk learners who usually leave school because of low motivation; reform is believed to raise or encourage learner efforts and increase their attitude to lead them to higher levels of achievement (Vilija, 1997).

United Nations Educational, Scientific and Cultural Organisation (UNESCO) (1978) encourages academic reform to ensure quality teaching and learning globally. In Africa it can provide teaching and learning to promote achievement and a learning culture. Ministries of Education should provide teaching and learning opportunities that cater for all, and invest maximum time and money as required by the country in terms of their future development plan. In most countries, Namibia included, Mathematics education reform has been the major concern and priority of the government (NIED, 2009), as most of the Southern and Eastern African countries are striving towards compulsory Mathematics at all levels of education (Githua & Mwangi, 2003a). Implicit in this reform is an equally substantive change in professional development practices at all levels. Teaching was traditionally viewed as a way of transmitting information from the teacher to the learner, but reform is aiming at teacher-learner paradigm where teacher and learners are actively involved in the classroom events (Nieuwoudt & Golightly, 2006). The reason for reforming of curriculum is to review the role of the learner, teacher, learning content and nature of classroom engagements.

The teaching and learning of Mathematics has been a great challenge since independence in Namibia, due to the previous regime where subject choices were offered based on race, location and socio-economical position (Mutorwa, 2004). Considering the results of various investigation projects, observations and assessments conducted in Namibia judging Mathematics achievements, it was obvious that intensive education and training reform was inevitable to improve academic results in the nation. Attitudes of learners and teachers who are directly involved in the implementation of reform are usually ignored during the decision process (Ponte, Matos, Guimaraes, et al., 1994). Hyden (2010) is of the opinion that the education system has not produced academics or scientists of repute, therefore demands educational reforms and the Minister of Education should consult the nation and consider a conference for education reform with all the relevant stakeholders.

Well-structured education and training reform provide learners with ample opportunities for economic independence. Economic independence help in reducing unemployment, one of the reasons Namibia introduces education reform (Hyden, 2010). "Namibia's education planners and curriculum committees have not found a working formula that can feature the country as a strong competitor among knowledge-driven societies; that after 20 years of independence, is worrisome" Hyden (2010).

Intensive reform of Mathematics promotion requirements implemented by the Ministry of Education in 2010 affects both teachers and learners. The pass requirements policy for grades 0 - 9 Mathematics subject was made compulsory for every learner in the phase (NIED, 2009). The Ministry of Education believes that the reform is successful as the promotion problem is addressed. In Namibia the change is noticed in the shift from educational perspectives to new dynamics in the curriculum. To comprehend curriculum change, the teacher and learners are expected to comprehend the changes against the history of Mathematics achievements and the position of Mathematics in Namibia. In most countries education reform focuses on curriculum change. Curriculum change lead teachers to think about the influence of uncertainty and ambiguity on teaching and learning. Research indicates that teachers' beliefs and knowledge structures about education reform and the altered policy influence the attitude towards the changes (Qian, 2008). Education leaders must understand the kinds of uneasiness and uncertainty teachers and learners endeavour and steer them through these changes. Education reform includes:

- Changing preparation of material to improve critical thinking and interpretations
- Representing Mathematics challenges in different ways
- Considering innovative teaching and learning strategies to address the promotion requirements
- Adaptation of the above mentioned to own and learners' attitude and characteristics
- Tailoring Mathematics curriculum changes to adapt to the specific context (Shulman, 1986).

Most policy changes rest on higher standards for passing to next grades or entrance to Higher Education (HE); greater emphasis is placed on practice to increase the human capital of the country and greater autonomy for teachers and learners. According to Fullen (2000) implementation of curriculum change can only be successful if Ministries of Education focus on decentralisation, local capacity building, rigorous external accountability and stimulation of innovation.

Decentralization is an attempt to maintain and develop the school's site-based emphasis, and revising policies stand in the way of school-based reform (Lo et al., 2002).. Secondly, local school capacity includes things such as proving continuous professional training for teachers, redesigning the training of teachers and activities to prepare teachers, principals, parents and others to function as members within the education context. Thirdly, balancing the accountability support and interventions is tough, but this is precisely how sophisticated the infrastructure of the school must become. Lastly, stimulation of innovation involves ideas to change teaching and learning. This should be a strong feature, investments must be made in networks, support to teachers and learners and creating a functional strong and exciting system. New curriculum, manuals, training materials and, finally, the renewal of the educational system should strive for deeper knowledge that demonstrates positively for teachers, and for learners to enjoy attending school, not under pressure of parents or teachers. Therefore it is necessary to assess the academic reform in terms of the attitude of school teachers and learners towards education and the future.

2.14 Summary

Globally teachers agree that Mathematics should be meaningful to learners. If teachers and learners are able to see the connection between Mathematics and practical applications, more meaning would be brought into the classroom. Education is the vehicle to enhance human capital, therefore it must be regarded priority in any country and be set as a priority to improve the quality of education and implement efforts that will raise teachers' teaching and learners' learning. The success of education of any educational reform should focus on attitude change of teachers and learners as well as improving learning and achievement based on values and missions set by the Ministry of Education. Attitude is regarded as the tendency to react in a particular way, either positively or negatively in different circumstances; as a result teachers and learners are affected by each other's beliefs, motivation, and behaviour. Therefore, the Ministry of Education needs to take the implementation of education reform in Mathematics more seriously than just saying that teaching and learning need to take place to increase achievement. This chapter looked into the change in the Mathematics promotion requirements for Namibian grades 0 - 9 learners. The following were dealt with in detail: the requirements as well as the rationale behind these, beliefs, motivation and attitudes of teachers and learners and the effect on teaching and learning. Chapter Three will describe the research design and the methodology used to investigate the attitude of teachers and learners towards the new promotion requirements in Mathematics.

Chapter Three

Research Design and Methodology

3.1 Introduction

This chapter outlines the research design and methodology of this study. It describes the procedures that were used to gather data to address the research question of determining teachers' and learners' attitudes towards the Namibia's 2010 promotion requirements of Mathematics (Ministry of Education, 2009). This chapter addresses the research design, research methodology, the research context, the role of the researcher, participant selection, data collection strategies, analysis of data, trustworthiness of the research, ethical consideration, value of the research, and limitations of the study.

3.2 Research design

Creswell (2009, p. 233) defines research design as “plans and procedures for the research that span the decision from broad assumptions to detailed methods of data collection and analysis.” The research focused on the attitudes of teachers and learners towards the new promotion requirements of Mathematics. An interpretive study focused on the attitude of the participants' constructed human interaction and experiences. Interpretive studies deal with the theory and practice of interpretation, and the researcher reconstructed the original intention of the participants by interpreting the opinions of the different participants regarding the phenomenon discussed. No single correct interpretation of a phenomenon is possible, but an understanding thereof according to a set of crystallised procedures is likely. Generally interpretive studies start with an assumption that is supported through social constructions and shared meanings that lead to an understanding of the described situation (Nieuwenhuis, 2007a). The initial assumption that drove this study was the perception that teachers and learners were overwhelmed by the 2010 promotion requirements as they were not sure what these entailed.

This research opted for a qualitative interpretive study to capture the lived experiences of teachers and learners whose lives were directly influenced by the 2010 new promotion requirements for grade 5-9 in Namibian schools. According to Snape and Spencer (2003), “lived experiences” relate to research participants' subjective and first hand experiences of situations important to them. A qualitative research methodology is therefore of the essence, because collection of data was contained at a single school where the researcher is based. The study was conducted at a rural public Namibian school in Rundu district where the researcher is a Mathematics teacher and has a relationship of trust with the teachers, learners and parents linked to the school. As the study took

place in a single context (Snape & Spencer, 2003), it became clear that the research design is associated to a single strand bounded qualitative case study.

3.2.1 Qualitative research approach

There are many ways of doing qualitative research; there is not only one single correct way of doing it. About performing qualitative research effectively, Snape and Spencer (2003) emphasise:

- the nature of the social world and what can be known about it (ontology)
- the nature of knowledge and how it can be acquired (epistemology)
- the purpose and goals of the research
- characteristics of the research participants
- the audience for the research

A qualitative research approach within the sociological phenomenon indicates that the world is viewed from the participants' perspective and not from the researcher's viewpoint, therefore qualitative research belongs within the naturalist and interpretive paradigm (Burrell & Morgan, 1979). The researcher attempted to study the phenomenon in all its complexity (Fraenkel & Wallen, 2008). The people's individual and collective social beliefs and perspectives were described and analysed. There are various types of qualitative research designs, such as case study, ethnological study, and grounded theory. A case study was used to conduct this study.

3.2.2 Case study approach

Case study has many interpretations in literature and depending on the researcher a case study can be positivist, interpretive or critical. Cohen *et al* (2007, p. 253) define a case study as an "exploration or in-depth analysis of a specific instance that is designed to involve multiple sources of information that are rich in content." From this definition, case studies can be used to obtain an understanding of the study according to the participants' perspective. Therefore a case study is a way of collecting information from personal perspectives of participants for issues under study. Case studies involve a researcher where s/he explores bounded theory; collect in-depth data by using different sources (for example interviews), and then report the outcome of the case description (Creswell, 2007). Case studies are distinguished according to the size of bounded case being researched. There are three variations of case studies and the selection of the type of case study depends on the researcher as s/he is the one who is aware of the nature and reality of the research. For this study an intrinsic case study was used as the researcher explored the learners' and teachers' attitudes and motivation towards the new Mathematics promotion requirements.

3.3 Research methodology

Research methodology refers to the form of data collection, analysis, and interpretation that a researcher proposes for a study (Creswell, 2009). Babbie and Mouton (2001, p. 165) define qualitative research as “a methodology that generates rich, detailed data that can contribute to in-depth description, explanation and understanding of the natural context of research.” During this research an interactive research design was followed because the researcher accessed the source of the information (teachers’ and learners’ attitude towards the 2010 Mathematics promotion requirements) and the researcher directly interacted with the participants. This qualitative research is a case study as it was conducted in a specified setting and timeframe (Strydom, 2005a). The case study provides information relating to exploring and describing the teachers’ and learners’ attitudes towards the new promotion requirements of Mathematics. The unit of analysis related to the attitudes of teachers and learners towards the implementation of the 2010 Mathematics promotion requirements for grades 5 - 9 in Namibian education system. The analysis of the data provided the researcher with insightful information about the teachers’ and learners’ attitudes towards the 2010 implemented promotion requirements for grades 5 - 9.

Although the researcher obtained rich descriptions of the specific context, the researcher could not generalize the findings to the larger Namibian situation. However, similar attitudes may exist at comparable settings (Zan & Di Mortino, 2007) and some of the findings may be appropriate for such settings. The researcher made use of two data generation instruments; focus group interviews and researchers notes.

3.3.1 Focus group interviews

Focus group interviews are formal conversations with a number of participants which are carried out because the participants were selected according to certain characteristics that relate to the focus of the study (Greef, 2005). A focus group interview is a two-way conversation in which the interviewers ask the participants questions in order to collect data and learn about the opinions, ideas and opinions of the participants (Nieuwenhuis, 2007b). The participants also asked questions to the researcher to increase their clarity of the questions. During the interviews, some participants were unsure of how they should respond as research interviews were not an everyday event and they had not been exposed to this approach before (Cohen et al., 2007). Focus group interviews consisted of open-ended questions. Interruptions were avoided and follow-up questions were posed to ensure clear understanding of all issues at hand.

Focus group interviews were chosen so that learners could hear the perceptions of others in the group regarding the new Mathematics promotion requirements in order to generate a wider range of responses from the participants (Cohen et al., 2007). The focus group interviews were conducted in March 2012 (grade 7 on 6 March 2012; grade 9 on 7 March 2012; and teachers on 14 March 2012).

The interviews were conducted during weekdays at the designated school. The interviews lasted from forty to sixty minutes with each group. The semi-structured focus group interview schedules are available as Addenda 3.1 and 3.2. The transcribed interviews are available as Addenda 3.3, 3.4 and 3.5.

3.3.2 Researcher notes

The researcher's notes comprise information or data collected during the process of data collection that were used by the researcher during report writing. These includes any gestures, expression or behaviours observed by the researcher that were not captured by the tape-recorder during the focus group interviews with the Mathematics teachers and learners (De Vos, Strydom, & Venter, 2005). The researcher's notes were used when transcribing the interviews to contribute towards the richness of the data.

3.3.3 The research context

The context of this research relates to teachers and learners of a circuit in Kavango region. The circuit consists of about thirty primary schools, five combined schools and two senior secondary schools. This research was conducted at a combined school in the North-Eastern part of Kavango region, about fifteen kilometres from Rundu which is about 600km from the capital, Windhoek. The school has a permanent building structure, no fences around the school, and has no toilet facilities for the learners. Figures 3.1 and 3.2 depict the physical context of the school.



Figure 3.1 The physical context of the school



Figure 3.2 The physical context of the school

The selected combined school has 530 learners from pre-primary to grade 10. The school has nineteen teachers, three heads of departments, one secretary and one institutional worker. Only three teachers are trained to teach grades 7 - 9 Mathematics and they are responsible for the Mathematics education at the school. Two out of the nineteen teachers are under-qualified while the remaining seventeen teachers obtained teacher qualifications through full-time or part-time studies. About 15% of the learners at the selected school travel a distance of three to four kilometres to the school to attend classes every day. The general academic performance of the learners at the school is satisfactory at the lower primary level, but unsatisfactory at upper primary and senior secondary levels (that include grades 5 - 10).

The economic status of the regions is generally low as most of the residents are unemployed and they depend mostly on subsistence farming. Figure 3.3 depicts the economic status of the research context.



Figure 3.3 A landscape view depicting the research context

3.4 Participant selection

The researcher thought carefully about choosing research participants. Participant selection was performed in order for the researcher to collect data by conducting focus group interviews to be able to help address the research question (Nieuwenhuis, 2007b). The target participants of this study were Mathematics teachers and learners as they are directly involved with the implementation of the 2010 promotion requirements. Five teachers and twelve learners from the selected schools in the circuit were chosen as participants as they experience the implementation of the promotion requirements at grass roots level.

The participants for this research were sampled according to a non-probability purposive sampling strategy to capture the attitudes of the stakeholders towards the 2010 Mathematics promotion requirements (Strydom, 2005c). The researcher targeted a particular group and is aware thereof that this group does not represent the wider population. Strydom (2005c) explains that this type of sampling is solely based on the researchers judgement in that it is composed of participants that contain the most representative attributes to the population. The purpose of this sampling was to develop an in-depth understanding of the phenomenon (Cohen et al., 2007).

Grades 7 and 9 learners had been exposed to both the old and new promotion requirements; therefore they were the participants in the focus group interviews. Six learners for each grade were selected (three boys and three girls) according to their academic performance in Mathematics. The learners were selected with the assistance of the other Mathematics teacher who teaches at grades 5 - 9, and they were grouped into three groups: learners from high, moderate and low academic performance in Mathematics (McMillan & Schumacher, 2010). Due to this purposeful selection procedure, not all grade 7 and 9 learners were involved in the focus group interviews (Strydom, 2005b). The three focus group interviews consisted of grade 7 and 9 learners, as well as Mathematics teachers. The school has three Mathematics teachers, including the researcher. Therefore the researcher decided to select three available Mathematics teachers from neighbouring schools to form part of the focus group of five teachers.

All participants were prepared to take part in the research voluntarily (De Vos, 2005). Audio tapes were used to record the conversation for verbatim capturing of the interviews and subsequent analysis. Samples of consent letters (Addendum 3.6) and the interview schedule (Addendum 3.1) are part of the addenda in CD format at the end of the dissertation.

3.5 Analysis of the data

Data analysis involves scrutinizing the data from different viewpoints to understand and interpret the data (De Vos, 2005). The transcribed semi-structured interviews with teachers' and learners' focus

groups constituted the integrated dataset in ATLAS.ti™ (Addendum 3.7). The data were coded according to a process of open coding (De Vos, 2005) and then analysed further according to a methodology of content analysis where phrases of meaning formed the basis of coding and categorizing. Axial coding was administered to put together concepts according to the participants' responses to contribute towards the new theory on teachers' and learners' attitudes of promotion requirements in Namibia (De Vos, 2005) by comparing related data as it increases the internal validity of findings (Boeije, 2002).

The issues of validity, reliability and trustworthiness were observed in the research. Attention was given to the use of concepts, constructs, methodological issues, the role of the researcher, and to the control of bias. The researcher described these steps to ensure consistency and accuracy during the research process (Creswell, 2009). To add accuracy and consistency to the research, member checking strategies was used to examine evidence gathered from the participants (Creswell, 2009).

3.6 Trustworthiness of the research

The quality of data is maintained if good relationship is built on mutual trust between the researcher and the participants, therefore the researcher has to consider certain matters to win the participants' trust (Strydom, 2005b). For this section the researcher discussed the credibility, dependability, and confirmability of the research.

3.6.1 Credibility

Credibility is an alternative of internal validity which is more concerned of insuring that the research was accurately identified and described (Lincoln & Guba, 1985). During the process of data collection the participants in the research were informed of their rights as well as that the participation was voluntary. None of the participants was forced or threatened to take part or provide information. Teachers and learner participants were made aware in advance that they will be tape-recorded as it will assist the researcher to analyse data. Participants were also given an opportunity to check the analysed data for confirmation so that they can acknowledge and sign for the data collected (Lincoln & Guba, 1985). Giving the participants an opportunity to listen to themselves gave them an opportunity to volunteer additional information that they did not mention during the first time of the interview (Lincoln & Guba, 1985).

3.6.2 Dependability

Dependability is relative to reliability as many researchers attempt to change conditions in the phenomenon or the design (De Vos, 2005). The researcher changed the design or phenomena used

in the study to fit the situation as long as it was accepted and not hampered the content or went against the recommendations given by the author of the study.

3.6.3 Confirmability

Confirmability is used as a finding to determine whether data have been appropriately analysed or audited. This confirmation is done by tracing back the interview notes, document entries and any other appropriate inferences used for the study (Lincoln & Guba, 1985). The study provides the references of interview notes that were tape recorded as a way of confirming and proving that the process in which the interview was conducted was proper and not fabricated. Approval for the notes was signed off by the participants confirming that they accepted the transcribed notes being true and that no additional comments were made on their behalf.

3.7 Ethical considerations

Ethics is defined as widely accepted moral principles that offer rules for behavioural expectation, conduct towards the participants, researcher, assistants, employers and anyone who may be direct or indirectly involved in the research project (Strydom, 2005a). Ethical consideration involves: avoidance of harm (physical or emotional) to the participants and researcher, informed consent, violation of privacy/anonymity/confidentiality, competence of the researcher, and publication of findings (Strydom, 2005a).

Ethical issues anticipated by the researcher involved the issues of personal disclosure, authenticity, credibility, the role of the researcher, protection for their research participants, developing trust with them, promoting the integrity of the research as well as guarding against misconducts that might occur while conducting the research (Creswell, 2009).

Researchers should, at all times, observe general good manners and keep to a strict code of ethical conduct. Ethical consideration protects the researcher and the participants against violation of their rights for the duration of the research process (Creswell, 2009). Participants were kept informed about the confidentiality and anonymity of data throughout the research process.

Appointments were made with the participants so that the research would not affect their teaching, or create conflict with colleagues or school managers. The researcher gained permission from the relevant authorities, school management team and parents (Addendum 3.8) in advance before conducting the interviews. Participant's involvement was explained. Participation was not compulsory, and respondents were informed that they may withdraw at any point (Strydom, 2005a). The responses of the participants were treated with great confidentiality and the identities of the participants and the schools were not revealed during the research or the report (Addendum 3.9).

3.8 Value of the research

The value of this research is to motivate learners to understand that the newly implemented promotion requirement is a national issue and all the challenges attached to the policy are valid and of importance for the development of the national numeracy skills of the Namibian nation as a whole.

It is agreed that all subject teachers should spend a few minutes of their introductory lesson to encourage learners to regard all subjects as important and do their best to perform well, especially in English and Mathematics as they are compulsory for every Namibian learner from grade 1 up to 12 as from January 2010.

The research will be of assistance to the school, community and the Ministry of Education because it provides findings about how motivation changes teachers' and learners' attitudes towards Mathematics. The importance of mathematics as compulsory promotion subject to the next grade requires them to do well in six subjects which include Mathematics.

3.9 Limitations of the study

This research was based on the new promotion requirements which place more emphasis on the part where every learner should pass Mathematics from grades 1 - 9. The research involved Mathematics teachers and grades 7 and 9 learners. The research was limited to one school in Kavango region as it was possible for the researcher to contact the participants.

Although the study was confined to one school to collect data from the learners; teachers provided information from the surrounding schools. These may give relative findings to some schools, but not all relate to similar contexts e.g. all schools in Namibia.

