

Teachers' views on learners' perceptions of mathematics in

Mahikeng Area Office



060047057T

North-West University
Mafikeng Campus Library

J.M Malindi

Student number: 16116429

**Mini-dissertation submitted in fulfillment of the requirements for the degree of
Master of Education in Mathematics Education at the Mafikeng campus of the North-
West University.**

Supervisor : Prof. T. Mamiala

Date : November 2010



18 Boipelo Street
Unit 3
MMABATHO
2735

30 November 2010

CERTIFICATE OF LANGUAGE EDITING

This is to certify that

TITLE OF DISSERTATION

Educators' views on learners' understanding of Mathematics in Mafikeng Area
Project Office

SUBMITTED BY

Johana Mapududu Malindi

FOR THE DEGREE OF

Masters in Education
(Mathematics Education)

IN THE

School of Postgraduate Studies
Faculty of Education
North West University
Mafikeng Campus

Has been edited for language by:

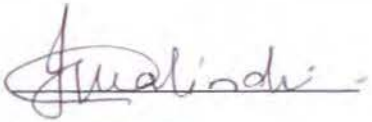
Prof. SA Awudetsey



Prof. SA Awudetsey
0722371390

DECLARATION

I declare that this research report is my own unaided work. It is being submitted for degree of Master of Education in the North-West University, Mafikeng Campus. It has not been submitted before for any degree or examination in any other university.

A handwritten signature in dark ink, appearing to read 'J.M. Malindi', written over a horizontal line.

J.M. Malindi

30 day of November 2010

Acknowledgements

I acknowledge the generous support of:

My supervisor, Prof Thapelo Mamiala. I would like to thank you for your patience and guidance during the study.

The schools at which the research was conducted, teachers and learners who were willing to participate.

My husband Simon and our children Sipiwe, Thandiwe, Thulani and Phemelo for their support at all times.

Mr Sedupane for analyzing the questionnaires and Mr Rodwell Chihwai for helping with the typing.

Above all I want to thank the Almighty God who gave me power to finish my research, and guided me all the time during my study.

Abstract

In many instances, learners perceive Mathematics as “difficult” and either avoid the subject or drop it as soon as they are allowed to (Van Rooyen & De Beer, 2006: vii). Research studies conducted have shown that South African learners as compared to learners of other countries are not achieving in mathematics. In the past, examination tended to drive the curriculum. Teachers acted as transmitters of knowledge, transferring information into the heads of the learners. The traditional teaching approach tended to be theoretical, examination driven and content based. Competent and committed Mathematics teachers are a key factor in addressing these challenges.

The National Curriculum Statement, which was introduced in South Africa in 1998, places an emphasis on producing learners who are critical thinkers, capable of solving problems and responsible for their own learning. The focus of the study is on teachers' views on learners' understanding of mathematics within the context of some of the above mentioned aspects. Through Outcome Based Education within National Curriculum Statement and other strategic interventions in mathematics, teachers are provided with skills and knowledge to address challenges associated with learners, understanding.

Questionnaires were administered to thirty four (34) educators and interviews were conducted with thirteen (13) educators. Descriptive analysis was employed to further interrogate the data. Learners underachieve because of lack of prior knowledge and motivation. Learners admire good person qualities and teaching techniques as well as teachers who are patient and explain concept well. By respecting learners ideas and encouraging independent thinking, teachers help learners to reach their intellectual potential.

Specific intervention which can be created in order to assist educators to change learners' stereotypical belief about mathematics were also addressed. It is recommended that educators need training in National Curriculum Statement and also in subject content. Teachers' qualities should be linked to good subject knowledge, teaching skills and classroom management.

TSHOSOBANYO

Gole gantsi, baithuti bale ba serutwa sa Dipalo jaaka serutwa sesethata. Bontsi boikgatholosa go dira Dipalo kgotsa basetswelele go ithuta serutwa sa Dipalo fa go kgonega, (De Beer & Van Rooyen, 2006: viii). Dipatlisiso di fitlheletse fa baithuti ba Aforika Borwa ba sa dire efetileng, ditlhatlhobo di ne di laolathutego. Barutabana ba ne ba dira jaaka baneibakitso go e tsenya moditlhaloganyong tsa bana. Mokgwa wa pele wa go ruta o ne o sa diragatse, e ne e le puo ya molomo, mme ditlhatlhobo di ne di itshetlegile ka se se mobukeng. Barutabana ba ba nang le bokgoni ebile ba le boineelo mo go ruteng Dipalo, ke bone ba ka buang ka dikgwetlho tse.