3.10 Summary

This chapter unpacked the research design and methodology used during this study. The research design related to a qualitative case study. Qualitative research was opted for because of the nature of the study, which locates the researcher in the centre of the research process. This means that qualitative research helps the researcher to interpret the data collected into meaningful and simplified units.

Other important issues explored in this chapter are trustworthiness and ethical considerations. Member checking of data collected was applied as it helped to build trust between the researcher and the participants.

Chapter Four

Data Analysis and Findings

4.1 Introduction

The research methodology was comprehensively discussed in the previous chapter. The data analysis and findings are reported in this chapter. De Vos (2005, p. 339) describes data analysis as a “process of bringing order, structure and meaning to a mass of collected data.” Chapter Four presents a discussion of the findings of the research study. The researcher elucidates responses and notes as teachers’ and learners’ attitudes are described and explored.

4.2 Rationale

Mathematics teachers are qualified educationists who teach Mathematics to learners. To motivate learners in Mathematics teachers should be aware of pedagogical content knowledge in their field of study. To improve achievement levels of Mathematics learners in Namibian schools, teachers should be well qualified. Learners contribute valuable experiences towards the teaching and learning environment. The low pass rate in Mathematics at school level and the occasional reports on the low international rankings necessitated the Ministry of Education (2006b) to re-assess their Mathematics curriculum. Improved achievement in Mathematics is considered to be among the requirements to address the Namibian Vision 2030. The Vision is that Namibia strives to become a “prosperous and industrialized Namibia, developed by her human resources, enjoy peace, harmony and political stability” (NIED, 2009, p. 2).

The Ministry of Education (2009) introduced a new promotion requirement to be implemented at all Namibian schools and it states:

A learner in grade 5-7 shall be promoted if he/she has obtained a D-grade or better in each of English and Mathematics. A learner in grade 8-9 shall be promoted if he/she has obtained a E-grade or better in six subjects including Mathematics and English (Ministry of Education, 2009, pp. 3-4).

Education has moved from the traditional method of teaching to an understanding-based way of teaching. To develop positive learners’ attitude, teachers should adopt strategies to maintain a positive attitude towards the policy changes. The growth of Mathematics as subject as a scientific field can be seen as a process of deeper understanding of the difficulty (Potari, 2012). The low pass rate of learners in grades 5 - 7 and 8 - 10 is a problem indicator in Mathematics education in Namibia (Hungu et al., 2010). With the change in curricula and the pressure to increase pass rates, the implementation of new promotion requirements has put teachers under pressure to adopt their teaching and learning strategies to increase pass rates as required by the Ministry of Education

(Ministry of Education, 2006b). Therefore the complexity of the challenge to implement these changes lies in the classroom and how teachers and learners react towards these changes. The attitudes of teachers and learners are captured in the way teachers balance the Mathematics outcomes, learners' thinking, motivation and attitudes. This study intends to determine from teachers and learners what their experiences of the new promotion requirements are and if these can maintain the academic stability of teaching and learning in the grades 7 - 9 Mathematics classrooms.

4.3 Biographical information

This study included Mathematics teachers and learners affected by the introduction of the new promotion requirements in a selected circuit. Teachers and learners were the participants in this research as they are directly involved with the implementation of the promotion requirements at schools. In Tables 4.1, 4.2 and 4.3 the researcher replaced the participants' names with numbers to maintain the confidentiality and anonymity of the respondents in accordance with ethics (Addendum 4.1).

4.3.1 Biographical information of teachers

Table 4.1 presents the biographical information of teachers and includes information related to age, gender, qualification, teachers experience and vernacular language. Teachers involved in the study were from three schools situated in Shambyu circuit, Kavango Education region in Namibia. The researcher verbally obtained the biographical information during the focus group interviews (Addendum 4.1). All five participants' responses are included.

Table 4.1 Demographical information of teachers

Teacher	Age (years)	Gender	Qualification	Teaching experience (years)	Home language
1	38	Female	BETD+HED	15	Damara>Nama
2	28	Male	BETD+ACE	6	Rukwangali
3	31	Male	BETD+ACE	5	Thimbukushu
4	27	Male	BETD+ACE	5	Umbundu
5	33	Female	BETD	6	Oshindonga

The findings of Table 4.1 reveal that three participants were older than thirty while two teachers were from the age group that ranges between 25 and thirty. Four teachers had been in the profession for 5 - 6 years, while only one teacher had 15 years of teaching experience. Teachers were fairly well qualified and all had at least completed a Basic Education Teaching Diploma. Three teachers had improved their qualification for the teaching profession to an Advanced Certificate in Education. One of the teachers had completed a Higher Education Diploma. All teachers received training and are qualified to teach up to grade 12, except for one female teacher who is only qualified to teach grades

1-7. All participants were Mathematics teachers in Shambyu circuit, Kavango Education region in Namibia. The group was well represented gender-wise, three males and two female teachers. None of the teachers used their home language as the language of instruction at the school.

4.3.2 Biographical information of learners

In this section respondents reported on their gender, age and home language (Addendum 4.2). The biographical information that is presented in Tables 4.2 and 4.3 represents the verbal responses of the grades 7 and 9 learners from the selected school in the Kavango region. All the participants' responses are included.

Table 4.2 Demographical information of grade 7 learners

Grade 7 learners			
Learner	Gender	Age	Home language
1	Male	12	Rukwangali
2	Female	14	Rushambyu
3	Male	12	Oshindonga
4	Female	14	Nyemba
5	Female	16	Rukwangali
6	Male	16	Rushambyu

The total group of grade 7 participants comprised three males and three females. The researcher took the learners' Mathematics passing rates into consideration, and selected a female and male participant from each section. From the table it is clear that two of the six learners were older than the requisite age of 11 - 13 years, while two of the learners were 16 years old. This means that only two of the learners were in the age range of the requirement for grade 7. None of the learners speak the language of instruction used at the selected school.

Table 4.3 Demographical information of the grade 9 learners

Grade 9 learners			
Learner	Gender	Age	Home language
1	Female	16	Rukwangali
2	Female	17	Silozi
3	Female	18	Nyemba
4	Male	17	Rukwangali
5	Male	15	Nyemba
6	Male	17	Rumanyo

Six learners were selected from the grade 9 group. The total group of grade 9 participants were representative of three males and three female, paired in groups of two according to their pass rates. It is clear from Table 4.3 that of that five of the learners were older than the requisite age range of 14 to 15 for grade 9. While still in grade 9, four participants were older than 16 years. The oldest of the grade 9 learners was a female. Although the language of instruction at the school is Rumanyo,

majority of the learners do not use this as their home language. Only one male learner used Rumanyo as home language.

4.4 Pattern classification and findings

Each focus group interview was coded, co-coded and re-coded until the researcher was satisfied with the thematic analysis using Atlas.ti™ (§ 6.2.26). The concept used by the researcher to enhance the data analysis will be explained (Krippendorff, 1980; Muhr & Friese, 2004):

- *Hermeneutic Unit (HU)*: Primary documents are stored in HU by assigning text, audio, video or graphical material
- *Quotations*: Segments of the primary documents that are important to the user
- *Codes*: Codes are used to classify at different levels of abstraction in order to create sets of related info units for the purpose of comparison. A code is directly linked with quotations.
- *Categories*: Used to answer the question “why”, which can be seen as a thread throughout certain codes.
- *Network view*: A network view is a visual diagram that connects similar elements together with relation between codes and quotations.

Figure 4.1 displays the process of pattern seeking, theme identification and emergent categories.

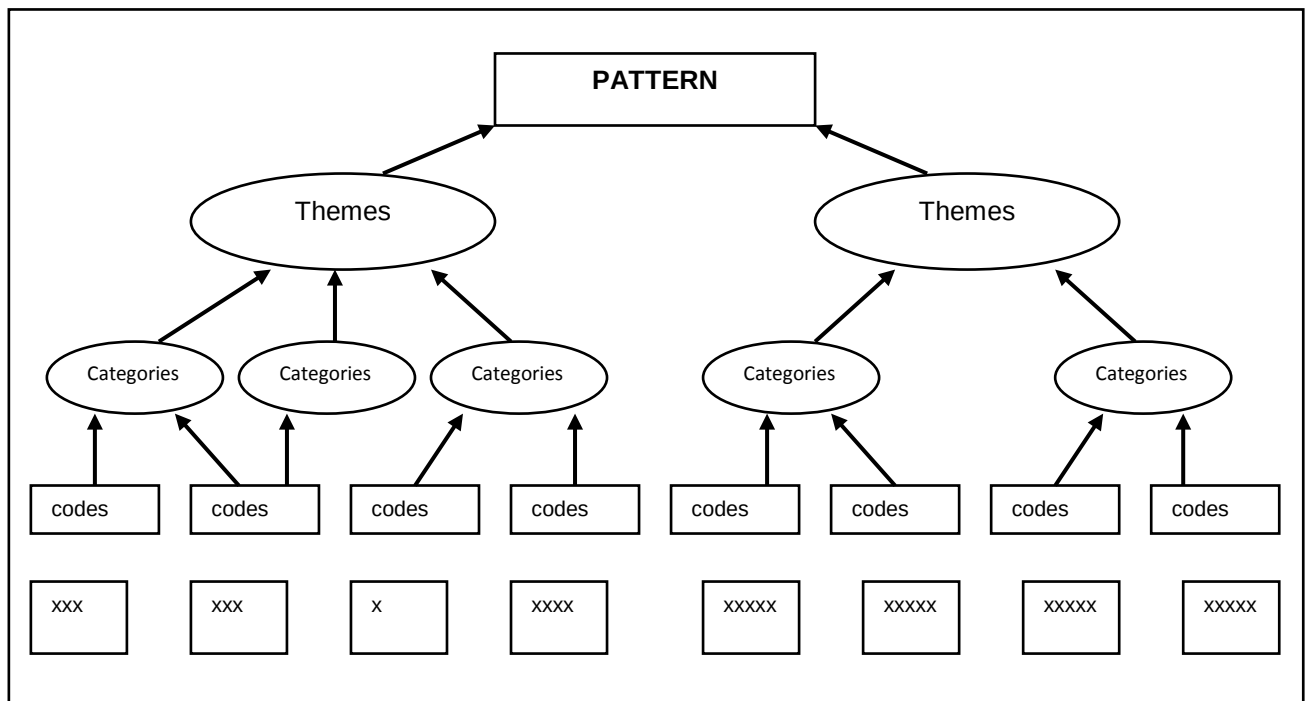


Figure 4.1 Building patterns of meaning (McMillan and Schumacher, 2001)

The researcher aimed to determine the attitudes of teachers and learners towards the new Mathematics promotion requirements in Shambyu circuit, Kavango Education region in Namibia since the implementation of in 2010. After structuring, coding and refining the data, six patterns and nine themes emerged from the data analysis. The Atlas.ti™ version 6.2.26 networks are presented in three subsidiary sections; (i) the attitudes of the Mathematics teachers, (ii) the attitudes of the grade 9 learners and (iii) the attitudes of the grade 7 learners. The themes identified for each of the sections present the results of the coding. To authenticate the themes the following technique was applied for each of these themes. The researcher tested themes against literature where the themes are positioned within the existing literature to either confirm or contradict the themes or identify as previously unrepresented in literature. The exploration of the themes addressed the main question of the study:

What are the attitudes of teachers and learners towards the implementation of the new 2010 Mathematics promotion requirements?

4.5 Attitudes of Mathematics teachers towards the implementation of the new promotion requirements

Figure 4.2 (Addendum 4.3) presents the attitudes of the Mathematics teachers in Namibia towards the new 2010 promotion requirement of grades 5 - 9. This analysis eventually led to the identification of two patterns, three themes and seventeen categories. Mathematics teachers' attitudes that were identified are grouped as: social aspects and new Mathematics promotion requirements.

Kennedy and Kennedy (1996) state that all professions are involved in some kind of change, even the teaching profession experiences change. Usually the education changes take place in the curriculum and have an effect on the education system. Change is a multifaceted and complex process with teachers' attitudes too influencing the changes. The attitudes of teachers are interconnected with their teaching approach, beliefs and motivation (Wentzel, 1998).

4.5.1 Pattern: Social aspects

Social aspects refer to practice that could change and have a specific effect on result of individuals schooling, knowledge, competencies, and beliefs (Pateman, 2002), demonstrating change that takes place in the understanding and experiences of the individual in social environment where they function. Social aspects include the social interaction between teachers and learners and between peers, and they relate to the policy makers (Reed et al., 2010).

4.5.1.1 Theme 1: Learners

Table 4.4 is representative of the structure of teachers' perceptions as they emerged from the data analysis (Figure 4.2)

Table 4.4 Structure of teachers' perception related to learners

Pattern	Social aspects	
Theme	LEARNERS	
Categories:	Perceptions towards Mathematics Involvement Practical application	Upper primary phase experiences Pass rates Language problems

Perception is a concept that indicates differences in the way an individual sees, senses and listens to information within the environment (Weiner, 1992). Individuals are responsive to their surroundings, inclusive of physical and social occurrences, according to Randel, Stevenson and Witruk (2000). One teacher indicated that the learners are more positive toward the subject after the implementation of the new promotion requirements:

Learners show positive attitudes towards the subject...It [new promotional requirements] will increase their understanding because if the things are difficult for them you spend more time on that topic until they understand and if they develop positive attitudes it will be easy for them to understand and if you complete your scheme of work on time then you got enough time for revision (P1: 66).

In contradiction with the above perception, one teacher was of the opinion that some learners in the Mathematics class are not positive especially if they are not equipped to cope with the subject matter:

For the teachers it [the new promotional requirements] is a big challenge because our learners have a negative attitude towards Mathematics, because they don't understand it. They don't know what the importance of Mathematics is. And when it comes to higher grades this subject become boring to them and that's why they don't like it. They hate it (P3: 33).

According to Astin (1984) learners who are involved in their own academic performance improve and they concentrate more on the subject, as opposed to uninvolved learners that neglect their studies. The practical application of Mathematics and the relation to the involvement of the learner in the subject is confirmed by Blum and Niss (1991). Teachers are positive that learners who are more aware of the practical application of the subject will be more concerned about their own academic performance. This may result in an attitude change towards the subject:

At least if they can picture that Mathematics is used everywhere then their attitudes will change as well as the interest of wanting to learn more will increase (P4: 85).

Teachers are expected to keep the learners interested in Mathematics. Teachers are of the opinion that learners whose interest is captured in the lower primary phase will continue to be positive about Mathematics as they progress to the upper primary phase, even up to the junior secondary phase:

The Mathematics lesson must be planned in such a way that learners have interest from the lower grades, than when they come at the upper primary and junior secondary they will still have their interest (P2:36).

The indigenous language of the learners is the key to their academic world; it is their way to expand the conceptual environment of the classroom. There is a relationship between the language spoken at home and educational attendance and attainment (Kasule & Mapolelo, 2005). Learners are not instructed in their home language in the Mathematics classroom, the language of instruction is Rumanyo. Only one of the learners in the focus group interviews speaks Rumanyo. Teachers are concerned about the effect of the language of instruction, especially as learners experience difficulty with problem solving. One teacher was particularly concerned:

Because they are having a problem with the language for when a learner needs to come up with problem solving (P1:22).

According to Smiths, Huisman and Kruijff (2009) the positive effects of home language instruction are stronger in rural areas, highlighting the potential of improvement of the situation of groups in more difficult conditions. Furthermore teaching and learning in the home language increases the self-esteem.

Some teachers label learners in Mathematics concerning their ability, prior knowledge and even their background. The assessment results indicate that there is a desperate need to change their teaching strategies; however teachers persist to teach Mathematic with prejudice:

We already know that Mathematics is a problem subject to a lot of learners and that is one of the subjects they perform the lowest in (P4:19)

4.5.1.2 Theme 2: Teachers

Theme two provides an overview of how teachers experience the implementation of the new Mathematics promotion requirements. Teachers are individuals that teach, one whose occupation is to instruct others (teacher (n.d.), 2012). A common topic that emerged from this sub-section was that PCK is considered to be crucial toward the attitude development. The researcher discussed the three

emerging categories in an attempt to establish teachers' perceptions and whether it has an effect on their subject knowledge (Table 4.5).

Table 4.5 **Structure of teachers' perception related to own attitudes**

Pattern	Social aspects
Theme	TEACHERS
Categories:	Knowledge about subject Teaching strategies Collaboration with others

To teach Mathematics effectively teachers should have a clear understanding of Mathematics themselves. A combination of Mathematics teaching strategies is imperative for effective teaching. There is a relationship between the pedagogical knowledge and content knowledge (Shulman, 1986). If learners do not attain the outcomes of the Mathematics curriculum teaching and learning will be unsuccessful. Participants suggest that Mathematic teachers are aware of the importance of subject knowledge:

As a [Mathematics] teacher you must show your interest as you go into a class, you must not go with doubts or give work that you also struggle with (P2:43).

You must be a mentor for them [learners] that when they see you then they will say "no, if teacher is doing it let me try also to do it". But if they see you are struggling then they will say "if the teacher is struggling, what will I as learner do?" So as a teacher you must coach the learners. When you are teaching, show them strategies on how to solve difficult things mentally and show the interest yourself, not like you are forced to do it (P3:44).

Teaching strategies differ from teacher to teacher as well as from subject to subject. Policy encourages teachers to use learner-centred teaching strategies as these supports and nurture the learners' critical thinking skills and Mathematical literacy. A participant explains that he is utilizing cooperative learning and group work during the teaching of Mathematics. He employs various learning strategies to create an atmosphere that is conducive for high-quality achievement:

I give them an activity to do and try to assist the ones that need my attention. Sometimes when I explain something on the chalk board - maybe the way I explained it is not clear to some of them, sometimes I used to call those ones identified as fast learners at least to help those ones that are slow. Maybe through learner to-learner [group work] maybe they will be able to cope or maybe the understanding will be a bit better. And sometimes it really helps (P2:28).

Teaching methods may include class participation, demonstration, recitation, memorization and a combination of the methods. As an alternative to teaching Mathematics as a basic pedagogic subject of facts, teachers mention that they approach Mathematics as a subject of creative teaching and learning methods. One teacher shared her way to explore creative ways. According to her problem solving can be addressed using a variety of songs and games:

I think that the syllabi must be changed to be much more impressive in such a way that songs, games and other funny things must be put into Mathematics so that when they [learners] come they gain that interest to solve Mathematical problems. That problem solving must be in form of a song or a game (P2:36).

Collaboration is defined as working together to achieve the same goal (Collins English Dictionary, 2012). Collaboration plays a vital role in education and especially when two or more teachers work

together to realize the same curriculum outcomes. It creates opportunities for teachers to explain complicated and complex sections of the curriculum to each other. Teachers report optimistic attitudes towards collaboration. This shows that they would not resist the idea of working in collaboration with their colleagues to share new teaching strategies and innovative ideas:

If I and my colleague teach the same subject we sit together or help each other to prepare or assist each other to teach the topics (P3:72.)

I think regular visits of teachers or where teachers come together on a regular basis and study question, exam papers question by question, where they discuss how questions are asked, because sometimes you come together for a short period - once per year to discuss the papers. Sometimes it is not good as the time is not sufficient to cover what needs to be discussed (P4:75).

Lafifi and Touil (2010) support these responses when they suggest that teachers who find it difficult to prepare their teaching content, especially in rural areas, can benefit from the advantages of collaborative efforts. Such efforts specifically aim to increase the success of members in their tasks.

4.5.2 Pattern: New Mathematics requirements

Educational policies include policy statements, procedural guidelines, principles to follow and practice which govern the educational decision-making and the implementation of the policy at grassroots (Smith, 2002). With this in mind the Ministry of Education launched the new promotion requirements of Mathematics to increase the Mathematical abilities of the learners and to develop the Namibian learners into a critical thinking youth. As a reform agenda the Education and Training Sector Improvement Programme is aligning the entire education system of Namibia toward the needs of the 21st century and with the Namibian Vision 2030.

4.5.2.1 Theme 1: Policy

Policy is typically defined as a principle or rule that guides decisions and achieves rational outcomes (Smith, 2002). In education like other organisations a policy is officially promulgated through officially written documents with the endorsement of the administrative authority. Policies include standard elements such as a purpose statement, scope, an effectual date and a responsibility section (Darling-Hammond, 1997). The researcher aims to examine the attitudes of teachers towards the implementation of the new Mathematics promotion requirements in 2010.