Dipatlisiso di itshetlegile mo ponong ya barutabana mo kutlwisisong ya serutwa sa Dipalo mo baneng ba sekolo. Mmatlisisi o bua ka tseregano e erile e e ka dirwang go thusa barutabana mo go fetoleng dikakanyo le ditumelana tse di fosagetseng ka Dipalo. Thutego e e simolotseng go dira ka 1998 mo nageng ya Aforeka Borwa, e gatelela gore barutabana ba rotloetse bana go ikakanyetsa ka phuthologo, baitharabolole le mathata a barakanang nao, mme ba tseye maikarabelo mo dithutong tsa bona. Barutabana ba tlhoka go katisiwa mo go OBE, NCS le diteng tsa Dipalo gore batle ba kgone golebagana le dikgwetlho tse baithuti ba rakanang natso.

Mokgwa wa dipatlisiso o o dirisitsweng e ne e le wa bontsi-ntsi mo e leng gore tse dineng di batlisisiwa di kwadilwe ka dinomoro le dipalopalo. Dipatlisiso di tserwe mo barutabaneng le barutwana ka tiriso ya dipotso. Mokgwa wa go lekola boleng o dirisitswe go sekaseka dipatlisiso. Barutabana ba kopilwe go tshwaela ka fa barutwana ba tsayang dipalo ka teng. Diphitlhelelo tse di fitlhetsweng ke gore barutwana ba tlotla motho yo o ltseng dipalo, mekgwa ya go ruta, mmogo le barutabana ba ba pelotelele go tlhalosa mareo.

Go ya ka OBE, karolo ya barutabana ke go fetolela kitso kwa botsereganying, go rotloetsa le go thusa, go kgontsha barutabana, go tsaya maikarabelo a dithuto tsa bona. Barutabana ba thusa barutwana go fitlhelela botlhale jo ba ka bo fitlhelelang ka go tlotla dikakanyo le kgololesego. Katlanegiso enngwe ke gore bokgoni jwa morutabana bogola gangwe le kitso ya serutwa, bokgoni jwa go ruta le botsamaisi mo phaphosi borutelong.

LIST OF ACRONYMS

NRC	National Research Council
NCS	National Curriculum Statement
EFA	Education for All
MLA	Monitoring Learners Achievement
TIMSS	Trends in International Mathematics and Science Study
DoE	Department of Education
OBE	Outcome Based Education
CASS	Continuous Assessment
APO	Area Project Office
FET	Further Education and Training
PCK	Pedagogical Content Knowledge

LIST OF TABLES

	Page
Table 1.1	5
Table 4.1	26
Table 4.2	28
Figure 1	29
Figure 2	30
Figure 3	31
Figure 4	32
Figure 5	33
Figure 6	34
Figure 7	35
Figure 8	36
Figure 9	37
Figure 10	38
Figure 11	39
Figure 12	40
Figure 13	41
Figure 14	42
Figure 15	43
Figure 16	44
Table 4.3	45

TABLE OF CONTENTS

A.	Declaration	i
B.	Acknowledgements	ii
C.	Abstract	iii
D.	List of Acronyms and abbreviations	vii
E.	List of tables	vii

CHAPTER 1: ORIENTATION

1.1	Introduction and background	4
1.2	Statement of the problems	7
1.3	Research questions or hypothesis	7
1.4	Aim or purpose	7
1.5	Significance of the study	8
1.6	Delimitations	8
1.7	Limitations of the study	8
1.8	Definition of terms	9
1.9	Outline of chapters	10

CHAPTER 2: LITERATURE REVIEW

2.1.	Introduction	11
2.2.	Importance of Mathematics	12
2.3.	Specific interventions that can be created in order to assist teachers to change learners' stereotypical belief about Mathematics.	12

2.3.1 Teaching strategies	12
2.3.1 (1).Curriculum and instructions	12
2.3.1 (2) Learner-centeredness	16
2.3.1 (3) Assessment	17
2.3.2 Content knowledge and understanding	18
2.3.3 Motivation and interest	20
2.3.4 Language	20
2.3.5 Parental involvement	20

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 Methodological framework	21
3.2 Population and sample	21
3.3 Research instrument	22
3.4 Format and content of the questionnaire	23
3.5 Ethical statement	24
3.6 Conclusion	24

CHAPTER 4 DATA COLLECTION AND ANALYSIS

4.1 Data collection	24
4.2 Data analysis and interpretation	25
4.3 Conclusion	39

CHAPTER 5: SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction	47
5.2 Critical questions	48
5.3 Recommendations	48
5.4 Conclusion	55

6. REFERENCES

Appendix A – Letter	61
Appendix B – Permission letter	62
Appendix C – Questionnaire for the high school Mathematics teacher	63
Appendix E - Interview tool - Teachers' responses	67

CHAPTER 1

ORIENTATION

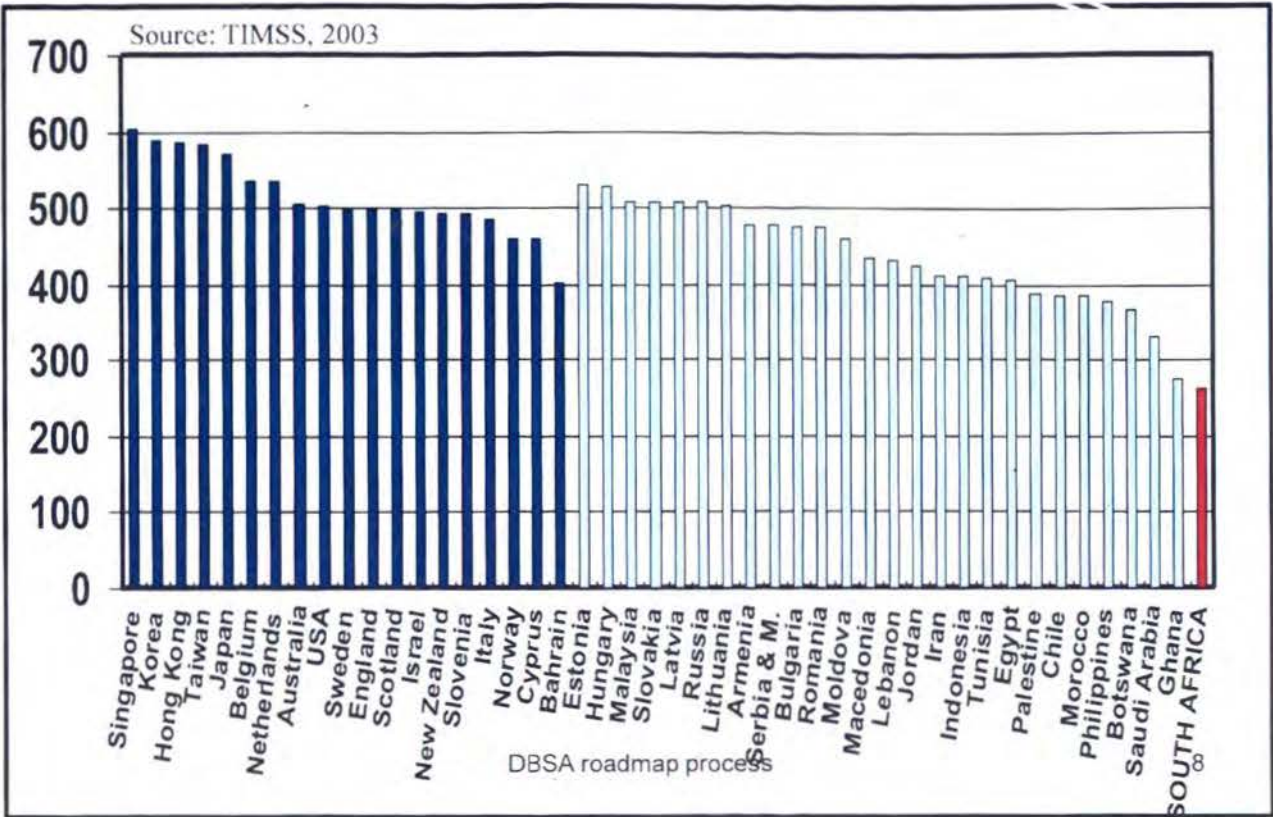
1.1 Introduction and background

Apartheid ideologies and their adherent had no intention for black South Africans to learn mathematics or any of the Sciences. Such ideologies maintained that the black person had no capabilities for these subjects. mathematics institution in the schools stressed drill and memorization of operation rather than understanding numbers. There was no link between what was taught in mathematics classrooms and skills needed in every situation (Department of Education, 1992: 3). In addition, Howie (2003:1), Rock and Shaw (2000:550) have also reported a number of short comings in the teaching and learning of mathematics. This led to failure and frustration resulting in negative attitudes towards mathematics.

Most of the learners indicate that they perceive mathematics as an unattractive field of study (Picker & Berry, 2000:65). They believe that teachers use violence, intimidation and threats to make them learn. Their view of mathematics shifts gradually from enthusiasm to apprehension, and from confidence to fear (National Research Council, 1989:43). Eventually most learners leave mathematics under duress, convinced that only those who are intelligent can learn mathematics. This causes a decline in enrolment of learners in advanced mathematics courses, and hence the increase in shortage of mathematicians and teachers of this important learning area.

Jaworski (1994:218) indicated that learning mathematics is related to being a Mathematician. If learners have images of mathematics, which are inaccurate, or stereo typed, this will hinder their studies of mathematics.