Table 4.6 Structure of teachers' perception related to new policy

Pattern	New Mathematics requirements		
Theme	POLICY		
Categories	Ministry of Education Requirements of MoE Involvement of MoE	Advantage of new policy Inclusive	Disadvantage of new policy Resources Challenges

* MoE (Ministry of Education)

Globally high performance standards are set in schools, including both teachers and learners in an attempt to improve the quality of Mathematics outcomes. According to Salhberg (2007a) education reform targets basic knowledge and skills necessary for learners to understand, write and read. Implementation of the new promotion requirements is constituent to education reform and is not negotiable. Teachers are confronted with the challenge to put the new promotion requirements into practice:

The Ministry set up a rule for both teachers and learners whether they like it or not. That is a very big, big challenge (P4:52).

Teachers, particularly those in rural areas, are in need of workshops, presented either by departmental or private originations to provide them with tools, training opportunities and resources to develop their teaching skills relevant to the implementation of the new promotion requirements. According to Speck and Knipe (2005) professional development in an education environment can be defined as opportunities to enhance pedagogical content knowledge, which can be attained through workshops organized by Ministries of Education:

I think every time the syllabi is released they always call the teachers for a workshop or they inform them about what methodology to use, what's the government require from us and what do we need to do to support the government (P2:70).

One participant responded negatively with regard to the support received from the Ministry of Education. This means that teachers expect the Ministry of Education and other education stakeholders to provide the learners with information about the opportunities available in Mathematics:

To make the learners like the subject then the Ministry also should also do something. They (Ministry) should provide materials for the learners to convince the learners that this subject is the most important subject or what is the importance of the subject? If you do Mathematics what can you do? What career is involved in Mathematics? (P3:33).

The recent teaching and learning policy implemented by Ministry of Education aims to ensure lifelong quality learning and basic education for all. By introducing Mathematics as compulsory subject from grades R to12 the Ministry of Education attempts to change Mathematics achievements. Teachers understand the policy but do foresee problems with the achievement of the learners:

The policy is clear. Its implementation sometimes become very tough where we already know that Mathematics is already a problem subject to a lot of learners that is one of the subject they perform the lowest, where most of the learners they end up performing with A's, B's in other subjects and it's a problem now with its implementation when you have to grade learners you want to promote learners. These learners will end up getting A's and Bs in other subjects and end up getting a D or an E for instance at the primary level in Mathematics than we will be able know that's why I am saying the implementation to grade them taking in consideration you already know the level of implementation for that learner. Now at the end of the day, in other subjects they will be performing well and they will be able to pass that grade or class will allow the learners to proceed. That's where this implementation I foresees a problem, because it will fail learner because Mathematics which we already know as a tough subject to them (P4:19).

It is important to know the disposition of learners, especially those who are below average, who needs additional attention, but it must be kept in mind that above average learners can often become uninterested, experience boredom, and dissatisfaction with school if less attention in class is received. With the education reform of Mathematics, the teacher is expected to challenge all learners to achieve

higher promotion marks. Teachers believe that learners who are average and above average as well as those who are slow are capable of improvement and achieve with the new promotion requirements:

I think it includes or accommodates even the slow ones. They did not only look on one side. For me it is a good thing because both the fast and slow learners are accommodated (P2:11).

In most classes, it is true that less focus is placed on the above average learner than on those that are slow learners (Newton, 2012). Above average learners must engage in higher-order thinking activities that involve doing things and thinking about what they are doing (Bonwell & Eison, 1991). Teachers feel that they are bounded by the new policy and they recognize that they have a motivational and educational task to endeavour to increase the interest of learners in the subject:

There is no way we can run away from it, because we have to try and accommodate these learners who cannot cope, those who never liked Mathematics before (P4:52).

The Ministry of Education started a textbook project acquisition cycle covering a five year period from 2006–2011, extended to 2012. The objective is one textbook for every learner in key subjects; English, Mathematics and Science. Given the serious lack of textbooks as well as supplementary teaching and learning material the development of locally-produced and innovative teaching resources has strongly been promoted by the Ministry (USAID, 2012). Some participants shared their innovative practice and provide meaningful suggestions on how to address the predicament regarding lack of teaching and learning materials:

Like the other time I asked them if you have a cake then somebody ask you "give me half most of them when they say give half you only break a piece, just a piece of cake and give to the friend. But they don't know that's fraction that we are talking about in the community. "Give me half" I told them, half means equal parts divided into two. That's what half means (P2:55).

Contrary to the above, one teacher showed concern and reported learners learn better when they become part of the subject. Her response may be an indication that she prefers to use available teaching and learning materials and prefers not to spend time to make new material to add to the interest of the learners:

They [learners] have got no materials to make it interesting. At the lower grades learners need to see and that arouse their interest. When they see and touch than the subject becomes interesting (P3:33).

4.5.3 Summary

Attitudes of the Mathematics teachers towards implementation of the new promotion requirements for grade 5 - 9 are summarised. The above mentioned information covers three identified themes; learners, teachers and policy.

- *Learners*

Teachers testify that their attitudes are interrelated to the Mathematics learners' attitudes. Some learners demonstrate positive attitudes. Learners with an awareness of the subject content knowledge and understanding of the practical application of the subject information can present either a positive or a negative attitude towards the new promotion requirements of Mathematics.

- *Teachers*

Raising interest and enthusiasm about the subject from lower primary level to upper primary level is viewed as an important aspect to establish the attitudes of the learners. Home language is also mentioned as a vital aspect to teaching and learning of Mathematics; the issues concur with literature that reports that learners' attendance is higher when there is home-language instruction and attendance is lower for groups specifically concentrated in rural areas (Smith et al., 2009). Teachers' perceptions about PCK play an integral part in their attitude towards the learners and teaching. Most teachers were of the opinion that collaboration with others enhance their PCK and improve their overall teaching abilities. Teachers acknowledge that their confidence and subject knowledge are significant and affect the quality of teaching. Many teachers complained about the attitude of non-interest demonstrated by Ministry of Education. Workshops, professional development courses and information distributed to learners on the subject of career opportunities can influence the attitudes of both teachers and learners.

- *Policy*

Teachers encounter many challenges to put new Mathematics promotion requirements into practice. Training is viewed as an important factor to equip teachers with ways to implement compulsory Mathematics for grades 5 - 9. The shortage of teaching and learning support, text books and other relevant resources contribute to teachers' attitudes toward the Ministry of Education becoming negative, especially in the rural areas.

4.6 Attitudes of grade 9 learners towards the implementation of the new Mathematics promotion requirements

Figure 4.3 (Addendum 4.4) presents the attitudes of the grade 9 learners towards the implementation of the new promotional requirements of grades 5 - 9. The analysis eventually led to the identification of two patterns, three themes and twenty-one categories. The grade 9 attitudes that were identified and grouped as: teacher and learner related and subject related.

4.6.1 Pattern: Teachers and learner related

According to previous studies each teacher can have at least one or two learners in the class who dislike the subject and should be prepared to deal with these learners effectively (Callahan, 1971). These learners should be handled cautiously. Learners with a dislike in Mathematics should be supported to change their attitudes, while learners who like Mathematics must be supported to keep a positive attitude.

4.6.1.1 Theme 1: Teachers

In Mathematics, problem solving may be a gauge of an individual's critical thinking (Peker, 2009). One of the main issues that cause fear is problem solving. Fear in the classroom impacts on the learners' affective learning, motivation and attitudes, and the likelihood of learners to ask the teacher for help is little (Wilson & Fernandez, 1993). Fear, unconstructive motivation and negative attitudes in the class, referring to the subject or the teacher, should be countered with innovative instructional methods that comprise methods to augment problem solving techniques (Peker, 2009). Many studies confirm that teacher conduct and teaching technique can influence the behaviour of learners, especially when confronted with boring lessons and indulgent discipline (Psunder, 2009).

Table 4.7 Structure of learners' perception related to teachers

Pattern	Teachers and learner related		
Themes:	TEACHER		
Categories	Fear Feeling towards teacher	Learner behaviour Attention in class	Teaching strategies Teacher training

According to Ashcraft (2002) fear of Mathematics causes anxiety which he defines as a feeling of tension or fear that interferes with Mathematics performance. He continues by saying Mathematics performances are poor because of the negative attitudes towards the subject and the fear of the teacher. The fact that learners do homework doesn't really mean that they understand the content, but they are merely afraid of the teacher and the punishment. Fennema (1995) maintains that teachers' personality and their behaviour are very important in formation of learners' attitudes towards the subject but also towards the class teacher. If learners fear the teacher they will have problems understanding the subject:

And sometimes I think it is good for the teacher to be rude all the time. Just to be serious that whenever she enters the class she is just rude or just to say harsh words to them. The learners will be scared of her whenever it will be her period than the learners will say "hummm, we have to do this work even if the learners were given homework to do they will be scared that: "This teacher if we don't do her homework she will come beat you or she will come tell you bad words". Then they will always pay attention and respect her. Then they will say "huuh, this teacher if you won't pay attention she will do this or this. They will be scared of her and do her homework (P1:46).

You will do that homework during first period, because you know that when that teacher will come he will beat you (P2:70.)

Vilija (1997) is of the opinion that one of the major aspects that help to create a pleasant atmosphere at schools is good relationships between teachers and the learners. The feelings that learners show towards the teacher will also be reflected by the learner's performance regarding the subject taught by that specific teacher. Learners who care for their teachers will enjoy the subject more:

If you hate the teacher that subject will also be difficult for you, because you will not listen when the teacher teach (P2:109).

Than what we use to think Aaah "this teacher hates us, Why is it always us who get 0 or 1 or 2 while others get higher marks?" I think there is no teacher who hates a learner and it was only us learners who did not pay attention when she was teaching. Sometimes she comes in and we just have in our mind that this teacher hates us, because we only used to get 0. We will do different subjects and not listening to what she teaches (P1:69).

Contradictory to the above one participant shared a positive experience:

Like me, I like our Mathematics teacher because she encourages us (P5:100).

Learners tend to misbehave in the class because they lack understanding of the rules and culture of the school as they come from divergent circumstances that make them behave differently (Ball & McDiarmid, 1990). It is evident that behaviour in the class can be associated with the learners' living environment, thus teachers in Shambyu circuit; Kavango Education region visit parents to be familiar with the learners' background and to have a better understanding of the learners' behaviour. Some learners might misbehave in class due to the need of being recognized by the teacher (Ball & McDiarmid, 1990). Therefore, what is essential in elementary school is gaining control over your own behaviour and learning to coordinate your behaviour with others. In support two participants react:

I don't like people who make jokes, because when we come here we come here and learn not just making jokes with the learners and waste maybe thirty minutes and only get ten minutes to teach. It's not good like that (P5:53).

Ja, because there are some learners who like asking just silly questions for pleasure sometimes it is not that you are going to ask a nice question, just when asking out of the topic (P1:58).

Teachers need content knowledge and should understand what they teach as well as become aware of their fears and biases so that they will be able to overcome them (Veal & MaKinster, 1999). Kim (1987) is of the opinion that teachers should encourage learners to ask questions and seek understanding by challenging themselves; they should explore the world's complexities and not always concentrate on academic achievements. Learners are aware of the teacher's lack of pedagogical content knowledge and report:

I will agree with you because if the teacher does not know learners won't understand (girls laughed) (P1:51).

And some of these things let me say you find that this teacher he's not good in maths, they just gave him a subject while he's not good at it they just gave him to operate that particular subject. But if you find a good teacher who went further study for that particular subject in that case you will see that Mathematics is easy because that's why we are saying some of us that Mathematics we don't understand that particular subject because of the teacher (P3:50).

Teaching should implement teaching methods which incite learners for learning (Vilija, 1997).

Teaching should be understood as supporting learner's pre-knowledge and not only delivering information, because the intention is to take the teaching and learning needs of the learners into

account when preparing for a lesson (Shulman, 1987). Teachers should manifest different teaching strategies that will encourage learners to think critically; these involve brainstorming, case studies, group work questioning, pair work debates and other methods that are applicable for a learner-centred approach. Teacher training is very important because it provides teachers with the greatest chances for success by providing knowledge, experiences and guidance to the learners (Geddis, 1993). The most important rationale for teacher training is to help prevent failure and promote success. The answers were vague and ambiguous as they explained:

I feel good because I see how the madam is answering questions and teaching, I am able to follow. The madam is teaching well and she explains well using more than one method. That's why I am saying it makes me feel good (P2:15).

But especially like those songs it will never help you when you just sing one song, unless you must sing all the topics for the learners to understand that this song you get some words in this song and you get some words in this song than it will help you. Not only one song from January to December only numbers. And in the examination you will not get only numbers, there's ratio, Algebra and all those than it will be a problem. You will only answer the question on numbers the rest you will leave because you don't know (P2:45).

I don't like it if a teacher is coming in the class and teaching without giving work. She has to leave work for learners for homework, class activity to see whether the learners understand or not. And she has to give them a test again to see if the learners understand the topic or not. If not they have to re-write the test again (P5:67).

4.6.1.2 Theme 2: Motivation

Motivation according to Schunk (2010) is an internal drive that activates and guides an individual to maintain certain behaviour which can be positive or negative. Research reported that the effort learners are prepared to put in when completing an activity is directly related to the success that they expect to achieve. Furthermore it determines the degree to which they value the activity and the success of the activity at hand (Green, 2002).

Table 4.8 Structure of learners' perceptions related to motivation

Pattern	Teachers and learner related		
Themes:	MOTIVATION		
Categories	Attitude about subject Opinion about ability	Attention towards peers Sharing ideas	Motivation New requirements

Naele (2005) states that attitudes towards Mathematics are motivated by beliefs of individuals and play a big role in the learning of Mathematics. Mathematics is "associated with expressions such as I Like/don't like Math followed by I can/ can't do it /It is easy/It is difficult/I hate Math" (Zan & Di Mortino, 2007). These attitudes are developed due to previous understanding of Mathematics at school, and it takes time for their mindset to re-organize as pointed out by learners:

...if you keep on saying this topic is difficult it will be like that until you die (P2:111).

One thing which makes us not to pass let me say for example last year I and my friends we used to dodge homework and tests we only used to get 0 and other low marks (P1:69).

Learners who are taught by applying meaningful learning teaching methods perform considerably

better and display more positive attitudes than those who are taught in the traditional teacher-learner centred method. This is an important finding because it confirms that teachers should help learners learn in a manner that would equip them with lifelong learning skills (Poblete & Diaz, 2007). Learners are not all alike; they see the world differently in a way that makes the most sense for their perceptions about what they think and how they define what is important, which leads to learners' natural learning styles. It is therefore vital for teachers to deliberately employ various methods to reach individuals, as the subject experiences of learners affect their beliefs about the subjects:

They gave you homework to go and do it at home. And you did not do it at home and in the morning when you just see that the next period will be Mathematics you borrow someone's book and then you copy someone's answers while you didn't know how that girl calculated the answers and now when she will mark you will get 100% than you think that you are bright or brilliant which is not true (P1:74).

Classroom environment is an important factor regarding learners' eagerness to engage in social activities, such as assisting their peers to avoid negative disciplinary actions (Dossey, 1992).

Therefore, learners display unselfish and helpful attitudes towards teachers who encourage them:

You can even get knowledge from the teacher some from your friend and some you just add your own knowledge (P2:70).

According to Caleb (1992), learning atmosphere in a classroom is enhanced when using groups. This will encourage learners' interaction with one another, and allow a group of learners to have good controlled discussions. When learners have better communication with their peers, it helps them learn to express and share their own ideas as well as accommodate and respect views of others at all times (South African Management and Development Institute (SAMDI), 2007). Learners should collaborate in the class as a team to assist each other in order to maintain good class room atmosphere which is conducive for teaching and learning for all the learners:

This is the problem which I am facing and I know how they will tell you something better that will help you to get better. I think that's how we can get help because if you just keep quiet it will just be like that (P1:95).

The learners are positive about the new promotion requirements as they are aware of the rationale thereof. The way learners think about Mathematics, is the way that they will perceive it. So, if learners do not limit themselves they can have high quality achievements, there is possibly a drive towards what is relevant to them and that will motivate them to achieve their goals:

Actually, I think there is no doubt for me to get a D. It will depend on my better understanding, because like now I've realized that I have to learn or study Mathematics like other subjects (P1:14).

The reason I said I will get an A, because I perform very well in the tests and I understand well when the teacher is teaching in the class (P6:24).

The Namibian government realized that education provision has to be revised to prepare school leavers. Therefore they carried out a curriculum assessment to provide them with extensive foundation skills, increase in resource allocation, upgrade teacher qualification and pedagogical competency as the curriculum recognized Mathematics as an essential learning area (NIED, 2009). Learners should realize the importance of Mathematics to help them become critical thinkers, scientifically and technologically literate to be part of a highly competitive international world:

And the other thing is that the disadvantage is that this rule if you fail Mathematics you repeat the whole

grade. I don't think it is a good rule because this teachers, the doctors, ministers who are sitting there in the past they used to pass other subjects but Mathematics they used to fail it but just to go and do those subjects they want. And now us some of them are not good in that subject. Some of them may not be good in Mathematics, but some they used to pass other subjects but Mathematics they used to fail it but they used to go to other grades just to go and do those subjects which they want (P1:94).

4.6.1.3 Theme 3: Academic achievement

Learners' engagement in the classroom is very important. Akey (2010) mentions in her report that learners have different ways of engaging themselves , therefore what learners believe and what they expect to succeed in is linked to their level of commitments. This means that learners who believe that they are academically incompetent tend to be anxious and fearful in the classroom and they easily lose focus which might lead them to failure.

Table 4.9 Structure of learners' perceptions related to academic achievement

Pattern	Subject related		
Themes:	ACADEMIC ACHIEVEMENT		
Categories	Language problems Level of understanding: *Calculator use *Lack of problem solving skills	Knowledge about subject Study methods	Job opportunities Importance of subject

Learners should be open to guidance and encouragement from their teachers whenever they experience problems or have difficulties to understand a specific content. Furthermore, Akey (2010) explains that understanding is crucial to learners' success, and it is concurred by Hancock and Betts (2000) that learners who learn more and enjoy learning activities show a level of understanding in Mathematics. It is not always possible for the learners to understand and they have to focus on what is said:

That means that you can do like that and also when you look at the board, just looking at the board straight after that you forget what the person was saying. At least look at the board and look at the person too and overcome your knowledge at one place just on the lips (P1:40).

Furthermore, language attitude is an important concept because it plays a key role in language learning and teaching (Kloosterman and Cougan, 1994). A negative attitude leads to problem with the comprehension of the language. The participants in this study are not taught in their home language and experience problems with understanding difficult concepts explained in English or any other language. The relationship between Mathematics and language is sufficient and run counter to the conventional wisdom on language in Mathematics teaching and learning in Southern Africa. Studies indicated that learners whose teachers make use of code-switching did worst than those whose teachers that consistently use one language – language of instruction (Fetler, 1989):

I think we have to understand English the way questions are asked and it's also a good idea that when the teacher is teaching you have to pay attention (P2:34).

David (2007) emphasizes that teachers should orientate learners to different techniques that will familiarize them with variety of Information and Communication Technology (ICT) tools available to them to solving problems in related to Mathematics. The use of technology and the introduction to a cooperative learning are both important areas. It is certain that the availability of calculators and computers will change the meaning of understanding. Furthermore, with new tools and the ever-changing teaching and learning environment, a teacher will have to deal with a variety of teaching methods and techniques that technology and environment provide (Poblete & Diaz, 2007). The handheld calculator changed the environment in which the Mathematics teacher and learners function. Waits and Demana (2000) explain that it takes experienced teachers to change the practice of learners:

I didn't understand how you are going to calculate these things, how do you study Mathematics; the teachers didn't use to tell me (P1:72).

There is no need to change thinking process that may result from calculator use. Learners' confidence is established by interaction with the ICT device. Literature states that changes in the Mathematics that we teach can sometimes be very disturbing to the novice user:

And also some of them [learners] they have calculators but they don't know how to use them. They only know maybe when it comes to plus, times, minus all those things and when it comes maybe squares, cubes or all those things on the calculator they might not know all those thing (P1:77).

It is better to know Mathematics because it will help you know how to count. Even if someone came to the shop to buy some food or buy something in the store you will not know how to use those computers because you don't know Mathematics (P5: 106).

Calculators reduce the drudgery of applying Mathematics procedures when those procedures are not focused on the lesson (Waits & Demana, 2000). Learners should practice different calculations on their own so that they get used to the different functions on the calculator to avoid disappointments during tests or examinations. Calculators changed the way we teach and the way learners learn:

So, okay well you can see the numbers on the calculator, how will you use your calculator will depend on you. You can have a calculator but you can fail. Better if you just pay attention to the teacher at least it will help you (P5:76).

And it is also a problem maybe you used to keep in your mind that I have a calculator than when it comes to a calculator you thought maybe you think they will only put maybe multiply, plus or whatever all those things (P4:78).

...if you don't have a calculator you can follow. And one thing we don't have to depend on a calculator, because some of the things you just need to know how the teacher does it (P5:100.)

Calculators help learners to see the value of Mathematics as they connect school Mathematics to the real-world phenomena around the learner (Wheatly, 1980). There is strong evidence in research to support the use of ICT devices in Mathematics classrooms. Hembree and Dessart (1992) conducted a meta-analysis of eighty-eight studies on the use of calculators in Mathematics teaching and learning and come to the conclusion that the use of calculators for instruction and testing enhances learning and the performance of skills, problem solving, and the attitudes of learners.

Mathematics helps learners to develop their critical thinking skills which can help them during decision making or when gathering information for their homework or project (Porter, 1989). Learners are encouraged to reason and develop new problem solving strategies when solving Mathematical problems because critical thinking is not only for class room use, but it will be used in their everyday life as well as in the workplace in the future (Yu & Yeung, 2003). Mathematics is regarded by most of the countries as a very important learning area due to the fact that it is applied almost in all working environments:

Is good (very loud), because if you get higher points it will help you hum...get a good job better than security. Is not bad is good. It is good because you will learn to count and get a job in the bank or in the shop to count the money even to help the children, even your own children (P3:22).

It's good to study not just to think I will get a job as a security or a cleaner. If one day you will have your own kids it will not be easy for you to take care of them, just struggling even if you want to go work no one will help you (P6:44).

Knowledge about Mathematics is critical because it influences the information that enters working memory (Duarte, 2007). Study methods cannot have effect in a vacuum; it depends on some background information about the different concept and themes in Mathematics that will trigger the learning processes (Kara, 2009):

As Mathematics is a difficult subject to study, Mathematics requires you to study in groups. Another way is to go through the examples given by the teacher when revising (P2:16).

Yaaa, there is a difference because for example like for last year I didn't know that you should study Mathematics like any other subject (laughs). That's why I used to fail, because I have realised that you study in groups or with a partner. I never knew how to study Mathematics and some topics I never knew. Because some topics yaa, you understand better but some of them you know, they are difficult (P1:23).

Mathematics is considered as a challenging subject globally and all learners are aware of the stance on the subject: The attitude of participants towards Mathematics understanding is influence by this outlook:

I never knew how to study Mathematics and some topics I never knew. Because some topics yaa, you understand better but some of them you know, they are difficult (P1:44).

Learners should be prepared for the world outside the boundaries of the school, as many of them would be looking for jobs to survive. The only way that young people can survive economically is to be self-confident and competitive. According to Kapenda (2012) inhabitants in rural Namibia do not focus on industrial development, they expect the government to provide them with the necessary resources and funds, consequently the rural areas are facing poverty. This is why learners try to improve their performance and maintain that with good achievements they can progress:

But me studying is important, because if you keep on failing your education will not go well. When you fail it will not help you find a nice job (P3:43).

It is better to get even security job at least you will get something for you to buy a bag of maize meal (P1:45).

The teaching methods applied must comply with the outcomes-based teaching and learning approach for the Ministry of Education which is a learner-centred teaching and learning approach aimed at enabling learners to be independent, self-regulated, reflective, proactive and critical thinkers through problem-solving activities (NIED, 2009). Karp (1980) writes that teachers with positive attitudes incorporate instructional materials and representations that provide learners with resources other than the teacher for self-instruction. She also mentions that teachers with positive attitudes toward Mathematics use instructional methods which encourage independence. This means that the learners will be exposed to various teaching strategies that will accommodate them in order for better teaching and learning to occur. Although provision of resources is one of the Ministry's targeted goals there are certain schools where basic infrastructure such as class rooms (permanent structure), desks, and chairs is lacking, therefore it becomes a great challenge to teachers to deliver quality education to the learner.

4.6.2 Summary

Attitudes of the Mathematics grade 9 learners towards implementation of the new promotion requirements for grades 5 - 9 are summarised. The above-mentioned information implies three identified themes: teachers, motivation and academic achievement.

- *Teachers*

Psychological aspects are viewed as important issues to establish positive or negative attitudes among learners regarding Mathematics performance. Presence of anxiety is mentioned as a major aspect of how learners feel and behave in the classroom. Anxiety towards Mathematics is a feeling of distress that learners often experience before tests and examinations. Keeping the new promotion requirements in mind the researcher concluded that anxiety and fear should be mentioned as vital aspects that implicate the development of attitudes. Compassion between teachers and learners provide for positive environment that increases the social skills and reduces poor behaviour of learners. Caring helps to better teachers and learners' attitudes, and increases the school attendance of learners from low socio-economic environments to better their education. In a society that is characterized by child abuse, poverty, teenage pregnancies, violence, crime, high drop-out numbers and substance abuse, families depend on teachers to act as secondary caretakers. Teachers' and learners' perceptions about the environment play a crucial part in the attitude towards the new promotion requirements. Some learners are of the opinion that teachers are not always committed and sure about how to best teach complex and sensitive issues in Mathematics.

- *Motivation*

Solving problems and creating integrated mind-sets about Mathematics and the new promotion requirements have a profound influence on understanding between teachers and learners. As many learners seek for meaning and purpose, the new promotion requirements are of extreme value as means for motivation. Motivation is more than an internal drive and it plays a part in

setting the tone for teaching the subject. Those learners who understand the rationale of the implementation of the new promotion requirements are positive; they recognize the reasons for change and illustrate a positive attitude toward these changes.

- *Academic achievement*

Raising an understanding of the teaching and learning environment is viewed as an option to raise keenness among learners on producing high-quality work and improving achievement. There are many challenges teachers encounter when academic achievement is addressed. A general rule implies that early academic achievement will enhance later academic achievement, leaving the teacher and the learner with a feeling of accomplishment. Although ICT devices have been utilized for many years, issues still occur with the application of the basic ICT device. Findings mentioned about calculators border on fear or dislike of technological devices. Most learners are of the opinion that the device is difficult to understand and to use, even for easy Mathematical procedures. Teaching and learning is viewed as an important aspect to prepare learners with skills to survive in a competitive working environment. Learners' attitudes are positive towards the new promotion requirements as these prepare them for greater goals.

4.7 Attitudes of grade 7 learners towards the implementation of the new promotion requirements

Figure 4.4 (Addendum 4.5) presents the attitudes of the grade 7 learners towards the implementation of the new promotion requirements of grades 5 - 9. The analysis eventually led to the identification of two patterns, three themes and eighteen categories. The grade 7 attitudes that were identified and grouped as: instructional experiences and future expectations.

4.7.1 Pattern: Instructional expectations

Expectation is a belief that you will achieve your goal, you anticipate that it will happen (Department of Education (NYC), 2011). Learners learn when they are involved in practice with their teacher and they participate in the teacher-guided practice. The act of practice is referred to as instruction (Dictionary.com, 2012); learners' expectation is thus to be engaged in Mathematics by the teacher throughout the lesson, and to gain necessary skills to cope with the subject matter on their own. Some of the learners possess knowledge, skills and motivation to be involved in learning and teachers are more dependent on content, clarity, nature and quality of their own instruction. Teachers and learners are driven by their own assumptions with regard to instructional expectations. The value of the subject and the worth in real-life situations has an effect on the learners' expectations.

4.7.1.1 Theme 1: Learners' beliefs

Kloosterman and Cougan (1994) state that Mathematics learners believing that answers are correct are mostly intrigued by the rule and not by the conceptual understanding needed for problem solving. Beliefs, a psychological state of mind, contribute to the effort that learners put into understanding. Learner beliefs furthermore contribute to the efforts that they put into learning. World-views of teachers and learners provide the framework to understand and define their lives. Beliefs in Mathematics can have a profound influence on the solving of problems, understanding the subject knowledge, searching for meaning, dealing with change and learning and open-mindedness (Maaß & Schlöglmann, 2009).

Table 4.10 Structure of learners' perception related to beliefs

Pattern	Instruction expectations
Themes:	LEARNERS BELIEFS
Categories	Opinion about subject Grading Favourite subject Application of knowledge Next grade Beliefs

Learners tend to make personal interpretations about their past successes and failures as they assist them in setting personal goals to avoid going beyond their abilities, because the internal feeling of attaining their goals is more powerful than being praised by the teacher or getting good grades (Tollefson, 2000). Learners' attitudes towards Mathematics play a very important role in their achievement; as a result learners become more motivated when they achieve goals that they set for themselves (Nordlander & Nordlander, 2009):

I feel good learning Mathematics because you learn how to calculate something that you don't know or maybe you are given homework for Mathematics you will learn and understand it. It is good (P6:99).

Only Mathematics it is very important for you to study hard Mathematics because it will help you (P3:104).

According to Bandura (1997), learners develop beliefs associating these to their previous success; as a result, when some learners do not perform well in Mathematics they may begin to believe that they do not have the skills or abilities to be successful and this will cause their performance to decline.

Learners who tend to be positive towards Mathematics believe that it will help them in the future:

For me it's better than last year because it is better to know that you will pass Mathematics (P2:77).

If you study only one subject and fail the others you will still fail. So, it's good to study all the subjects and pass them (P6:38)

Learners are aware that practice and hard work will help them to succeed in their school life; therefore they try to improve all the time in order to progress. Learners who believe that they have limited mathematical ability tend to be less motivated than learners who believe that ability can be increased and that they can get *smarter* by studying (Donaghue, 2003). One participant confirms that she enjoys challenges because they build self-confidence and enable you to overcome and apply these skills. It will become easier to overcome challenges and changes:

To me, it's better to study Mathematics, because if you keep on studying it won't be difficult for you. Just study hard. You will see yourself that no, the thing that used to be difficult, but later it will be easy (P3:34).

Learners' attitudes towards their own achievement, as well as family background, are crucial factors for understanding the importance positive achievement in Mathematics (Ball, Thames, & Phelps, 2008). It is important for learners to do well in Mathematics because it encourages them to go an extra mile and improve their situation. For one participant this means to be a key figure in the community being able to be of assistance to others:

It is good to learn Mathematics because if you don't know how to count you will give wrong change to the people and even if a person came to buy one sweet for one dollar, you will give change for ten dollars and you wasted money and your boss the person who employ you in his/her bar will think "eeeeeee" where did you use to put his money and the things which I used to buy is not enough. You use to eat or what? Ehhmmm, I don't know. Even if you don't use to eat his money you just use to give wrong change to the people and maybe the person who employed you will say the person used to eat money. It is not true. Maybe he will say come and let me or come and count and give me change for five dollar or seven or ten dollars. You will give a change for six dollars and it will make for you to lose your job and maybe you are paid better money by that person. Then he/she will say you don't know how to count, bring my money back. Even you if you didn't get paid he/she will ask you to pay back the money, maybe if you don ' t have the money which got lost in the bar or maybe you lost five hundred and you get paid two hundred , you cannot find money to pay back give back. Maybe you don't have family or you have but they are not working. Some they used to work but maybe they don't give so you won't be assisted (P3:101).

4.7.1.2 Theme 2: Mathematics instructions

During a good Mathematics lesson there should be ample opportunity for the learners to engage in critical thinking. Teaching practice promotes learners' achievements with the use of additional supportive techniques to reach objectives that develop Mathematics abilities of all involved. Modelling by the teacher is an element of good teaching because the approach towards Mathematics as well as

instructional strategies encourages learners to achieve better. Achievement in Mathematics depends on achieving the outcomes for each grade as stipulated in the policy, particularly knowledge and skills.

Table 4.11 Structure of learners' perception related to Mathematics instruction

Pattern	Instruction expectations		
Themes:	MATHEMATICS INSTRUCTION		
Categories:	Teaching strategies	Study method	Parental support
	Behaviour in class	Attention in class	Blaming teachers

Teaching Mathematics is not only about the PCK or enjoying the subject, but teachers should adopt strategies that will motivate learners to value the importance of applying the knowledge and the skills in real life situations (VandeWalle, 2003). Effective learning is the fruit of effective teaching, therefore factors such as class size, teachers' knowledge, qualification and teachers' training as well as other variables contribute greatly to learners' achievement in Mathematics (Adeeba & Naoreena, 2010). Although this participant is of the opinion that other learners are not confident and don not understand the teacher, this learner is confident:

Some learners used to say that teachers when our teacher used to teach we don't use to understand. She use just to sing , but people those who use to say that we don't understand, to me aaahaa, if you just listen while the teacher is teaching then you will understand everything the teacher is teaching. You will understand! (P3:36)

Bar-Tal and Guttman (2004) are of the opinion that teachers judge learners' poor achievement in schools as a result of lack of parental support in motivating them to do better in schoolwork. Instead of encouraging the learners to do better, some parents try to influence their children that teachers are not capable of teaching. Consequently learners tend to blame teachers when they fail or get low marks in tests or exams. Parents believe that learners' failure or success depend mostly on how effectively the teacher interacts with the learners (Latham, 2004). It is evident that instead of parents blaming teachers'-attitudes, the parents and others need to be informed about the learners' autonomy and responsibility to succeed:

They [parents] always blame the teacher but it is yourself who did not listen. You must take note and you must study every summary and not just say that aah, this summary I did not get time ,I did this and this and should study this subject aha, you must study so that everything is clear to you (P3:82).

Learners who are highly motivated to study Mathematics have a tendency to achieve as they have positive attitudes towards the subject and pay attention, ask questions as well as take responsibility to expand their Mathematics knowledge by doing extra activities (VandeWalle, Cron, & Slocum, 2001). Learners are therefore expected to pay attention when the teacher is teaching instead of making noise or engaging themselves in any disruptive behaviour. Comportment between learners restrains teaching and learning because of the manner in which they behave towards the teacher and each other. Learners need a favourable atmosphere for deep learning to occur. This is confirmed by some of the participants:

You also have to make sure that when the teacher is teaching you have to listen and not make noise (P4:35).

When the teacher was teaching you were playing... (P3:84).

4.7.2 Pattern: Future expectations

Catalano, Berglund, Ryan, Lonczak, and Hawkins (2004) describe future expectations as hope and optimism about possible outcomes, and identify expectations as an important element to attain positive outcomes. A learner's decision to accept a challenge will be influenced by his/her performance expectations and perceptions of what will happen if the outcomes are achieved. Future planning is associated with learner performance. Future expectations of the grade 7 Mathematics learners in this study are based on financial stability, jobs, careers and other related aspects.

4.7.2.1 Theme 1: Social environment

According to Barnett and Casper (2001, p. 1) social environment encompasses the “immediate physical surroundings, social relationships and cultural milieu within which the individual functions and interacts”. Historical social issues and power relations over time are dynamic characteristics within such an environment, and because of the dynamic nature can change over time. Therefore it can be assumed that the learners living within a specific social environment will respond in a certain way seen against constraints or advantages of their situation. The transition from the senior primary phase to senior secondary phase can be a difficult process for learners. This period of change is characterized by planning future goals and the discovering ways on how to achieve the objectives.

Table 4.12 Structure of the perceptions learners related to the environment

Pattern	Future expectations		
Themes:	SOCIAL ENVIRONMENT		
Categories:	Financial stability	Opinion about jobs	Career choices
	Jobs	Practical applications	Qualifications

Most of the learners reject the idea of ordinary careers. The grade 7 learners stress that everyone should do well in school to secure better careers. The competencies and skills attained at school will have an influence on the job prospects available:

It is good because you will learn to count and get a job in the bank or in the shop to count the money even to help the children, even your own (P3:22).

Participants indicate that they will be satisfied with jobs that will provide them with enough money to support a family; this implies that the learners are satisfied with jobs available in their environment. Learners' future aspirations are positively related to their Mathematics performance and the goals they set for themselves:

It's good to study not just to think I will get a job as a security or a cleaner. If one day you will have your own kids it will not be easy for you to take care of them, just struggling even if you want to go work no one will help you (P6:44).

Security, Security? I think it is good. Because if you have a lot of children you cannot be able to pay their school fees and buy food to bring in the house (P3:45).

You have your sisters and maybe brothers and they are still young. You want to drop school because of nothing. You want to go to and work at the farm. Your brothers and sisters will suffer even your mother also, because you are out of school you are just there in Otjiwarongo or Tsumeb just at the farms. You are not sending food or money at home you are just quiet there with your girlfriend sharing money and enjoying without sending money home. Even at the farm they might say this month you are not paying because you are not working. But it is true you are working, but they just don't have enough money to pay you. And you will suffer there hmm! You don't even have body oil (lotion) you just smell hmm...and you are even shame to come back to your own house (P3:73).

One participant indicates that only the wealthy will have opportunities without completing their schooling. The learners think that work is essential because it makes them feel successful, independent and responsible, and school is important to insure a good job. Learners from wealthy families do not feel that school is important:

The only thing that will help you if you are in a school. Some people they have their family like white people. They used to say that I don't have to study because my father bought me a car, I have my farm already. What will I do at school? And for us, you have your house there, your mother is not working and maybe your father died. You are just paying money from the Toyota (orphan grand) and you are just saying school is nothing (P3:71).

Almost all learners were able to identify manners/strategies to exploit the values of Mathematics. The participants classify keeping track of scores, working in a bank, giving correct money to customers and other detailed examples of applying a specific mathematical concept outside of school. Learners think that they will get a paid job and probably live independent. Learners are of the opinion that Mathematics will assist them to be successful when choosing a career as it is a very important subject in the curriculum:

No, just keep on doing your job because you deserve it. You are the one who did not study. People where telling you, teachers where telling you study but you didn't want you deserve it. You want to not be a security! (P3:56).

But me studying is important, because if you keep on failing your education will not go well. When you fail it will not help you find a nice job. You just find those stiekwerks [Piece-work]. If you are lucky you get security job. But then if you will get good marks, even a certificate will help you to get a job. You cannot just go and say I want to clean a road or become a cleaner in this hospital or school. You must at least have your certificate, but it's good to study not to say this subject is difficult I cannot study it. No, try...it's good for you to try, even to study. It will help you get a better job (P3:43).

According to Donahue, Perry, & Weinstein (2003), learners are more likely to drop-out when they are not motivated to study. This suggests that peers may indeed reject their fellow learners, particularly in economically disadvantaged groups. This may have a negative effect on the attitude of these learners as their expectations for success are diminished:

And you are maybe only having only a plastic (Laughs) for half of a bread bringing to the house. People will laugh those ones who used to work. They'll say he was our classmate now he is a security at the school. People will laugh and when you hear that people are laughing at you, some they used to say that they can laugh, me I have a work(P3:59).

4.7.3 Summary

Attitudes of the Mathematics grade 7 learners towards implementation of the new promotion requirements for grade 5 - 9 are summarised. The above- mentioned information implies three identified themes; learners' beliefs, Mathematics instruction and environment.

- *Learners' beliefs*

Learners signify that their attitudes are consistent with their beliefs about the value of Mathematics. Positive attitudes encourage learners to pass and achieve beyond the expected, learners are keen on studying to accomplish improved living. Mathematics is mentioned as a favourite subject and a vital aspect to teaching and learning; a possible indication of the learners' attitude towards the promotion requirements. Learners are of the opinion that they will find employment shortly after completing school.

- *Mathematics instruction*

Teaching and learning is viewed as an important issue to development of various critical thinking skills. Learners are positive towards the subject as they experience improvement in their capabilities as learners who want to be successful. Some learners are negative towards the school and education and regard it as a waste of time. Learners depend on the Mathematics instruction and promotion requirements to succeed in life.

- *Future expectations*

Raising concerns about security and job opportunities is mentioned as vital issues that determine the attitude of the learners. Competencies and skills are identified as promotion abilities. Most learners could associate better jobs with the new promotion requirements. Learners' feelings of indifference from families have a strong negative influence on the later achievement and expectations. Compulsory education is implemented to improve quality of education in Namibia at large, also preventing the high drop out of rural learners.

4.8 Conclusion

Chapter Four started with descriptive data analysis regarding participating teachers and learners. The focus of the study was to determine the attitudes of teachers and learners towards the implementation of new promotion requirements for grades 5 - 9. The data collected through qualitative focus group interviews were analysed and described. The results from the data were discussed according to three subsidiary sections:

- teachers' attitudes towards the implementation of the new promotion requirements of Mathematics
- grade 9 learners' attitudes towards the implementation of the new promotion requirements of Mathematics

- grade 7 learners' attitudes towards the implementation of the new promotion requirements of Mathematics.

Together the results from these three sub-sections provide the researcher with a deep and comprehensive understanding of the attitudes of teachers and learners towards the promotion requirements as experienced in Namibia. In Chapter Five the research will conclude with a summary and conclusion.