Table 1.1 TIMSS report on performance in mathematics



The consequences of the former apartheid educational system in South Africa are still catastrophic (Kahn, 2004: 149). They still hamper the career prospects, especially black learners. The Third International Mathematics and Science Study Repeat Survey (TIMSS – R) of world wide trends in respect of scholastic performance in mathematics confirmed once again that South African mathematics learners performance was significantly poorer than that of the vast majority of other participating countries in the tests that measured basic mathematical skills (Howie, 2001:18). Refer to table 1.1 above.

Research studies conducted have shown that South African learners as compared to learners of other countries are not performing well in mathematics (Gower, 2008:12). It further indicated that every year matric learners produce high fail rates in mathematics. Both local and international comparative equality tests have consistently graded South Africa poorly (Centre for Education Policy Development and Evaluation, 2003: 17). It further

indicates that South Africa ranked one of the lowest countries in a UNESCO-UNICEF project monitoring learning achievement in 12 African countries. Over 10000 South African Grade 4 learners participated in 2000 and scored 30% for numeracy. Similar findings were made by the World Economic Forums global competitiveness report for 2000, which ranked South Africa second last out of 59 countries in mathematics.

It has been reported that outdated teaching practices, lack of content knowledge and pedagogical content knowledge contributed to poor teaching standards (Makgato & Mji, 2006:254). A large number of under qualified or unqualified teachers who are teaching Mathematics has increased the poor standards. Mathematics audit revealed that more than 50% teachers have no formal subject training (DoE, 2001a: 5). The Education for all (EFA) 2000 assessment (2005) also reported that in spite of approximately 85% of Mathematics teachers, being professionally qualified; only 50% have specialized in Mathematics in their training.

South Africa is in need of suitably qualified teachers, doctors, scientists and many other scientifically orientated professionals. With the statistics of mathematics generally poor in the entire schooling system (Howie, 2003:1), it is conceivable that a system will not be able to produce enough learners who qualify to enroll at universities to pursue courses related to mathematics. South Africa does not have the capacity to expand economically without importing foreign scientific and technological expertise (Pratzner, 1994:3).

Lack of expertise impacts on the general economic outlook of the country (Makgato & Mji, 2006:254). For example, to provide employment for all, either through job creation or employment in the labour markets.

1.2 Statement of the problem

Learners have a stereotypical belief about Mathematics (Picker & Berry, 2001:86). They view it as being tough and boring, unattractive field of study. Teachers use intimidation and violence in order for learners to learn material, only those who are intelligent can do Mathematics, the lecture style of teaching which sets up an teacher as an authority figure. Mathematical knowledge is seen as something not to be discussed or negotiated. These factors cause a decline in learners who do mathematics.

The problem experienced is that learners do not understand mathematics as a learning area based on observing patterns with logical thinking. They find situations in which high demands made on them in order to process loads of information and to apply their knowledge and skills in everyday situations (Maree and Erasmus, 2007).

1.3 Research Questions or Hypothesis

The questions revolve around learner performance and teachers teaching mathematics

- 1.3.1 What are the teachers' views on the cause(s) of learners' not to choose Mathematics as one of their subject?
- 1.3.2 What are the teachers' views on the causes of underachievement by learners?
- 1.3.3 What may be appropriate intervention strategies that may assist teachers to change learners' stereotypical belief about mathematics?

1.4 Aim

Maree and Erasmus (2007) argue that South African training institutions are challenged to assess whether they train learners sufficiently in survival, to become lifelong learners and to accept responsibility for the learning process. The aim of the study is therefore to facilitate improved access of traditionally disadvantaged learners to good quality public education in South Africa.

1.5 Significance of the study

The study will benefit both the learners and teachers.

In an ever-changing society, it is essential that all learners passing through the further education and training band acquire a functioning knowledge of Mathematics, even if the learners will never enter the career that is directly linked to mathematics. A solid foundation can help them to understand the world around them better. It can also help them in their daily life, such as in calculating a discount in shops.

The study will benefit teachers in a sense that they will be confident with respect to knowledge of the subject they teach.

1.6 Delimitations

Of the total number of twenty-six high schools in Mahikeng Area Office, a random sampling of twelve schools was made. Thirty four (34) teachers from grade 10 to 12 were selected in the study and thirteen (13) teachers participated in the interview.

1.7 Limitations

The timing of data collection process was a challenge. This happened at the time learners and teachers were busy with the mid-term examinations. It was therefore not easy to set up appointments with schools during this time of the year.

1.8 Definition of terms

Stereotype - Mental picture learners have about mathematics, the picture might be inaccurate or stereotyped (Jawoski, 1944:218)

Interventions - Mediation or appropriate intervention needed to be created in order to change learners' stereotypical beliefs about mathematics

Rate - High or low compared to a standard. South African mathematics learners were compared to learners of other countries.

Attitude - An individual's degree of like or dislike for an item.

Outcomes – based education: It is a curriculum approach to teaching and learning that requires a shift from teaching input through syllabuses to a focus on learning outcomes (Jacobs et al., 2003: 102).

Constructivism: It is a theory of construction of all knowledge and its limits. Learners actively construct their own meaning and knowledge by interacting with their environment instead of passively absorbing information (Comfrey, 1990:20).

Learners – centeredness: it places more focus on learners learning than on teachers teaching. Teachers in this case should serve as facilitators' motivators and consultants of active team. (DoE, 2000).

Teacher – centeredness: Learning is transitive. The teacher transmits ideas, concepts and knowledge to the learner, while learners are positive.

Continuous assessment: Assessment is on ongoing basis. The assessment of a learner should rest on a whole series of performance of that learner, not only on one or two tests or on examination (Jacobs et al, 2003:35).

National Curriculum Statement: It is a curriculum approach teaching and learning that requires a shift from teachers input through syllabus to a focus on learner income (DoE, 2002).

Pedagogical content knowledge: It is described as ways of representing the subject, which makes it comprehensible to others. It also includes an understanding of what makes the learning of specific topics easy or difficult (Shulman, 1986:9).

1.9 Outline of Chapters

The report is structured into five chapters and they are briefly as outlined below:

Chapter 1. The focus is on introduction and background, the statement of the problem, research questions or hypothesis, aim or purpose of the study, significance of the study, delimitations and limitations, definition of terms and acronyms.

Chapter 2. It elaborates on literature related to teachers' views on learners understanding of Mathematics. A thorough study of primary and secondary sources will be made. Primary sources include research articles in journals, abstracts, research reports and scholarly books. Secondary sources are those written by authors who were not direct observes or participants in the events described.

Chapter 3. In this chapter the research design and methodology employed is discussed. It elaborates on how the research was conducted and what steps were taken to ensure the reliability of the study.

Chapter 4. The focus is on data analysis and interpretation.

Chapter 5. The chapter provides a summary, recommendations and conclusion on the study.

1.10 Summary

The chapter focused on introduction and background, the statement of the problem, research questions, aim of the study, its limitations and delimitations, definition of terms as well as the chapter outlines.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Inadequate achievement in mathematics frequently occurs respectively amongst black learners (Erasmus, 2002:75). He further indicated that learners find themselves in an educational situation that does not always promote optimal actualization of their personal potential. They find themselves in a situation in which high demands are made on them in order to process loads of information, to master contents and to apply their knowledge and skills in everyday situations. Learners end – up being frustrated, leaving mathematics convinced that only those who are intelligent can do mathematics. Education and training during apartheid was characterized by under-development of human potential, blacks in particular were the most affected (Makgato & Mji, 2006:253)

Outcomes-based education was introduced in South Africa in 1997 (Department of Education, 2003:3) The reason for introducing a new system in South Africa was to transform society from being racists, fragmented and undemocratic to one that will create a culture of human rights sensitive to multiculturalism and nation building.

One of the most fundamental ways to achieve these purposes is to have a school curriculum in which young people learn to be active, creative, critical thinkers who will live productive and fulfilling lives when they become adults. This means that schools should no longer be institutions where learners merely memorise abstract content, but rather places where learners learn practical and thinking skills that will equip them to obtain and use knowledge that is relevant to their lives.

2.2 Importance of mathematics

Mathematics is based on observing patterns with logical thinking. It enables creative and logical reasoning about problems in the physical and social world and in the context of mathematics itself (Department of Education; 2003: 2.)

South Africa is in need of qualified mathematics teachers, doctors, scientists and many other scientifically oriented professionals. With the status of mathematical literacy generally poor in the entire schooling system, it is conceivable that a system will not be able to produce learners who qualify to enroll at universities with mathematics as a major subject of

study. Currently South Africa does not have the capacity to expand economically without importing foreign scientific and technological expertise (Pratzer, 1994:254).

2.3 Specific interventions that can be created in order to assist teachers to change learners' stereotypical belief about mathematics

Factors are divided into two categories, namely direct and indirect influences. Direct influences include teaching strategies, content knowledge, understanding, also motivation, and interest. Indirect influences include the role played by parents in their children education and general language usage.

2.3.1 Teaching Strategies

It has been reported that outdated teaching practices and lack of basic content knowledge have resulted in poor teaching standards (Makgato and Mji, 2006:254). In some instances this has resulted in schools not offering mathematics as a teaching subject, even those who offer the subject do not have qualified teachers who would promote effective teaching and learning.