Chapter Five

Summary and Conclusion

5.1 Introduction

The teaching and learning of Mathematics are highlighted by challenges and complexities, particularly when the goal is to implement reform-orientated Mathematics pass rates. Within this challenge the teachers are pivotal to how the change is interpreted and acted out in the classroom. The nature of the thinking, beliefs, motivation and attitudes of Mathematics teachers and learners are directly related to successful Mathematics teaching and learning. If teachers hold beliefs, motivation and attitudes that are compatible to the new promotion requirements of grades 5 - 9 learners in Namibia, successful teaching and learning are more likely to occur. Responsibility for successful teaching and learning in the educational situation rests equally on the shoulders of teachers and learners. It is anticipated that education reform and policy changes will affect the teaching and learning culture of schools.

A qualitative case study obtained information from a particular school in a rural area in the Kavango region in Namibia. At this school, relevant information could be collected in a specific context from the teachers and learners regarding personal perspectives about the implementation of the new promotion requirements in Mathematics (§3.3.3). This chapter provides a summary of the study and the implications of the research are considered. Furthermore, conclusions and recommendations relevant to the purpose of the research are presented. Paragraph 5.2 offers an overview of the study. The key findings of the subsidiary sections are unpacked in paragraph 5.3. The emerging aspects are revealed in paragraph 5.4. Finally, in paragraph 5.5 some recommendations and limitations resultant are presented.

The question that guided this research was:

What are Namibian teachers' and learners' attitudes towards the new Mathematics promotion requirements for grades 5 - 9?

To answer the primary research question three subsidiary sections submerge and needed to be addressed:

- Findings related to the teachers' attitudes towards the implementation of the new promotion requirements of Mathematics
- Findings related to the grade 9 learner's' attitudes towards the implementation of the new promotion requirements of Mathematics
- Findings related to the grade 7 learners' attitudes towards the implementation of the new promotion requirements of Mathematics

5.2 Overview of the study

An overview of the chapters is provided.

5.2.1 Chapter One

The need to address the subject under discussion is motivated in Chapter One against the background of the current situation in the Namibian education. This Chapter presents the introduction to the study in which the background and primary problem are described. The results of recent SACMEQ projects are discussed and the TIMSS 2003 report are mentioned as potential motivation for the new Mathematics promotion requirements implemented in 2010 (§2.6). The Ministry of Education anticipates that the change in the Mathematics promotion requirements will encourage teachers and learners to work towards better results. The promotion requirements state that for a learner to be promoted to the next grade, learners in grades 5 - 7 should obtain at least a D-symbol and learners in grades 8 - 9 should obtain at least an E-symbol in Mathematics (§1.4.1). The importance of attitude in Mathematics education as well as the effect on teachers' and learners' teaching and learning is identified. The researcher provides background information to study (§1.2). The qualitative case study research design is identified as research approach. The outline of the study has been captured in the research aim: To determine the attitudes of teachers and learners in Shumbyu circuit, Kavango Education region in Namibia towards the new promotion requirements for grades 7 - 9.

5.2.2 Chapter Two

In Chapter Two literature pertaining the nature and philosophies of Mathematics are discussed briefly. This chapter unpacks the SACMEQ projects and particularly refers to Mathematics in Mauritius, Botswana, South Africa and Namibia, all Southern Africa countries that participated in the above-mentioned projects. The four countries selected are geographically close to each other although their history, economics and demographics differ (§ 2.5). A pertinent view of the SACMEQ project in Namibia provides the reader with knowledge about the stance of Mathematics and rationale for change in the promotion requirements for grades 7 - 9 (Table 2.2). Related concepts from the literature review were explored to provide a conceptual framework for this research (Figure 2.3). A systematic international and national literature review provided the researcher with integrated dimensions of attitude. The researcher explored factors which directly or indirectly influence teaching and learning in Mathematics in Namibia. The effects of relationship between beliefs, motivation and attitudes are discussed. Various challenges are emphasized that may affect the attitudes of teachers and learners towards the new promotion requirements in Namibia.

5.2.3 Chapter Three

Chapter Three reports in detail on the research design which was in the form of a qualitative case related to an interpretative design. Detail of the research methodology as well as the justification for using a qualitative case study can be found in Chapter Three. The case study provided information relating to exploring and describing teachers' and learners' attitudes towards the new Mathematics promotion requirements in Namibia. Data collection included three focus group interviews that were audio recorded and transcribed verbatim for data analysis. The transcriptions were analyzed by means of related codes, categories, themes and patterns. Ethical aspects were considered in each step to minimize the risk to participants. Although the researcher obtained rich in-depth descriptions the results of the investigation may be relevant only to the Shumbyu circuit, Kavango Education region in Namibia.

5.2.4 Chapter Four

Chapter Four presents the findings of the qualitative case study, which was designed to arrive at answers to the two subsidiary questions that evolve from the study. The data analysis commences with a biographical discussion of the teachers that teach 7 and 9 Mathematics (§4.3.1), the profiles of grade 7 learners (§4.3.2) and grade 9 learners (§4.3.3) are subsequently described. A computer-based qualitative data analysis procedure guided the researcher's selection of codes, categories, themes and patterns (Figure 4.1). After structuring, coding and refining the data, six patterns and nine themes emerged from the data analysis. The emergent categories and themes served as directive to account for the main research question. The information was carefully applied to compile networks that address supplementary sections of the data (§4.4). The Atlas.ti™6.2.26 networks are presented in three subsidiary sections; (i) the attitudes of the Mathematics teachers, (ii) the attitudes of the grade 9 learners and (iii) the attitudes of the grade 7 learners. The themes are discussed according to the sub sections that provide the researcher opportunity to discuss and explore the main aim of the research (§1.5). Aspects interrelated to the attitudes of the Namibian teachers and learners towards the new Mathematics promotion requirements for grades 5 - 7 are identified as complex. The complexity necessitates the discussion of the findings based on the emergent three networks that respectively associate with teachers, grade 9 learners and grade 7 learners in an attempt to unravel the primary research question of the study.

5.3 Key findings related to the subsidiary sections

Changing the promotion requirements for grades 5 - 9 to new promotion requirements was an immense endeavor by the Ministry of Education. This study explored what the attitudes of the teachers and learners are towards the new 2010 promotion requirements, in the Shumbyu circuit, Kavango Education region in Namibia. Findings regarding the edification towards attitudes of the

teachers and learners and the relationships that lead to positive and negative attitudes are in line with the literature (§2.12). Regarding the attitudes, three subsidiary sections emerged to address the aim of the study. In Figure 5.1 findings that originated from the data analysis are reported as convergent findings from the subsidiary sections. The convergent findings are in line with the categories, themes and patterns that emerged from the data analysis of the focus group interviews with Mathematics teachers, grade 7 learners and grade 9 learners. In this regard the findings and results are presented as strengths and weaknesses extracted from the attitudes identified from the three Atlas.tiTM networks.

Although teachers and both grades 7 and 9 learners reported many similar factors, a number of different factors emerged. Both groups reported positive and negative facts relevant to attitudes and the development of attitudes. Despite having several factors in common, they differ in the development of attitudes and how these are experienced. The findings will be discussed according to the strengths and the weaknesses that contribute toward attitude development (Figure 5.1).

Members of the Mathematics teachers group reported some strengths and weaknesses extracted from attitudes relevant to learners, themselves and the new promotional policy. Firstly the strengths are discussed. According to the Mathematic teachers (§4.5.1.1), learners reveal a positive attitude towards Mathematics as it is relevant for everyday and practical purposes. The teachers experience that learners are positive regarding the new promotion requirements, as they have prospects to achieve in Mathematics. The Mathematics teachers maintain that positive attitudes of the learners towards the new promotion requirements developed are interrelated to the teachers' attitudes. This illustrates that if the learners display a positive attitude the teachers will also be more positive, and if teachers are positive learners will display more positive attitudes. The teachers further state that the collaboration motivates them. The teachers meet with their colleagues and discuss the problems experience that relate to the new promotion requirements policy. PCK strategies are deliberated on and they support each other with preparation, discussion of examination papers, discussion of memorandums, and share general subject matter ideas (§4.5.1.2). Despite having inadequate support material supplied by the Ministry of Education, the teachers stay focused and positive, they create their own material to support the Mathematics teaching and learning.

Secondly, the weaknesses as extracted from the findings are unpacked in this section. Poor language proficiency leads to poor achievement which in turn can lead to teachers and learners with negative attitudes towards the subject (§4.5.1.1). Teachers reported that they label learners in advance and are aware that the labelling changes learners' attitudes from positive to negative. As result of the labelling learners may be negative towards the new promotion requirements. The fact that teachers receive insufficient teaching materials, up-grading or re-training workshops driven by the Ministry of Education or other stakeholders, may lead to teachers developing a negative attitude toward the implementation of the new promotion requirements (§4.5.1.2). There is a lack of self-confidence when dealing with the new promotion requirements without firm support systems in place. With regard to the implementation of the policy teachers demonstrate negative attitudes as they lack content knowledge and required teaching strategies as well as skills to adhere to the requirements specified by the policy (§4.5.2.1). Teachers generally feel that the implementation might look good on paper, but its real implementation is questionable as teachers and learners struggle to recognize the rationale behind the reform, they are uncertain about consequences of the new Mathematics promotion requirements . Teachers and learners are unable to cope with the new promotion requirements and therefore have to approach Mathematics from another perspective.

Findings amongst learners lead to the identification of strengths extracted from attitudes as indicated by learners during the focus group interviews. Learners are of the opinion that positive attitudes are established if teachers are caring and interested in their performance in Mathematics; this improves both teachers' and learners' attitude towards the new requirement (§4.6.1). The outcomes of positive attitudes are associated with feelings of accomplishment, application of the subject in everyday life and the preparation towards greater goals (§4.6.1.2). All learners have skills to do Mathematics; if they are made aware of their natural skills regarding the subject and towards learning, it will provide them with positive attitudes and feelings of accomplishment (§4.6.1.2). Learners are positive towards skills development to use calculators for Mathematics calculations but only a few of the learners can afford to purchase a calculator (§4.6.1.3).

The weaknesses as extracted from the attitudes are reported. Resulting from the grade 9 learner responses to the unstructured questions during the focus group interview the following information was captured. Learners experience negative attitudes in the Mathematics classroom like anxiety and fear toward the teachers, who are very strict and make use of corporal punishment. Learners' negative attitude towards the subject will affect their attitude towards Mathematics in general (§4.6.1.1). Teachers are uncertain and insecure when teaching Mathematics and sometimes struggle to answer the learner's questions (§4.6.1.3). The lack of knowledge is easily detected by the learners, and they lose interest in the subject; subsequently the learner will not care about the new promotion requirements. For the teacher to develop Mathematics skills, it is also required that he/she must identify natural skills to expand upon (§4.6.1.3). Furthermore learners do not recognize the value of the new promotion requirements and display a negative attitude towards the policy. It is expected from the teacher to explain the rationale for the change in the policy but even they are uncertain about the motivation thereof. Negative attitudes develop when the learners struggle to understand the work explained in Mathematics (§4.6.1.3). Regarding the use of ICT, it was revealed the learners do not know how to use calculators in Mathematics. Most learners display negative attitudes toward the use of the ICTs in Mathematics and this is portrayed in the negative attitude displayed towards the subject.

According to strengths extracted from the attitudes as clarified by grade 7 learners, teachers aim to develop the learners critical thinking skills (§4.7.1.2). This provides an interrelated positive attitude pertaining to teachers, learners and Mathematics. Teachers are considered role models at school and are respected; they therefore are in a position to change learners' attitudes from negative to positive, especially if they are confident themselves. Making Mathematics a pleasurable subject can change negative attitudes into positive attitudes. The teachers and the learners should enjoy teaching and learning of Mathematics. Positive beliefs about Mathematics due to previous accomplishments, offer teachers and learners opportunities to use to their advantage, presenting conditions that increase their positive feelings (§4.7.1.1).

The responses of the participants about future expectations can be illustrated as economic related issues. Learners are positive about the new promotion requirements as these provide them with critical thinking skills (§4.7.1.2). Learners experience the new promotion requirements as an opportunity to succeed in life, something which will provide improved career opportunities (§4.7.2.1). Learners are highly motivated to pay attention to the teacher. They are positive about the fact that, should they achieve high quality results, they will avoid engaging in descriptive behaviour. They display positive attitudes as the new promotion requirements offer opportunities to increase the level of education and passing rates (§4.7.1.1).

Learners reported that parents' attitudes vary. This implies that the learners sometimes experience positive and sometimes negative attitudes towards Mathematics. It seems that the new promotion requirements have no effect on parents' attitudes towards the subject (§4.7.1.2). Learners believe that if the Ministry of Education provides parents with workshops informing them about the value of Mathematics in everyday situations the parents will discover that Mathematics is for every individual. Learners expect the teachers to adopt teaching strategies that will motivate learners to study (§4.7.1.2). Furthermore, learners want teachers to explain the work well in class. If the teachers and the learners are negative towards the classroom management if no effective teaching and learning take place. Learners need to be informed about future possibilities using Mathematics (§4.7.2). Learners experience negative attitudes if they do not know what the aim with the new promotion requirement is and what opportunities are involved (§4.7.1.1). The learners want their teachers to be knowledgeable, be familiar with the subject and make Mathematics pleasant to become skilled at.

5.4 Emergent aspects from the study

In having gravitated within this study to question how the Namibian teachers' and learners' attitudes towards the new Mathematics promotion requirements for grades 5 - 9 was conceptualized, the researcher found evidence that teachers and learners show positive and negative attitudes towards the Mathematics and therefore it affect their attitudes towards the new promotion requirements.

A disturbing concern is that the negative attitudes of teachers and learners cannot be wished away at present. Findings of this study affirm what was expected from literature: attitudes of teachers and learners are interrelated and this affects the teaching of Mathematics in a positive or negative manner. This has implications for classroom interaction between the teacher and the learners, the learners and the learners as well as the interrelation between the aspects mentioned and Mathematics. Learners can identify when teachers lack confidence to teach and answer questions relating to Mathematical theory and interconnected concepts.

This research has meaningful implications for Ministry of Education, school managers, teachers and learners in the sense that it provides useful information on the implementation of the change in

policies and promotion requirements and the manner in which the teachers and learners experience these (Figure 2.2). Statements made by the participants that need further attention are in relation to the qualifications and PCK of the teachers, as grades 9 and 7 learners respond that teachers cannot always answer their Mathematics questions and redirect them.

5.5 Recommendations and limitations

All countries experience education reform at some time or another. Thus there are lessons to be learnt from these policy changes in other countries which can be of value to Ministries of Education. Qualitative research data provided present Mathematics teachers and learners directly involved in such policy changes the opportunity to air their thoughts about their attitudes towards implementation of policy like new promotion requirements. These studies can prove to be of immense value to Ministries of Education on how to approach policy changes.

English is not the home language of the interviewer, teachers or learners, and sometimes they did not understand the questions. They then responded in ways which they were not asked to, evading the focus of the question. This study also implicitly raises the question of what can be done to ensure that teachers and learners are part of the education reform strategy or change in policy decision making. It is vital for teachers and learners to recognize the reasons for the change and how transformation like education reform and policy changes affect promotion in subjects.

The researcher needs to reiterate two constraints on the generalization of the results. Firstly, the study was based on a small group of learners and teachers from a single rural school in Namibia. The research focused on participants in a rural area and the views are only related to this group of teachers and learners. These learners were directly involved in the change of the promotion requirements for Mathematics. Most of the learners were from diverse cultural backgrounds and hail from middle to lower socio economic status. Thus it would not be appropriate to assume that the findings would be the same with other populations in other school settings.

5.6 Suggestions for further research

In regard to the contributions towards implementation of new promotion requirements in Namibia for grades 4 - 9, certain aspects require further research:

- Urban schools should also be involved in research, so as to develop a more comprehensive representation of the state of affairs in Namibia with regard to the implementation of the new promotion requirements for Mathematics.

- The status with regard to teachers' qualifications and skills to implement the new promotion requirements for Mathematics in rural and urban areas needs to be carefully investigated.

5.7 Conclusion

The study was an interpretative study performed at a combined rural school in the North-Eastern part of the Kavango district in Namibia. The research provided information on the strengths and weaknesses as extracted from the attitudes of Mathematics teachers as well as grades 9 and 7 learners. The study provides authentic convergent findings that address the implementation of the new Mathematics promotion requirements (Figure 5.1). The major observations are firstly that teachers' and learners' attitudes are interrelated and affect the implementation of new promotion requirements of Mathematics in a positive or negative manner. Secondly, that support during education reform from Ministry of Education relates to the attitudes teachers and learners in Mathematics. After finding that learners' and teachers' attitudes affect the implementation of new promotion requirements this study recommends that the Ministry of Education takes cognisance of teacher's views before policy changes are formulated and implemented. This research may be used to examine whether the effects on the change in promotion requirements can be observed in other schools.

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ADDENDUM 3.1

Focus group interview schedule

TEACHERS

Interview duration: 30 -60 min

Interview method: Semi-structured interview

Focus question: To determine how the 2010 promotion requirements of Mathematics influence teachers' and learners' attitudes towards effective teaching and learning of Mathematics

Response mode: Recorded by interviewer (Audio-tape)

Introduction to participants:

The purpose of this short interaction is to collect information on your views on the implementation of the 2010 mathematics requirements (new) .This interview will last approximately 30 min. You may ask questions of clarity or raise concerns during the course of this interaction, you are most welcome to do so, feel relaxed. The aim of this interaction is to understand your perceptions and attitudes on the subject under discussion.

Questions to guide the interview

1. How do the new mathematics promotion requirements for grade 5-9 compare with the previous promotion requirements?.
2. The implementation of the new mathematics promotion requirements contribute towards better mathematic results in grade 5-9. How do you experience this in your specific grade?
3. Why do you think the government introduced the new requirements for mathematics?
4. How do you understanding the implementation of the new mathematics promotion requirements for grade 5-9?
5. Do the new promotion requirements change mathematics learning and teaching in grade 5-9? Refer to your own motivation towards this change.
6. How did the Government involved teachers in implementation of the new promotion requirements?
7. Should the Government monitor the implementation of the requirements?
8. 2010 was the first year of implementation of the new promotion requirements. How did you cope?
10. Explain the learners attitude towards the new mathematics requirements.

ADDENDUM 3.2

Focus group interview schedule

LEARNERS

Grades 7 and 9

Interview duration: 15 -60 min

Interview method: Semi-structured interview

Focus question: To determine how the 2010 promotion requirements of Mathematics influence teachers' and learners' attitudes towards effective teaching and learning of Mathematics

Response mode: Recorded by interviewer (Audio-tape)

Introduction to participants:

The purpose of this short interaction is to collect information on your views on the implementation of the 2010 mathematics requirements (new) .This interview will last approximately 30 min. You may ask questions of clarity or raise concerns during the course of this interaction, you are most welcome to do so, feel relaxed. The aim of this interaction is to understand your perceptions and attitudes on the subject under discussion.

Questions to guide the interview:

1. In 2010 the mathematics requirement for promotion changed. What can you tell me about this change? (What do you know about the change?)
2. Does the teacher expect more of you since the new Mathematics promotion requirements were implemented?
3. How do you experience the implementation of the new Mathematics requirements? (and amongst your classmates?)?
4. What can you do to improve your mathematics symbol to be promoted to the next grade? (Do you need to do something?)
5. Why do you as grade x learners think the promotion requirements for Mathematics changed?
- 6.. Explain if the new Mathematics promotion requirement changed the way you feel towards Mathematics (and how do you in general feel about Mathematics)?
7. What can you tell me about the way your teacher teaches Mathematics

Focus group Namibia Teachers

27.03.2012

The group consisted of five Mathematics teachers, the 6th one didn't make it and apologised for any inconveniences caused. There were two female teachers and three male teachers from combined schools and senior secondary within the neighbourhood of the schools surrounding. One of the teachers was quiet the whole session; she didn't say a single word or comment anything.

Researcher: Good afternoon colleagues!

Teachers: Good afternoon.

Researcher: Thanks for your time. The main purpose of this short interaction is to share ideas and opinions regarding the newly implemented Mathematics policy for grade 5 -9. So you are welcome to give your opinions and to ask for clarity for you or to ask questions. Just feel free to share so that we can all learn from each other. So the main, main purpose is for me to find out about your views, your opinions, and your attitudes towards the newly implemented Mathematics requirement. So to start off I would like to find out about your opinions of the new Mathematics requirements for grade 5 -9.

Teacher2: Aaa, I think it is a good thing, because you see on the policy when it was implemented grade 5 – 7 learners will start with a D-grade and for grade 8 – 9 they will start with an E grade. I think it includes or accommodates even the slow ones. They did not only look on one side. For me it is a good thing because both the fast and slow learners are accommodated.

Teacher1: Everything has advantages and disadvantages. The advantage of this policy is it accommodates the slow and the fast learners, but then how I view it, I will talk specifically on the grade 5 – 7 learners. The, grade 5 they struggle catching up. We know our learners when they come to upper primary some are trying, some we need to pull them along. But now why I say it is really not good because the fast learners they tend to relax because we usually get better grades from our learners but now since this policy was introduced they became aware that I can even get a D-grade and I can still pass. They tend to relax, because they just aim for D- grade and definitely they become lazy.

Teacher5: From my own view I will try to break the policy into two. From grade 5 – 7 I think it is a good thing, the policy itself is excellent. I like the policy. I believe each and every individual on the universe they encounter Mathematics. Mathematics is part of life and each person experiences it. Taking that grading of the D, changing it to E there is a room for everyone to cope but the junior level grade 8 through 9 I think somehow there I foresee some problems where if we talk of Namibia it is better to identify learners who can proceed with Mathematics rather than getting an E in Mathematics. That will force them (learners) to remain in the same grade until they have reached a certain level. That's where I am seeing there is a hole somewhere that will be able to bring problems to others who are unable to cope. Although they have the basic in Mathematics doesn't mean they can pass the subject.

Researcher: Alright.

Researcher: Okay.

Teacher3: With me I will say there is no way a learner pass Mathematics at upper primary and fail at junior secondary, because those are the people who have difficulties. The grade at 5 – 7 is D and as you go to 8 and 9 the symbol comes down to E again. In grade 8 – 9 at least a C that's where we will see changes. We want learners to study hard in Mathematics that's why we should force learners to study hard from grade 5 – 7 and when they reach grade 8 we should also apply even harder and not to relax again.

Researcher: Okay. Alright, is the maybe looking at the implementation itself, do you experience any problems to use it at school especially at your school?

Teacher4: Yes, I see some problems although the policy is there. The policy is clear. It's implementation sometimes become very tough where we already know that Mathematics is already a problem subject to a lot of learners that is one of the subject they perform the lowest, where most of the learners they end up performing with As, B's in other subjects and it's a problem now with its implementation when you have to grade learners you want to promote learners. These learners will end up getting A's and Bs in other subjects and end up getting a D or an E for instance at the primary level in Mathematics than we will be able know that's why I am saying the implementation to grade them taking in consideration you already know the level of implementation for that learner. Now at the end of the day, in other subjects they will be performing well and they will be able to pass that grade or class will allow the learners to proceed. That's where this implementation I for see a problem, because it will fail learner because Mathematics which we already know as a tough subject to them.

Researcher: Alright.

Teacher1: Just to add to what my colleagues said. It's really difficult teaching these learners especially the Grade 5's. Because they are having a problem with the language for example like in the example a learner need to come up with problem solving. What do I do? Which operation sign should I use? Should I multiply? Should I add, should I divide and other problems. The problem is the language that they do not understand. At the end of the day we work with scheme of works which need to be completed for every term. It will be difficult for you to cover what you were supposing to because the learners are very slow especially in the first term.

Researcher: Okay, looking at those problems now how do you try to manage keeping the policy in mind but you still need to do a lot of things for you to complete the syllabus. With all those problems now how do you manage?

Teacher1: At least by now every teacher they know his or her learner who is slow and so forth. What I do every time I give an activity to the learners you can give all of them an activity at the same time, but than others will finish on time. So what I do is the ones that I see as they have mastered the work I give them so

Researcher: Okay!

Teacher2: Me what I normally used to do is I give them an activity to do and try to assist the ones that need my attention. Some times when I explain something on the chalk board may be the way I explained it is not clear to some of them, sometimes I used to call those ones identified as fast learners at least to help those ones that are slow. Maybe through learner - to - learner maybe they will be able to cope or maybe the understanding will be a bit better. And sometimes it really helps.

Researcher: Okay!

Researcher: So, with all those problems experienced but still the Ministry want you to take the responsibility to assist learners so that they can change their attitudes towards the subject. What do you think about that? So the

ministry wants you to make learners change the attitudes towards the subject, how do you see it?

Teacher4: I think if the ministry is insisting on it they saw something good in it, although we come and experience problems. I think the only thing that I think is there is also attached is that most of the learners started developing attitudes on Mathematics at times the effects is that the base there where the education itself starts: Pre-primary or lower primary through upper primary. I think also the learners to come out to be good in Mathematics as early as grade 5 – 7 it will be good. We should also try to collaborate with teachers at lower primary. To be able to pursue, the pushing of learners liking Mathematics should start from down there, then it will be better when they will come at upper primary they are already aware of the importance of the subject at an early stage.

Teacher3: For the teachers it is a big challenge because our learners have a negative attitude towards Mathematics, because they don't understand it. They don't know what the importance of Mathematics is and when it comes at higher grades this subject become boring to them that's why they don't like it. They hate it. They have got no materials to make it interesting. At the lower grades learners need to see and that arouse their interest. When they see and touch than the subject becomes interesting. To make the learners like the subject then the ministry also should also do something. They (the ministry) should provide materials for the learners to convince the learners that this subject is the most important subject or what is the importance of the subject? If you do mathematics what can you do? What career is involved in mathematics?

Researcher: Okay.

Teacher2: Just to add on what the other colleagues have said, so for the learners to develop the interest in the subject it must start from the lower grades. So you find out from the lower grades learners they like English because they sing, they do games, and because the syllabi it goes hand in hand so that learners must have that interest. I think that the syllabi must be changed to be much more impressive in such a way that songs, games and other funny things must be put into Mathematics so that when they come they gain that interest to solve Mathematical problems. Those problem solving must be in form of a song or a game. It must be planned in such a way that learners have hmmm, let's imitate from the lower grades than when they come at the upper primary and junior secondary they will still have their interest. Because most of the activities will be done through the song and they will know it like the way they know these other things as they started early.

Researcher: Okay.

Teacher4: Maybe to come in again, I think the whole education thing, learners learn more of things that they are able to see. In Mathematics that's a big challenge when they are talking about X, they are talking about Y (laughs); talking about A they are bringing it in Mathematics. At least they know in English that a letter I use to write letter "A" for the word "Apple". Now you are telling me $2+a=5$. So it becomes a big challenge because they cannot see any link between the number and the letter that is given so that is what gives a big problem to the learners to be able to master the content. I think the syllabi as others have said it should be more of things that they can be able to see. Trying to put practical into Mathematics rather than trying to study numbers in general, but trying to put it with numbers that have meaning in other subjects.

Researcher: Alright, interesting!

Researcher: All those challenges, how do you try to change the learners, especially at the school? How do you try to encourage them so that they can at least try to like the subject?

Teacher2: Okay, as a teacher yourself must show your interest yourself as you go in a class you must not go with doubts or give work but you also struggle then you ask “can you press on your calculator Maria”. “Press on the calculator so that you can give the answer”. When you go there you must even show methods that even learners use this method they don’t need to use calculator. You make them to see that Mathematics is one of the easiest subjects. So when you are teaching yourself not like you are struggling. You must be a mentor for them that when they see you then they will say “no, if teacher is doing it let me try also and do it”. But if they see you are struggling then they will say “what more if the teacher is struggling, what will me as a learner, what will I do?” So as a teacher you must coach the learners. When you are teaching, show them strategies on how to solve difficult things mentally and show the interest yourself, not like you are forced to do it.

Researcher: Good!

Teacher4: Could you please repeat the question again? I have forgotten the question, what was it again?

Researcher: It’s like the challenges that you are facing?

Teacher4: Ooohoo! Okay the challenges. Only that!

Researcher: Muummmm..

Teache4: I think there are a lot of challenges. The Ministry set up a rule for both teachers and learners whether they like it or not. That is a very big, big challenge. There is no way we can run away from it, because we have to try and accommodate these learners who cannot cope, those who never liked Mathematics before. So it is a very big challenge. So as teachers we should try do thorough preparation and also trying as a teacher to be creative. Try to make learners see that Mathematics is what they are living out of, that Mathematics is what we see everyday bringing the outside situation into the classroom. It will help learners to realise that we must study hard otherwise we will fail. It will be better if learners will know themselves that “Aaaahaa, Mathematics is this way or that way then they will study hard because they have realised themselves that it is important.

Researcher: Alright.

Teacher2: Just to add on that one. For at least as a teacher when you are teaching Mathematics if you know that the topic that I am going to teach tomorrow is fractions you must consult other teachers to assist you and ask them where fraction is used in the community. Because learners must not see that Mathematics is only a subject in the classroom. So learners must not remain that fractions is only not a thing that to see we use in the class, but a teacher at least you must bring things like things happening in the community where people are using fractions in the community. Then that helps. Like for my learners they think Mathematics and fractions is only used in the classroom. Like the other time I asked them if you have a cake then somebody ask you “give me half most of them when they say give half you only break a piece, just a piece of cake and give to the friend. But they don’t know that’s fraction that we are talking about in the community. “Give me half” I told them, half means equal parts divided into two. That’s what half means. Now they see that some of them when they go into the community and parents will ask them they will be able to explain something, because fractions is also used in the community. It is good to bring reality things into the class so that it helps learners develop interest towards the subject.

Researcher: Alright, hmmm you are talking of grade 5 – 7 getting a D-symbol. What are the advantages there for the learners to obtain a D in grade 5 - 7?

Teacher1: I think the only advantage is maybe that all learners will be able to pass because the grading is lower. There is such a big chance that most of the learners will pass Mathematics.

Researcher: Okay.

Teacher4: I think also that the learners are also made aware of the importance of the subject as introduced starting at lower grades from 5 – 7. That's low enough for each learner to be promoted to the next grade so that the learners can also see that if I don't do well in Mathematics I will not be promoted. Because the moment the learners will be able to pass, they will have courage to work hard and be able to listen in the class so that they can end up doing more and be successful in Mathematics. That's what I think is an advantage.

Researcher: So meaning learners are starting to like the subject even if the teacher is not teaching? How does that help you everyday to teach learners? The learners' tests I heard people referring to learners to touch, how does that help you if learners are catching up differently?

Teacher4: It depends from learners, when learners like the subject they intend you to do more. They tend to work hard. They work hard that you can even ask them to go stay in the class. They can even force you as a teacher to prepare more, when you prepare more you will end up giving more to the learners. And that will lead them to get better marks, better results which will enable learners to be more prepared and get ready for exams.

Researcher: Alright.

Teacher1: Maybe just to add on my colleague, if learners show positive attitudes towards the subject it will increase their understanding because like if the things are difficult for them you spend more time on that topic until they understand and if they develop positive attitudes it will be easy for them to understand and if you complete your scheme of work on time then you got enough time for revision.

Teacher3: Just to add on I see that the lesson will not be effective if the learners are not interested, so as a teacher if you just come in you always use a calculator to find the answers, learners will not be interested. They will think that this teacher come to the class to cheat us.

Researcher: Alright, with all those challenges that you are facing, what type of support do you receive with the new implementation of Mathematics requirement from your school and the ministry at large?

Teacher2: I think every time the syllabi is released they always call the teachers for a workshop or they inform them about what methodology to use, what's the government require from us and what do we need to do to support the government.

Teacher1: And another support, they provide is when teachers go for workshops we are given samples of investigations or topic tasks and projects for learners and sometimes there are times that you really get stuck what to give the learners. With these support it makes the teachers' work easier,

Teacher3: The other support is that if I and my colleague we teach the same subject we sit together or help each other to prepare or assist each other to teach the topics.

Researcher: Okay, is there maybe something you expect you are suppose to either from the school or ministry to get but you don't get?

Teacher4: I think a school is something unique. Although personally I think there are a lot of them, eeh I think regular visits of teachers or where teachers come

together on a regular basis and study question papers question by question where they discuss how questions are asked, because sometimes you come for a short period once per year to discuss. Sometimes it is not good as the time is not sufficient to cover what needs to be discussed.

Teacher3: So parents should work together with the principal of the school, they should come in and talk to the learners encourage them to take Mathematics seriously so that they can allow them to do well. It should not only be Mathematics teachers but other teachers should also come in to explain the importance of Mathematics.

Researcher: Okay, so previously Mathematics was not compulsory from grade 5 up to 9 so what do you think is the learners' attitudes previously compared to now that they have revised it? Is there any link how do you see it?

Teacher4: I think the reasons why the ministry revised the promotion requirements and made the Mathematics compulsory they saw something which was not good at all. So making Mathematics compulsory will force even those who thought they cannot do well in Mathematics to try hard and improve, because they are now aware that if they fail Mathematics it will make them repeat or fail. Therefore I think I have noticed change in learners' attitudes towards Mathematics even though not in great number, but change is there and the possibility of great number of learners to change is higher.

Researcher: Okay.

Teacher2: I think it is better than the previous year, because it is promoting Mathematics not only to be used at school, but also in the community learners are taught how to do calculations with a calculator and when they go home they will be able to go help those others who have businesses on how to calculate so that they give customers the right change. So it is not only trained at school but also to benefit the community.

Researcher: Anything else you would like to add regarding Mathematics requirement?

Teacher4: Mathematics is like, every one regard Mathematics as difficult so as Mathematics teachers we have to show that anything we do in life involve Mathematics and also we have to be more creative to make the subject interesting to the learners and convince them that Mathematics is in all the subject as you also write numbers in any subject when numbering questions or pages. At least if they can picture that Mathematics is used everywhere then their attitudes will change as well as the interest of wanting to learn more will increase. When you tell them about taking out in other subject learners will realise that it's Mathematics.

Teacher3: It's like learners need to be informed that Mathematics is everywhere and that's why it's made compulsory throughout their school career. They should realise that if someone asks them how many seats are in the car, or do you know how many kids you need? They should realise that it is Mathematics knowledge they need to apply. They need to know how to count.

Researcher: Alright, that brought us to the end of our discussion. I would like to thank you very much for sharing your opinions and ideas about Mathematics and the newly implemented requirement and I hope you go back and keep on motivating our learners so that they will develop positive attitudes towards Mathematics so that they practice it in their everyday life. Thank you very much, good day!

Focus group Namibia Grade 9

27.03.2012

Researcher: Good afternoon!

Learners: Good afternoon Madam!

Researcher: I hope you are fine. The purpose of this short interaction is to collect information on your perception, your attitudes towards the implementation of the two thousand and ten Mathematics requirements. This interview will last approximately thirty minutes. You may ask questions of clarity if you don't understand you can ask for me to clarify the question for you. So you are most welcome. Feel re. So the aim of this is for me to understand how you see the new Mathematics requirement, regarding Mathematics as a subject. So, huum let's start by me finding out about whether you know that you will be able to get a D – grade in Mathematics to be promoted to the next grade? (The learners were quiet for a while).

Researcher: Anyone can answer!

Learner1: Yes, I will get a B or A.

Learner2 and 3: Ye s, I will get a C.

Learner4, 5 and 6: Yes, I will pass getting higher than a D.

Researcher: Alright, so how do you feel about the grades that you've said? Most of you are saying that you will get higher or D's or B's or A's. So, how does that make you feel? How do you feel about that?

Learner1: Actually, I think there is no doubt for me to get a D. It will depend on my better understanding, because like now I've realised that I have to learn or study Mathematics like other subjects.

Learner2: Thanks for the opportunity given to me. For me, I feel good because I see how the madam is answering questions and teaching, I am able to follow. The madam is teaching well and she explains well using more than one method. That's why I am saying it makes me feel good.

Researcher: Okay.

Learner4: When I was in grade 8 I didn't understand Mathematics, but now in grade 9 I can understand very well.

Researcher: Uuuuhm.

Learner5: I feel I will pass, because I understand very well.

Researcher: Okay.

Learner6: The reason I said I will get an A, because I perform very well in the tests and I understand well when the teacher is teaching in the class.

Learner7: For me I think I will pass because I understand Mathematics very well when the teacher teaches.

Researcher: Okay, so how do you think what are you going to do for you to get the symbol that you are saying the D's , the A's , the B's. So how do you study Mathematics?

Learner2: As Mathematics is a difficult subject to study, Mathematics requires you to study in groups. Another way is to go through the examples given by the teacher when revising.

Learner1: Mathematics needs to be studied like any other subject. You need to understand and follow when the teacher is teaching. That's why I am saying I will pass because I have realised that I need to study with someone or ask someone if I don't understand.

Learner4: I am passing all my tests and understanding Mathematics better now.

Researcher: Is the any difference the way you are studying Mathematics now? Is there any difference from the past?

Learners: Yes, there is a difference (all shouted).

Learner1: Yaaa, there is a difference because for example like for last year I didn't know that you should study Mathematics like any other subject (laughs). That's why I used to fail, because I have realised that you study in groups or with a partner. I never knew how to study Mathematics and some topics I never knew. Because some topics yaa, you understand better but some of them you know, they are difficult.

Researcher: Okay!

Learner2: Especially like me, I thought you cannot study Mathematics. When the teacher is teaching I just listen, so there was nothing like studying. But as of this year I have discovered that you also need to study it and ask questions when you do not understand and the teacher will explain for you. Don't take your attention out from the classroom; you must keep your attention to the teacher.

Learner2: I think we have to understand English the way questions are asked and it's also a good idea that when the teacher is teaching you have to pay attention. You don't have to think about other things. If you just make a mistake and think about other things than you go off the topic and you won't know what the teacher is teaching. You just get lost or when the teacher was calculating, then after all aaaah, Aiye "I don't understand this thing" because when the teacher was teaching your mind was far. The solution for that is in the class pay attention what she is calculating things in then you understand. There are things which I have discovered that not only paying attention or listening, it can also make you to be lost. Better you try to look to the mouth of the person. That means all your knowledge is on that person.

Learner2: I disagree (laughs); you know okay not that when you look at the chalkboard you are only the looking at the chalkboard, but you are looking at the calculation the teacher is calculating. And if you have to look at the mouth of a teacher what she is talking that's when you can get lost. Because if you just looking at the person sometimes you won't get what she is saying.

Learner1: Yaa, that means that you can do like that and also when you look at the board, just looking at the board straight after that you forget what the person was saying. At least look at the board and look at the person too and overcome your knowledge at one place just on the lips.

Researcher: Interesting!

Learner: Aaamm, in grade 8 the teacher will come singing (laughs) everyday just prime numbers, but when he will start teaching you will not even pay attention. You will just think about that story (laughs again) he was singing when he came in at first.

Learner1: Sometimes you know maybe some teachers sing to make it for some other people to better understand. For example, In History we used to sing a song based to the topic, Yaa just as an introduction of the lesson. He just sings Vasco Da Gama discovered the sea or something like that. Some words you will understand and the story of the people.

Learner2: But especially like those songs it will never help you when you just sing one song, unless you must sing all the topics for the learners to understand that this song you get some words in this song and you get some words in this song than it will help you. Not only one song from January to December only numbers. And in the examination you will not get only numbers, there's ratio, Algebra and all those than it will be a problem. You will only answer the question on numbers the rest you will leave because you don't know.

Learner6: Yaa, I agree. Just like last year the topic that the teacher is teaching is different from what he's singing.

Learner4: He just come in Bingo, Bingo (laughs again).

Researcher: Anyone else who wants to add?

Learner3: And some of these things let me say you find that this teacher he's not good in maths, they just gave him a subject while he's not good at it they just gave him to operate that particular subject. But if you find a good teacher who went further study for that particular subject in that case you will see that Mathematics is easy because that's why we are saying some of us that Mathematics we don't understand that particular subject because of the teacher..

Learner1: (clear her throat) I will agree with you because if the teacher does not know learners won't understand (girls laughed).

Learner2: We have different types of learners, people have different interpretations. Some of them they can close their eyes, but they are listening. Some of them they can look up while they are listening especially like I myself if I close my eyes I will sleep. I look up I will think something else. Maybe what's the best I look at the mouth of the teacher when she speaks and I look at the chalkboard when she is writing. So I compare the things I hear her say and what see when she is writing.

Learner5: Especially like me, I don't like people who make jokes, because when we come here we come here and learn not just making jokes with the learners and waste maybe thirty minutes and only get ten minutes to teach. It's not good like that.

Learner1: Sometimes it is nice to make jokes but not for a long time, because if a teacher will come in the class and you guys don't want her/him to make some jokes he will just be serious, rude all the time because you don't want him/her to make some jokes. There is a time which you will make a mistake for you to start joking then he/she will be rude with you

Learner2: Jokes is bad but also good. The more you make jokes with learners the more they are ignoring you and if they ignore you they will not pay attention to what you are saying what they want only is jokes. At least just when you enter in the class when rubbing off on the chalkboard if you got something on the chalkboard after that you stop joking and teach. Then it will make learners also to listen. Jokes are just to bring them in the mood for them to pay attention. It's not obviously bad.