(1) Curriculum and instruction

Before 1994 mathematics classroom was only highly organized, the syllabus was rigid and textbooks were fixed. Mathematics was considered as a science that does not make mistakes. There was one correct answer for questions. Incorrect answers were not tolerated. Learners were usually punished if they make mistakes. Teachers were expected to perform according to a certain set of rigid expectations and they were punished if they did not (Thelen, 1993:118).

The old curriculum perpetuated race, class and gender division, and has emphasized separateness rather than common citizenship and nationhood. In 1997, the new curriculum, curriculum 2005 was introduced in South Africa. It changed the society from being undemocratic and fragmented, and as such, many developments are taking place in the field of mathematics education.

Curriculum needs to change from transmission to transactional curriculum, whereby students are actively involved in their learning to reach new understanding. Piaget (1983:68) argues that teachers must plan a developmentally appropriate curriculum that enhances learner's logical thinking and conceptual growth. He further argues that learning occurs by an active construction of knowledge rather than passive recipients.

Negotiation in constructivism unites teachers and students in common purpose. Smith (1993:72) confirms that negotiating curriculum means custom-building classes every day to fit the individuals who attend.

Boomer (1992:17) explains that negotiating the curriculum means deliberately planning to invite students to contribute, and to modify the educational programme, so that they will have a real investment in both the learning journey and the outcomes. Negotiation also means making explicit, and then confronting, the constraints of the learning context and non-negotiable requirements that apply.

If curriculum is negotiated in constructivism it will be problem-based, it will be organised around themes, current issues and real-life problems. If students are involved in negotiating the curriculum, they may be involved in the way their assignments are evaluated. In contrast, in traditional perspective, curriculum development process is not open to public comment.

The content of the curriculum is being selected and organised around the structure of the discipline. The syllabus is also rigid and non-negotiable. It is discipline-based.

In NCS, the focus will be on processes to develop connections and form conceptual frameworks into which new information may be integrated. The emphasis will be on holistic concepts. Whereas in traditional teaching the content is placed into rigid time frames, and is loaded with detail.

It is further stated that in constructivism, curricular activities rely heavily on primary sources of data and manipulative materials, whereas in traditional model, curricular activities rely heavily on textbooks and workbooks.

Constructivists encourage learner-centered education philosophy. They espouse active discovery learning environments in schools. Simon and Schifter (1991:62) argue that students should be consistently and actively engaged in exploring mathematical problem situations, look for patterns in generating ideas and hypothesis. The approach places more focus on learners learning rather than on teachers teaching.

The role of a teacher is to facilitate, manage and motivate learners. They should use symbols and procedures to make meaningful connections between the concepts. They should use manipulative models as tools. Teachers will no longer be sources and transmitters of knowledge, because learners will be trained to take responsibility for their own learning. Lindfords (1984:89) asserts that the way teachers learn, should originate from how learners learn.

Construction of knowledge plays a major role in teaming. Van de Walle (1990: 102) argues that knowledge must be acquired by the learner through active, reflective thought and especially in learning mathematics since mathematical concepts are relationships, which are not empirical in form. Comfrey (1990:98) also emphasizes that learners actively construct their own meaning and knowledge by interacting with the environment, instead of passively absorbing information. In traditional model, learners primarily work on their own which can lead to high failure rate of learners.

National Curriculum Statement (NCS) encourages learners to be assessed on ongoing basis. This can reduce the number of learners repeating. Assessment is interwoven with teaching and occurs through learner's exhibitions and portfolios. According to Owings and Follow (1992:27), portfolio assessment can help learners understand their strengths and weaknesses. Traditional model's assessment is examination driven. It is viewed as separate from teaching and occurs through testing. Assessment is associated with measurement for the purpose of selection, certification and accountability. This discourages learners, as their future determined by only final year test.

NCS classrooms are structured in such a way that learners are immersed in experiences within which they may engage in meaning – making inquiry, action, imagination, invention, interaction, hypothesizing and personal reflection. It is believed that teachers need to recognise how people use their own experiences, prior knowledge and perceptions as well as their physical and interpersonal environments to construct knowledge and meaning. The

goal is to produce a democratic classroom environment that provides meaningful learning experiences for autonomous learners.

In NCS classroom, students are encouraged to use prior experiences to help them form and reform interpretations. While in a traditional classroom, a teacher is seen as an expert, who knows the answers to all questions. Students are asked to identify their teacher's constructions rather than to construct their own meanings.

In NCS classroom, the teacher and the students share responsibility and decision-making and demonstrate mutual respect. An invisible and imposing impenetrable, barriers between student and teacher exists through power and practice in the traditional classroom.

(2) Learners-centeredness

In NCS, teaching is learner-centered. Learning is an active process in which learners make meaning out of their own experiences. Learners are encouraged to explore and discover mathematical concepts instead of passively learning mathematics. By exploring and discovering, students have the opportunity to actually do mathematics. They will create representations and explanations of new information, which will meaningfully connect with prior knowledge (Resnick & Ford, 1981: 58; Simon, 1986:40).

In contrast, in the traditional model of teaching, teacher centeredness is encouraged. Learning is transitive. The teacher transmits ideas, concepts and knowledge to the learner in the process while learners are passive. They are "tabula rasa" as they are regarded as blank slates upon which the teacher writes knowledge (Mugs and Jugs model of learning). A traditional perspective focuses more on teaching. From a constructivist view, knowing occurs by a process of construction by the knower. Lindfords (1984: 12) asserts that the way we teach should originate from how students learn.

Simon and Schifter (1991;37) identified the role of students within their working model for mathematical instruction. They argue that students should be consistently and actively engaged in exploring mathematical problem situations look for patterns in generating ideas and hypothesis, in verifying these hypotheses, generalizing, and justifying the ideas that they come up with.

A constructivist learner-centered approach places more focus on student learning than on teachers teaching. The roles of a teacher in the constructivist view of teaching are facilitator, manager and consultant.

Construction of knowledge plays a major role in teaming. Van De Walle (1990:67) argues that knowledge must be acquired by the learner through active, reflexive thought and especially in learning mathematics since mathematical concepts are relationships which are not empirical in form. In traditional model, students primarily work on their own.

(3) Assessment

Constructivism encourages learners to be assessed on ongoing basis. The assessment is interwoven with teaching and occurs through student exhibitions and portfolios whereas traditional model's assessment is examination driven. It is viewed as separate from teaching and occurs through testing.

The assessment component of an OBE curriculum should be based on:

- Criterion – referenced assessment, that is learners are assessed against a set of external criteria and is not compared with performance of other learners;
- Performance assessment – Learners must demonstrate that they are able to do what they are required to do as described in the outcomes; such actions should be on understanding, skills and attitude;
- Assessment of complex skills – Assessment should be conducted in such a way that many skills are assessed, at the same time and not just one skill at one time;
- Continuous assessment – Assessment should be done on an ongoing basis. The assessment of a learner should rest on a whole series of performances of that learner, not only on one or two tests or examinations. (Jacobs et al, 2003 : 106)

2.3.2 Content knowledge and understanding

A lack of knowledge about teachers and what they do can also contribute to learners stereotypical believe about mathematics (Picker & Berry, 2001:86). It may be that teachers hold certain stereotypes too, or that among the many Learning Areas the teacher must

teach, mathematics is one of the teachers least likes and is least comfortable with. Learners indicate that they memorize, they do not understand, when they ask the Teachers also does not know (Makgato & Mji, 2006: 257).

It has been reported that outdated teaching practice and lack of basic content knowledge have resulted in poor teaching standards (Makgato & Mji, 2006: 259). He further indicated that poor standards have also been exacerbated by large number of under – qualified or unqualified teachers who are teaching mathematics. Education for All (EFA) assessment (2005) also reported that in spite of approximately 85% of mathematics teachers being professionally qualified only 50% have specialized in mathematics in their training.

South African training institutions are being challenged to access whether they train learners sufficiently in survival skills, to become life long learners and to accept responsibility for the learning process (Erasmus, 2007:98). DoE's (2000: 23) Norms and standards for teachers lists the role of teachers as being among other things learning mediators, designers of learning programmes and materials. Learners admire good personal qualities and teaching techniques, and also teachers who are patient and explain things clearly (DoE, 2000:31). Desirable teacher qualities are linked to good subject knowledge, teaching skills and classroom management, relationships with learners, dedication, accessibility and hard work.

The national Curriculum Statement is based on the vision of a teacher who is socially politically critical and responsible. It means that the teacher should be aware of changes in current educational dispensation. Such teachers should be professionally competent and in touch with current developments, especially in their areas of expertise. In addition the teacher must be open to views and opinions held by learners, which may differ from his or her own.

The NCS envisages teachers who are qualified, competent, dedicated and caring and who will be able to fulfill various roles outlined in Norms and Standards for Teachers. (Department of Education, 2002a: 19).

The democratic and interactive process of a constructivist classroom allows students to be active and autonomous learners. Using constructivist strategies, teachers are more effective. They are able to promote communication and create flexibility so that the needs of

all students can be met. The learning relationship in constructivist classroom is mutually beneficial to both students and teachers.

A teacher in NCS exemplifies lines of reason to build theories, while in traditional teaching the focus is on rhetoric of conclusions. In NCS, the teacher responds to questions which develop lines of questions, while in traditional teaching, closed questions are encouraged. Besides the teacher devises co-operative learning strategies foster a collaborative environment whereas in traditional teaching a teacher dependent attitude is encouraged.