Learner1: And sometimes I think it is good for the teacher to be rude all the time. Just to be serious that whenever she enters the class she is just rude or just to say harsh words to them. The learners will be scared of her whenever it will be her period than the learners will say “hummm, we have to do this work even if the learners were given homework to do they will be scared that: “This teacher if we don’t do her homework she will come beat you or she will come tell you bad words”. Then they will always pay attention and respect her. Then they will say “huuh, this teacher if you won’t pay attention she will do this or this. They will be scared of her and do her homework.

Learner2: Especially like in that case it can also then influence the learners not to ask questions when they did not understand, because they know if they will ask you questions you will say vulgar words to them.

Learner1: No, it is not that maybe when you ask a question the teacher will not answer your question! Jaa, because there are some learners who like asking just silly questions for pleasure sometimes it is not that you are going to ask a nice question, just when asking out of the topic.

Researcher: Okay! How is the mathematics class this year?

Learner 4: It is good, because the teacher is always in the class and serious. You just have to pay attention.

Researcher: So, how does the teacher teach? You are saying she is serious, how does she teach?

Learner4: She can teach well and I understand now I am better. I just improved from last year.

Learner1: Jaa it is better, because the teacher she is not fast, she does not teach fast. She does not teach slowly she is just in the middle. And she teaches nice, you understand. So, the class of Mathematics is doing better or it is doing well. As since at the beginning I can see it is been going good. I can see by the end of this academic year we will understand the lessons, because the madam when she comes in the class she can’t give us only one method on how to calculate a particular problem and how to calculate, she gives us two methods and if you cannot afford to do this one. In that case at least you choose which one you use for you to help yourself in the examination.

Learner6: It is better because when the teacher is teaching she used to ask who did not understand and if you don’t understand you ask then she will explain for you.

Learner5: Like me I don’t like it if a teacher is coming in the class and teaching without giving work. She has to leave work for learners for homework, class activity to see whether the learners understand or not. And she has to give them a test again to see if the learners understand the topic or not. If not they have to re-write the test again.

Learner2: Something that I am saying that it is going good is because maybe by the moment she explains she have five questions. She explains this two and the three she leave it for us learners to work it out to see whether you understand when she was explaining. After that it is when she will give you homework and some days she will give you a test to see how far you understand that topic. So that makes the madam happy if the learners understand.

Learner1: One thing which makes us not to pass let me say for example last year I and my friends to joke, homework and tests we only used to get 0 and other low marks. Than what we use to think Aaah “this teacher hates us, Why is it always us who get 0 or 1 or 2 while others get higher marks?” I think there is no teacher who hates a learner and it was only us learners who did not pay attention when she was teaching. Sometimes she comes in and we just have in our mind that this teacher hates us, because we only used to get 0. We will do different subjects and not listening to what she teaches. When she will give you homework to go and do it you will fail it, because you where not listening when she was teaching. That’s what I have realised.

Learner2: Let me add to that, maybe they left you some work previously to do and second period is Mathematics but you didn’t do it. You will do that homework during first period, because you know that when that teacher will come he will beat you. What you will do, you will rush to do the work. While instead of just listening and then later you give the homework. You can even get knowledge from the teacher some from your friend and some you just add your own knowledge. It will be difficult for you because you did not pay attention. You just paid attention to the work that they gave you yesterday to do it during that period. That can also affect a person.

Learner6: I think you can listen and understand when the teacher is teaching, because when I was in grade 6 I did not study Mathematics but I don’t know how I passed it.

Learner1: For example at lower primary I think like for me especially from grade 5 to 7 for me what I used to do I just used to guess that the answer is this one or that one or maybe the answer is this one. I didn’t know how to do it. Maybe the only things I used to calculate is those simple things the ones I can calculate on a calculator not things from my head. I didn’t understand how you are going to calculate these things, how do you study Mathematics; the teachers didn’t use to tell me. Sometimes when the teacher will come in the class what she only does is, she just takes the textbook and say “look at the activity on page whatever” she won’t explain how to do those things or how do you study this things or how you can learn it.

Learner3: Maybe you are given home work to do when the teacher ask for the homework that time maybe you where standing outside, you copy from your friend. When you will be asked how you did it you won't know.

Learner1: And one thing of borrowing someone's exercise book for example; they gave you homework to go and do it at home. And you did not do it at home and in the morning when you just see that the next period will be mathematics you borrow someone's book and then you copy someone's answers while you didn't know how that girl calculated the answers and now when she will mark you will get 100% than you think that you are bright or brilliant which is not true.

Learner2: And one thing I have realised is that you the moment you copy someone else's answers, well you can calculate and get the answers, but if you don't know the formula to work out until you get the answers it will also affect you because you can calculate how to get the answer but you don't understand what you are asked, the calculation or how to use the formulae

Learner3: So, okay well you can see the numbers on the calculator, how will you use your calculator will depend on you. You can have a calculator but you can fail. Better if you just pay attention to the teacher at least it will help you.

Learner1: And also some of them (learners) they have calculators but they don't know how to use them. They only know maybe when it comes to plus, times, minus all those things and when it comes maybe squares, cubes or all those things on the calculator they might not know all those things.

Learner4: And it is also a problem maybe you used to keep in your mind that I have a calculator than when it comes to a calculator you thought maybe you think they will only put maybe multiply, plus or whatever all those things and then you just see that it is different calculations. But your calculator is there but you cannot use it.

Researcher: Alright, so what feelings do you have about Mathematics? How do you feel about the subject?

Learner1: Like this year, uuuuhm last year I hated mathematics but this year I like Mathematics because I can follow and understand very well.

Learner6: I like the subject because I can understand well.

Learner4: I like the subject because if you understand mathematics it can also help you to understand other subjects better.

Learner1: To me Mathematics is easy, because as the years are going it also how education is changing. Mathematics is also a passing subject even if you won't do it further you have to do it. That's the requirement for you to progress to the next grade. It will be appreciated for a learner to pass Mathematics to go to the next grade. It is important to work hard in Mathematics for you to pass.

Learner5: Mathematics is very, very important because as human being anywhere you can go even at the farm we count our cattle, our chickens. If you don't know how to count it is a problem.

Learner1: Can I ask a question? Why does it happen that she is a teacher, she completed school long time sometimes UNAM. She used to say I completed grade 12 with nice symbols all subjects, but when you go and ask the teacher about Mathematics grade 9 then the same teacher will say "hey, I am not the teacher for Mathematics", but she used to say that all her subjects have very good symbols but when it comes to Mathematics she don't want to help? Why is it like that?

Researcher: It depends on the field of study that the people take or maybe the competence of not feeling that she/he can answer that correctly, just the self confidence that she will give you the answer that you don't want.

Learner1: She used to have that self confidence, praising herself that "for me I have completed grade 12 with very nice symbols in all my subjects". But go and ask her a question from this subject "help me that she will say "uuuuhmm".

Learner2: Especially like me, there is no way you can tell me you pass well. Because you also you was a learner. Just like an old person saying "when I was a girl I was brilliant", but you can tell that this person knows that there is no one you can go and ask about it.

Learner6: Teachers like saying "when I was a student I used to do this and that whatever she was doing in the past.

Researcher: Anything else that you want to tell me about Mathematics, the way you feel about maths or the way the mathematics is taught? Anything related to mathematics?

Learner1: And the other thing is that the disadvantage is that this rule if you fail Mathematics you repeat the whole grade. I don't think it is a good rule because this teachers, the doctors, ministers who are sitting there in the past they used to pass other subjects but Mathematics they used to fail it but just to go and do those subjects they want. And now us some of them are not good in that subject. Some of them may not be good in

Mathematics, but some they used to pass other subjects but Mathematics they used to fail it but they used to go to other grades just to go and do those subjects which they want.

Learner1: For the government to make mathematics compulsory for me it is important, because I can see Namibia, all doctors we got is from Cuba is not from our country so Mathematics also is included to the subjects of Doctors and that we don't have engineers in our country we just go and give a tender to outsiders to come and work on that activity. We know we went for someone else in that way we are also taking money out of our own country. That's why I am saying Mathematics is also important for us to work for ourselves and not depend on somebody else. And if you see only passing one subject instead of Mathematics is no use. Teachers and friends are there you can ask them they can help you to pass. Please this is the problem which I am facing and I know how they will tell you something better that will help you to get better. I think that's how we can get help because if you just keep quiet it will just be like that.

Learner4: And I think that if Mathematics is not compulsory they will just say that "Aiye" Mathematics is not important to me because English is more important than Mathematics I will just learn English.

Learner6: I think it is good idea, because that way the learners need to study hard because they have to pass if he/she is not good he or she has to keep in mind that nothing is impossible they just need to study very hard.

Learner1: One thing you don't have to think that me I will only be serious with Mathematics or I can only study Mathematics and leave English. You can pass Mathematics but if you only pass Mathematics while the other subjects only Ds, with English included you can still remain in that grade. It is better you have time for all the subjects.

Learner3: It's a good idea to study Mathematics together with other subjects, because if you only pass Mathematics and English you will fail.

Learner5: Like me, I like our Mathematics teacher because she encourages us to buy calculators at the beginning so that you can follow what she's teaching. And then if you don't have a calculator you can follow but if you don't have a calculator it will be difficult to get answers.

Learner1: And one thing we don't have to depend on a calculator, because some of the things you just need to know how the teacher does it. Sometimes when she used to teach, she doesn't use a calculator some of the things are already in her mind then she will use those things. Sometimes I used to be surprised, sometimes she will ask a question and she will write an answer without calculating on the calculator. She calculated already in her mind.

Learner5: Some topics are difficult to calculate without a calculator. That's why a calculator is needed.

Learner1: That's why I am saying you don't have to depend on a calculator. When it is difficult yes you can use a calculator, but if you see that sometimes you can do without it you just do it.

Learner2: A calculator is just something which can help you work faster. Almost everything is on the calculator. It is good to have an answer if I am adding it is easier to workout mentally, because it saves time. If I add this or if I subtract this, what answer am I going to get? In that case it will be no calculator interferes after that especially like me it is fine. The moment you go for a calculator the time is moving.

Learner6: For me you cannot use a calculator for topics or calculations like $a+5$.

Learner1: Ja, that topic also. That's the most difficult topic. You will see that they will add a, b, c all those stuff it is confusing.

Learner3: It is a problem.

Learner1: Even if the teacher can teach I used to fail, because when you add those letters I will calculate those numbers and add them.

Learner2: If you hate a teacher that subject will also be difficult for you, because you will not listen when the teacher teaches.

Learner1: That's true, because whenever she will enter you will just say "I hate that teacher", "I hate that teacher. You won't pay attention."

Learner2: Another thing is, sometime when you are suspended and you know that this topic I don't understand try even during study time when the teacher is around to find out how you can do different calculation. And if you keep on saying this topic is difficult it will be like that until you die.

Learner6: The reason why we used to fail, maybe you are having Mathematics the teacher she is teaching and you take another subject or English book and write during the period, you will not be able to follow well.

Learner4: Calculator also on its own you will never get an answer unless you press it (laughs) so that it can give you an answer.

Learner3: You need to know your calculator very well.

Learner6: If you don't listen when the teacher is teaching you will miss a lot.

Learner2: If you don't follow when the teacher is teaching forget about passing, because you won't understand how to do the calculations or how they were done. Even when you are suspended you should ask others what they are learning so that you are not left behind.

Learner1: Some other learners are very selfish and maybe you didn't understand well. When you go and ask maybe you don't know that person well or you don't used to talk now you are desperate you just have to force yourself to ask because you need help. When you go there the person will not even look at you with a nice eye just because of that hatred. Like at school if you don't talk you just forget and after school you can continue ignoring each other. But at school you must talk.

Learner2: Some learners when they are not at school they don't ask others about what they have learned. They just think if I will be asked I will just say I was absent that's why I didn't do the homework. That also can affect you.

Learner1: And some of those it is jealous you know. Maybe you were absent and when you ask them "what did you learn yesterday"? They will just say "she did not come and teach" or "she did not give us anything". She won't tell you or she will just say "she came but what she gave us is something which is not important. It is not important, but you have to show that person that this is what we did.

Researcher: Alright, that brought us to the end of our discussion. It was really very interesting to listen to you and I hope we all achieve the better grades or symbols that we are expecting to get at the end of this academic year. Thank you very much for your time, and may you keep on having the positive attitudes towards Mathematics. Thank you very much!

Learners: You are welcome madam (all replied).

Focus group Namibia grade 7

27.03.2012

The researcher conducted a series of interviews of 3 focus group interviews (grade 7 learners, grade 9 learners and Mathematics teachers) about the teachers and learners' attitudes towards the new Mathematics promotion requirements for grade 5 - 9 in Namibia.

The learners were relaxed, calm and prepared to share to share their knowledge about the topic under discussion.

Researcher: Good afternoon!

Learners: Good afternoon madam (all replied by shouting).

Researcher: I hope you are all fine. The purpose of this interaction is to collect information on your attitudes and your thoughts towards the implementation of the 2010 Mathematics requirements. This interview will last for 15 – 45 minutes. So you may ask questions of clarity or raise concerns during the course of this interaction. You are most welcome to do so and feel relaxed. The aim of this interaction is to understand your perception and attitudes in regards to the subject under discussion.

Researcher: So, grade 7 learners what is your opinion of the implementation of Mathematics promotion requirement for grade 5 – 9? What do you think about the new system?

Learner1: I want to pass.

Researcher: Why do you want to pass?

Learner1: To go to grade 8.

Researcher: Anyone else?

Learner3: Actually, for you to pass it's better for you to study Mathematics if you want to work in the bank or become a doctor.

Researcher: Ok, do you know that you have to get a D – grade or better in Mathematics to be promoted to the next grade?

Learner1: Yes.

Learner2: Excuses me, I didn't get the question.

Researcher: Do you know that you have to get a D – grade or better in Mathematics for you to be promoted to the next grade?

Learner1: Yes!

Researcher: How do you feel about that?

Learner1: Is good.

Learner2: Is good.

Learner3: Is good (very loud), because if you get higher points it will help you .hum... get a good job better than security. Is not bad is good. It is good because you will learn to count and get a job in the bank or in the shop to count the money even to help the children, even your own children. They will come and say that "Daddy" here is my homework will you help me? Then you will say aaaaah! Me I don't know. Then what do you think?

Learner4: Is good to study hard, because than you will help your child coming from school when she'll bring the homework to you, you will be asked "please, father help me ". Then you will be able to help (laughs).

Learner5 : They can be send at school, because if you won't help them they will be writing wrong things and they can easily fail, because you are not telling them or teaching do this and this. You are just quiet. Even when you are buying things for your children for school you should know their sizes!

Researcher: Okay!

Learner1: (Laughs)

Researcher: How do you think, are you going to get a D-grade or better in Mathematics? A D-grade or better (higher than or better than that), Just say what you think?

Learner1: Me it's difficult.

Researcher: Tell us, why are you saying it's difficult? How do you study it?

Learner1: Quiet, others laugh.

Learner2: You need to study Mathematics by doing your homework.

Researcher: How do you study it? How do you study Mathematics?

Learner2: If a teacher gives you homework, after writing you study the methods. You go through the examples. You control yourself.

Learner3: Me, Mathematics is the easiest subject even the people use to say that Mathematics is very difficult than Natural science. To me, it's better to study Mathematics, because if you keep on studying it won't be difficult for you. Just study hard. You will see yourself that no, the thing that used to be difficult, but later it will be easy. You can even test yourself to see that you know it. Even when teacher will come and ask you are remembering. You can remember what you studied even yourself you have to study. Do not just keep eat, wash, and even go to bath. No! From bath you come eat, eat go to sleep. No! Take your book and study. Even some of us who don't have electricity at our house, and then we say we don't have electricity at our houses. We can study. We have time even afternoon we have time. Even when you finish eating you can study. You just keep studying and you remember. You just have to study and keep the things in your head just like a computer. You must not study and they are going out here, we must keep them inside.

Learner4: You study by asking each other questions from each other. You don't think about other things, because Mathematics is not something you should memorise and you also have to make sure that when the teacher is teaching you have to listen and not make noise. You should also make sure that you understand what the teacher is teaching. Even to another learner you can ask.

Learner3: Some learners used to say that teachers when our teacher used to teach we don't use to understand. She use just to sing, but people those who use to say that we don't understand, to me aaahaa, if you just listen while the teacher is teaching then you will understand everything the teacher is teaching. You will understand!

Learner5: You also have to control yourself. You must also check what the teacher told you to do.

Learner6: To me you have to study Mathematics with other subjects. If you study only one subject and fail the others you will still fail. So, it's good to study all the subjects and pass them.

Learner3: Let me add to that, if you are studying you must not just study all subjects. You must take your time. Study that subject. Maybe a teacher is saying that Friday you are writing a test. You cannot just study every subject; you must make time so that you can rest. You cannot study all subject at once, in only one hour that not good you'll not and catch the things you are studying. You are just mixing them. Even when the teacher is asking you are not remembering, because you are mixing them you must take time.

Learner6: You can make your own time table, maybe if the teacher is not there or even in the morning or afternoon during study you can study another subject. You cannot stick to one subject.

Learner2: For me every subject is important, because if you fail one subject any of the other six subjects and you pass only Mathematics or English you will still fail. That's not good.

Learner6: It's better for you to study all the subjects not only one.

Learner3: But me studying is important, because if you keep on failing your education will not go well. When you fail it will not help you find a nice job. You just find those stiekwerks (Piece-work). If you are lucky you get security job. But then if you will get good marks, even a certificate will help you to get a job. You cannot just go and say I want to clean a road or become a cleaner in this hospital or school. You must at least have your certificate, but it's good to study not to say this subject is difficult I cannot study it. No, try...it's good for you to try, even to study. It will help you get a better job.

Learner6: (Clear her throat) ...It's good to study not just to think I will get a job as a security or a cleaner. If one day you will have your own kids it will not be easy for you to take care of them, just struggling even if you want to go work no one will help you

Learner1: It is better to get even security job at least you will get something for you to buy a bag of maize meal.

Learner3: Security, Security? I think it is not good. Because if you have a lot of children you cannot be able to pay their school fees and buy food to bring in the house.

Learner5: Even though at least you are getting money to bring food in the house.

Learner6: How much is that? If you are only getting N\$200 is that enough to buy food and pay school fees? (Others Laughed).. Just to give an example like us at home we are many N\$200 will not even be enough.

Learner5: It is better for you to study.

Learner2: You cannot buy anything from N\$200, what about yourself?

Learner6: N\$200 is just not enough it is just better to study to get a better job.

Learner3: That N\$200 for example you have five kids and your wife, also even yourself you won't be wearing those uniforms of security only until you are going to sleep. If you are not the one on duty that night you won't go at the bar wearing that uniform for security. You cannot always put on the uniform every day. You need to study to get better money so that you can help your family even your mother and your father.

Learner6: Like us, our parents are struggling for paying school fees. And when you finish your school you want to be a security? What can you have to give feedback to your parents?

Learner3: I don't think that eeeh, security is a good job (paused) some problems used to come in the family. Maybe it is yourself who is sick. Where would you get the money even your own children or even your wife can take you to the hospital. You don't have money, maybe for example night time even you are injured you cannot get money to pay car so that they take you if you stay at a village. There at the village you don't have even a clinic or a hospital. Where can you get the money so that you can own your own money so that you can pay? You cannot get the money so that you can pay. So it's better for you to study so that you can own your own money so that you can get a better job even a teacher. You can help yourself hummmm, not just a security. It's not good to be a security...Aaaaye...!

Learner5: It's better than not working at least you get something! (Say it softly).

Learner3: It is not good to work as a security while your friends are working in a bank and you, you are a security. And they stay at the same village where you are (with you) and they used to come to buy food for their mothers and when they see you coming from the hospital or at the clinic or a school wearing a uniform of the security. They will say that "Hah" is this not the guy who was in our class at primary? The one my class mate? The people will say "Yes" he is a security now at our school. People will laugh and that's not good. And when you see your friends buying plastic bags with rice, buying clothes for their mothers, for their children you will just feel bad and some people used to kill themselves, but that's not good. They use just to think I will get out from this job or I will not work anymore people are laughing at me. No, just keep on doing your job because you deserve it. You are the one who did not study. People where telling you, teachers where telling you study but you didn't want you deserve it. You want to be a security!

Learner1: Those who are laughing can laugh at least you have something to help yourself.

Learner6 & 3: Those who are laughing are working. They are working.

Learner3: And you are maybe only having only a plastic (Laughs) for half of a bread bringing to the house. People will laugh those ones who used to work. They'll say he was our classmate now he is a security at the school. People will laugh and when you hear that people are laughing at you, some they used to say that they can laugh.

Learner5: They think something bad.

Learner1: It is better you are getting some money. You earn money.

Learner5: No, it's not good.

Learner6: It is not good.

Learner3: It is not good, because you have for example maybe you have five children they need to go to school and you need to pay for them their school fees or even buy the uniform for the school and food. Remember the 50kg of ace maize is how much? And when you want maybe to keep money so that you can use it for someone who is sick, you cannot get enough money to pay for those five children. Even your wife or yourself you will not walk like that without wearing clothes. Every day you are wearing a body shirt, every day only that body shirt. And sometimes you cannot find friends.

Learner1: You are at least wearing something, and maybe when you get money you will buy. You can farm and get Mahangu to eat.

Learner3: Maybe your kids need to go to the hostel and you need to buy five blankets and get N\$120 for each child for school fees and yourself and to bring food. Even if you have your own field or even eating Mutete (traditional spinach) every day is not good. If that day you didn't go to the field and bring crops you cannot find money to bring 50kg of maize meal to the house. Where will you get the money?

Learner6: And for yourself again!

Learner5: You will go borrow!

Learner3: If you go borrow even in a plastic people will laugh and say he went to borrow maize meal from the neighbours like he is not working. It's not good! So we have to study hard so that we get better jobs for you to get money to protect your family and to bring the food at home and keep some for yourself. You need to work not just be a security, a cleaner maybe but you need to study.

Learner1: If you need something you can ask your family to help you or maybe you have a field, you don't need to buy maize meal.

Learner3: The only thing that will help you if you are in a school. Some people they have their family like white people. They used to say that I don't have to study because my father bought me a car, I have my farm already. What will I do at school? And for us, you have your house there, your mother is not working and maybe your father died. You are just paying money from the Toyota (orphan grand) and you are just saying school is nothing.

Learner6: You just go and plough at the field instead of going to school.

Learner3: You have your sisters and maybe brothers and they are still young. You want to drop school because of nothing. You want to go to and work at the farm. Your brothers and sisters will suffer even your mother also, because you are out of school you are just there in Otjiwarongo or Tsumeb just at the farms. You are not sending food or money at home you are just quiet there with your girlfriend sharing money and enjoying without sending money home. Even at the farm they might say this month you are not paying because you are not working. But it is true you are working, but they just don't have enough money to pay you. And you will suffer there hmm! You don't even have body oil (lotion) you just smell hmm...and you are even shame to come back to your own house.

Learner6: You won't even know what to do because you are not sending money and your brothers and sisters will drop out of school because you are not helping them, because you cannot get a better job.

Researcher: **Ok, so how is the Mathematics class? How is the learning of Mathematics?**

Learner1: It is good.

Learner2: For me it's better than last year because it is better to know that you will pass Mathematics.

Learner5: To study hard, in the class. You have to listen.

Researcher: **And the teacher, how does the teacher teach Mathematics?**

Learner5: He teaches nice. He shows how to do calculations.

Learner4: He gives examples on how to do different calculations.

Learner3: Follow the teachers, if you will just keep on listen things will be smooth and not be difficult for you because you are listening. And if the teacher is standing in front of you teaching you are playing there, you are not taking note at the end of the month you just fail because you didn't listen. And you will tell the parents that it's not me it's the teacher who did not teach well. And when the teacher asks if you are repeating and the teacher is teaching Mathematics and you are doing English and when the teacher will ask you, you have already forgot because the teacher will say I am not the one who make you to fail it is your own fault. It is not the understanding but themselves. They always blame the teacher but it is yourself who did not listen. You must take note and you must study every summary and not just say that aah, this summary I did not get time, I did this and this and should study this subject aha, you must study so that everything is clear to you.

Learner5: Some parents will say you teacher, aiye" you did not teach my child", because of yourself you did not study hard. It is you not the teacher.

Learner3: When the teacher was teaching you were playing or thinking about food or something.

Learner5: Thinking about something else even at home.

Learner6: Or maybe at home, maybe your brother and father used to fight everyday at home and you just think maybe it is me who make them fight.

Learner3: Even or sometimes when the school is over they will insult you that awe you are not studying. Maybe you eat too much or you like to sleep something like that. So learners should tell their problems to the teacher even their mentor so that the teacher will help you to solve out the problem.

Learner5: Maybe you think when I will go home I will not get food to eat something like that or I will go to the river and wash you will be thinking about something outside the class instead of concentrating to the lesson.

Learner1: And at home we do not get enough time to study because parents send us go and do this and do this. That's not good.

Learner6: Some parents used to send children to sell Mutoho (traditional beer). That is not good. When a child is selling to the adults and the adults are talking something funny and the child will start saying "ove ngandi" (meaning: "you" referring to someone) something like that. When the elders are saying something funny just those things are not good for children. And the child maybe he/she will hear "ove ngandi" (referring to someone) that you used to drink too much, stop drinking. The child will start thinking that you are friends with the elder people. Just like as in the vernacular language "kuliteura novakondi" (meaning making jokes with adults without fear/respect). And when you start like that even at school you will talk funny with the teachers. There is nothing funny in it. Just embarrassing, must forget it. It is not for children leave those things. Children must only study not children to sell Mutoho (traditional beer) to the elders Huuummm, not for children.

Learner5: And when the elder get the funny things like a story like getting drunk and insulting, it is not good to hear what the elders are doing.

Learner3: Some are embarrassing. There are stories that a child cannot hear and the child is laughing also like the child is part of the story also and start laughing hehehee the child will start talking also just some other people used to say that the child will end up beaten by the elder and that's not good because that child used to join the elders' stories.

Researcher: Ok, so how do you feel about Mathematics as a subject?

Learner1: Mathematics is a good subject.

Researcher: Why do you feel this way?

Learner1: Because I can understand the teacher teaching.

Learner2: Is good because you know how to count even money.

Learner3: You learn a lot from Mathematics.

Learner6: I feel good learning Mathematics because you learn how to calculate something that you don't know or maybe you are given homework for Mathematics you will learn and understand it. It is good.

Learner4: Maybe you are the one selling in the bar and when people buy you can end up giving wrong change if you don't know how to count.

Learner3: Is good to learn Mathematics because if you don't know how to count you will give wrong change to the people and even if a person came to buy one sweet for one dollar, you will give change for ten dollars and you wasted money and your boss the person who employ you in his/her bar will think "eeeeeee" where did you use to put his money and the things which I used to buy is not enough. You use to eat or what? Ehmmmm, I don't know. Even if you don't use to eat his money you just use to give wrong change to the people and maybe the person who employed you will say the person used to eat money. It is not true. Maybe he will say come and let me or come and count and give me change for five dollar or seven or ten dollars. You will give a change for six dollars and it will make for you to lose your job and maybe you are paid better money by that person. Then he/she will say you don't know how to count, bring my money back. Even you if you didn't get paid he/she will ask you to pay back the money, maybe if you don't have the money which got lost in the bar or maybe you lost five hundred and you get paid two hundred, you cannot find money to pay back give back. Maybe you don't have family or you have but they are not working. Some they used to work but maybe they don't give so you won't be assisted.

Learner5: If you don't study Mathematics you will not find a good job. You will only find jobs in the shops.

Researcher: Anything else that you want to add about Mathematics and the way you think concerning the subject for the way you are taught Mathematics?

Learner3: You need to study hard because you cannot only pretend to do Home ecology or Natural science. Only Mathematics it is very important for you to study hard Mathematics because it will help you

Researcher: Anyone who want to add to that?

Learner5: It is better to know Mathematics because it will help you know how to count. Even if someone came to the shop to buy some food or buy something in the store you will not know how to use those computers because you don't know Mathematics.

Learner3: Sometimes you find someone who works in the bank. They use computers and those computers they use to know how to use them. They use to count there in the computer. They go there and maybe you don't know some employers use to ask if you know Mathematics. If you don't know you will not be help. Yaa.

Researcher: Ok, thank you very much.

Learners: Thank you madam.

Researcher: That brought us to the end of our discussion. It was very interesting listening to you, and I hope you all continue with the positive attitudes that you have towards Mathematics. Thank you very much once more!

Learners: Thank you madam.

ADDENDUM 3.6

PO Box 2499
Rundu
Kavango
Namibia
06 April 2011

Grade 5-9 Mathematics Learners

Kayengona Combined School,
Shambyu circuit,
Rundu

Dear learner

Consent to conduct research

I, AK Moses, am a MEd student enrolled at the School of Continuing Teacher Education, North-West University, Potchefstroom Campus in South Africa. I intend to collect data for my research study on learning and teaching. The title of my proposed dissertation is:
Namibian Teachers' and Learners' Attitudes towards the new Mathematics promotion requirements for grades 5-9: A qualitative case study

I hereby request that you participate in a focus group interview on your experiences of the implementation of the new Mathematics promotion requirements in your grade. The interview will last about 45 minutes.

I pledge to maintain professional and research ethical codes. This signifies that:

- Your participation in this research remains voluntary and at any time, you may withdraw from the research
- Anonymity and confidentiality of your personal information is guaranteed by the allocation of a number to your name, only known to the researcher.
- No demands will be made on academic teaching programmes

I plan to conduct this research from June to July 2011. I, as well as Prof AS Blignaut (108 299 4566) and Dr I Kok (018 299 2143) will be available to answer any questions you may have.

Could you please provide me with your written consent by filling-in the sections on the next page. Please return the consent form to me or the principal.

Your support of my research is highly appreciated!

Yours sincerely

Ms AK Moses

Student number: 21857726

Telephone numbers: 056255108 / 0812948375

mkainna@gmail.com

Permission for Research Project

Namibian Teachers' and Learners' Attitudes towards the new Mathematics promotion requirements for grades 5-9: A qualitative case study

LETTER OF CONSENT: MATHEMATICS LEARNERS (GRADE 5-9)

I, _____ (name and surname)

Grade 7 / 9 (please circle appropriate grade)

learner from Kayengona Combined School hereby give permission to be part of the above mentioned research project. I am aware that my participation in this study remains voluntary and that I, at any time, may withdraw from the research without being discriminated against, I also understand that all personal information will be treated as confidential by the researcher.

Name and signature

Date

Contact information:

Project head: Dr I Kok (018 299 2143)

Research supervisor: Prof S Blignaut (018 299 4566)

Researcher: Mrs A K Moses

PO Box 2499
Rundu
Kavango
Namibia
06 May 2011

Mr A Ilukena
Permanent Secretary
Ministry of Education
Government Office Park (Luther Street)
Private Bag 13186
Windhoek

Dear Mr Alfred Ilukena

Permission to conduct a MEd research study

Namibian Teachers' and Learners' Attitudes towards the New Mathematics Promotion Requirements
for Grades 5-9: A Qualitative Case Study

I, Ainna K Moses, am enrolled for a Masters in Education study at the School for Continuing Teacher Education, North West University, Potchefstroom Campus, South Africa. I am in the process of conducting research on Namibian Teachers' and Learners' Attitudes towards the New Mathematics Promotion Requirements for Grades 5-9 in the Shambyu Circuit, Rundu district

I hereby apply for permission to conduct this research with a sample of participants consisting of grade 5-9 Mathematics teachers and learners. The method of data collection involves face-to-face interviews and focus group discussions, which will each take approximately 15-45 minutes. The aim is to determine the teachers' and learners' attitudes towards the new Mathematics promotion requirements for grades 5-9 in the Shambyu Circuit, Rundu district.

I commit myself to the professional code of ethics for researchers which, amongst other aspects, include the following:

- The participation of all research participants is strictly voluntary
- The anonymity and confidentiality of the research participants are protected and guaranteed
- No interference with the general and academic programme of the school will take place
- Upon completion, the findings of the research will be made available to the Department of Education, as well as to the schools that participated in the research.

The planning for conducting the research is intended for the period between May to June 2011. If you need any additional information about the research project, you are most welcome to contact me, the project head, Prof Seugnet Blignaut (or my supervisor, Dr Illasha Kok).

Your support is highly appreciated.

Yours sincerely

Ms AK Moses

Student number: 21857726

Telephone numbers: 056255108 / 0812948375

mkainna@gmail.com

Biographical information of teachers

- 1.1 What is your name? You will now receive a number from this moment on
- 1.2 How old are you?
- 1.3 What are your qualifications?
- 1.4 How many years of teaching experience do you have?
- 1.5 What is your home language?

Biographical information of learners (grades 7 and 9)

- 1.1 What is your name? You will now receive a number from this moment on
- 1.2 How old are you?
- 1.3 What is your home language?

ADDENDUM 4.3

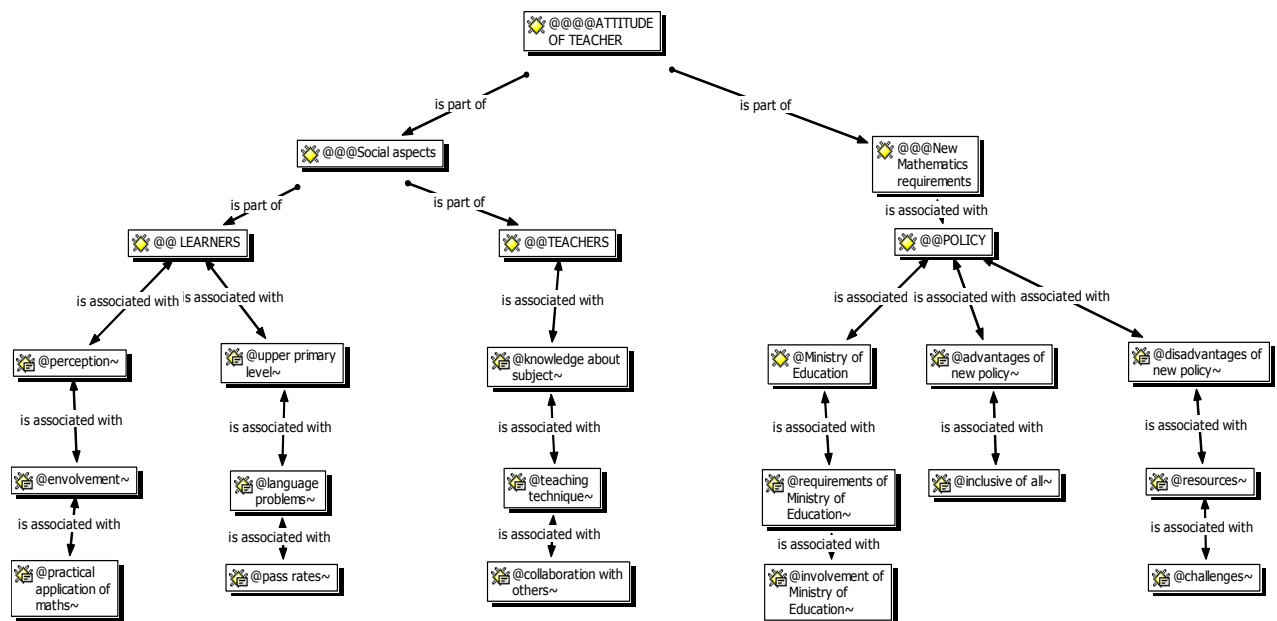


Figure 4.2 Attitudes of teachers towards the implementation of the new Mathematics promotion requirements

ADDENDUM 4.4

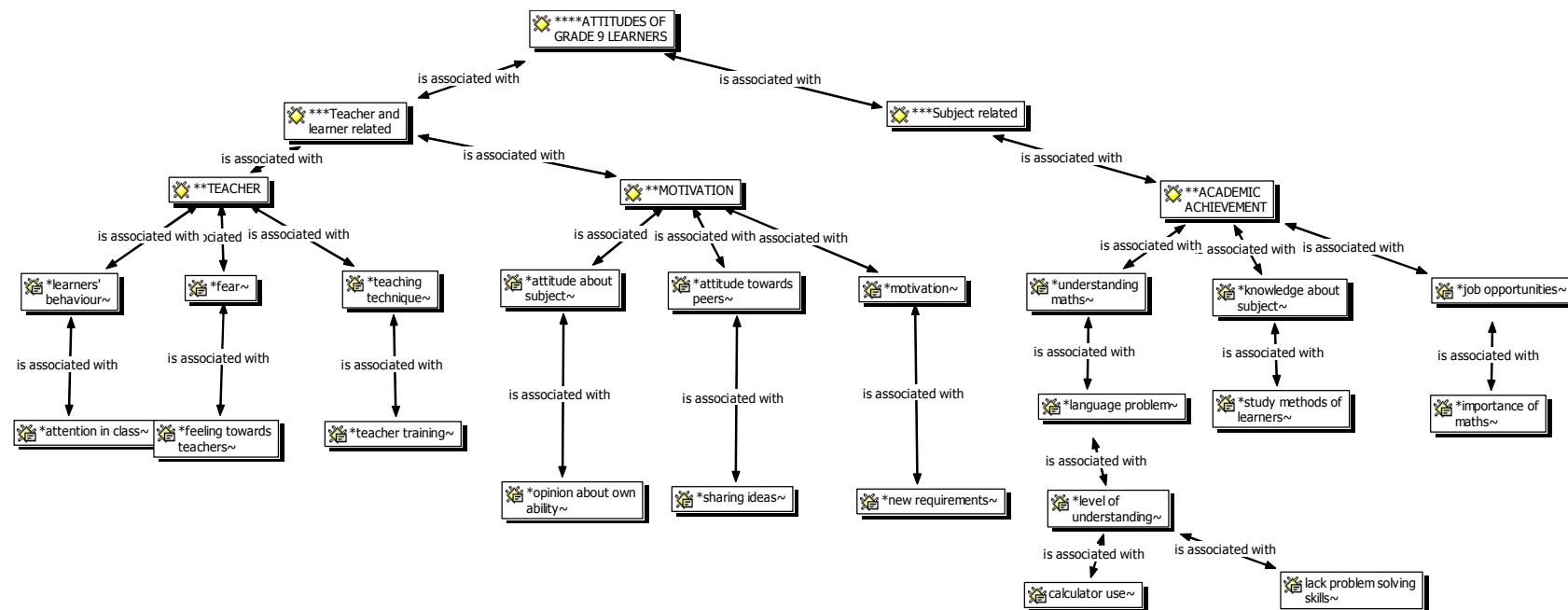


Figure 4.3 Attitudes of Grade 9 learners towards the implementation of the new Mathematics promotion requirements

ADDENDUM 4.5

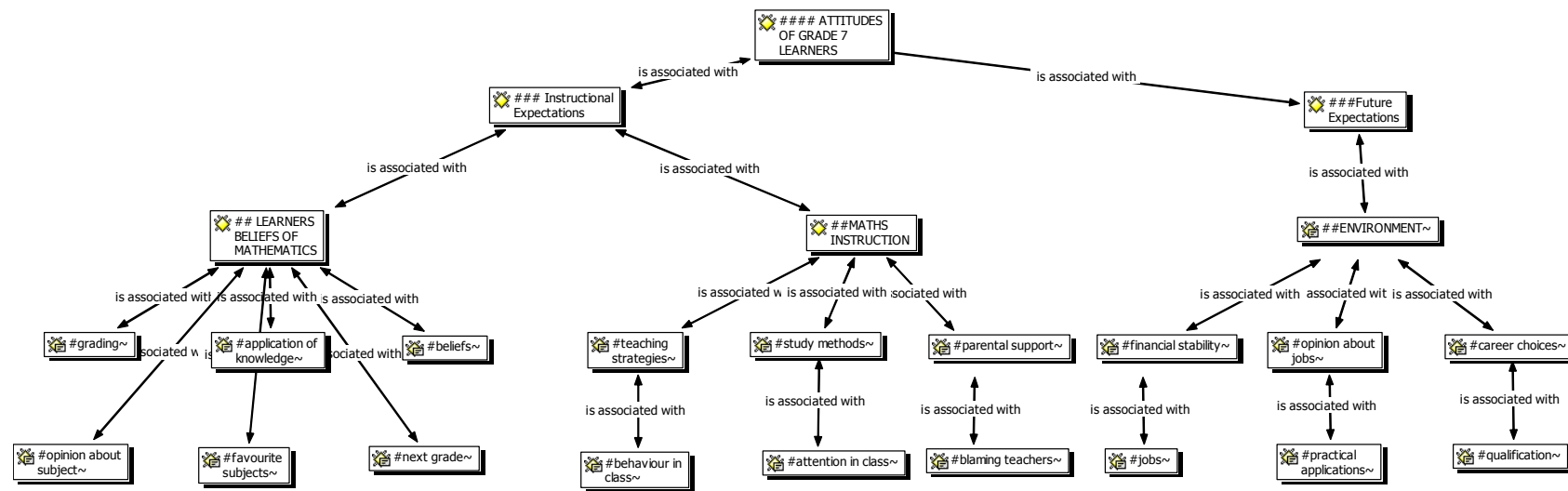


Figure 4.4 Attitudes of Grade 7 learners towards the implementation of the new Mathematics promotion requirements