In addition, teachers seek the student's points of view in order to understand student's present conceptions for use in subsequent lessons unlike in traditional model, where the teachers seek the correct answer in order to validate student learning.

2.3.3 Motivation and interest

Motivation is a function of confidence. If teachers are confident with respect to knowledge of the subject they teach, have a grasp of common misconception learners present in the classroom, and possess strategies for inducing learners' conceptual change through pedagogical content knowledge, then motivational issues would be much easier to handle. Learners will see the value and importance of education. (Makgato & Mji, 2006: 260).

2.3.4 Language

Some learners complained that it was difficult to understand some of the concepts used in mathematics (Makgato & Mji, 2006: 262). English is generally a problem on its own.

South African learners experience huge problems communicating their answers in the language test (Maree and Erasmus, 2007: 17). It is further indicated that learners struggle to deal with word problems and experience great problems with fraction and sums in which geometry had to be used to calculate area. It has been discovered that learners who have good command of the language do better in mathematics than those who have bad command of the language (Maree and Erasmus, 2007: 36). It is therefore evident that language proficiency has significant impact on the learners performance in mathematics.

2.3.5 Parental involvement

Parents have the advantage over anyone else in that they can provide a positive more stable and continuously positive influence that could enhance and complement what the

school fosters on their children. Makgato and Mji (2006: 263) indicate the importance of parental involvement in the learning of children. They also indicated that parents can be involved in school functions and the buying of necessary school equipment. It is indicated that some parents never come to school to discuss with teachers; their learner performance. Mbinda (2005: 235) further argues that the content of what learners learn, may fall short because in general, parents do not possess the necessary education and therefore find it difficult to determine and understand what was done at school.

2.4 Summary

The literature was reviewed in this chapter. Furthermore, the importance of mathematics of studying mathematics was discussed. Besides, there was an elaboration on how to create specific interventions to assist teachers to change learners' stereotypical belief about mathematics. The chapter concluded by focusing on issues that relate to language and parental involvement in the learning of mathematics.

CHAPTER 3

RESEARCH DESIGN, METHODOLOGY AND SAMPLING

3.1 Research design and methodology

The literature review on teachers' views on learners' understanding of mathematics in Chapter 2 and research questions outlined in Chapter 1 provide the guideline for the design of this study. The focus of this chapter is on the methodology used in the research on various aspects that are applicable to all the stages of the study.

The study proceeded from general to specific statements using prescribed rules and logic. A mixed method approach was used as methodological framework of the study (Mahlomaholo, 2009:12). Breweton, *et al*; (2002:35) define quantitative method as a system for organizing known facts to reach conclusion by using an argument. In quantitative research anything can be counted and the researcher remains objective. The strategy can be explorative, descriptive, comparative, casual, predictive or relational. Quantitative data is more efficient but may miss contextual detail (Neil, 2000:35).

Qualitative design in a form of interviews with teachers was also used. In qualitative research observations are made on particular events and then inferences are made about the whole situation (Neil, 2000:37) and in order for the observer to be absolutely certain of qualitative conclusion, many examples should be observed. The examples of qualitative research are in-depth interviews and group discussion. The researcher is subjectively immersed in the subject matter.

3.2 Site population and sample

The population was Further Education and Training (FET) mathematics teachers. (Grades 10, 11 and 12). Of the total number of twenty-seven high schools in the Mahikeng Area Office (AO). Simple random sampling of twenty (20) schools was made from the population. Thirty four (34) teachers teaching mathematics in grade 10 to 12 participated in the study.

3.3 Research Instrument

A questionnaire was used for data collection. The researcher administered copies of the questionnaires during a specified time. A well-designed questionnaires boost the reliability and validity of the data to acceptable level of tolerance. The following are some rules for constructing a questionnaire:

- Clarity, items should mean the same to all respondents;
- Short items are preferable;
- Double – barreled items which require subject to respond to two separate ideas with a single answer should be avoided, and
- Biased questions are to be avoided.

The following research questions are based on teachers' views on learners' understanding of mathematics:

- **What are the teachers' views on the cause(s) of learners' not choosing mathematics as one of their subject for the study?**

Data collection related to the above research question was done through a questionnaire. The questionnaire was based on Van Rooyen and De Beer (2006: 35), Makgato and Mji (2006:257), and Picker and Berry (2000:89) framework.

- **What are the teachers' views on the causes of underachievement by learners?**

Data collection related to the above research question was done through interviews. The interview instrument was based on the work done by Makgato and Mji (2006:257), and Picker and Berry (2000:89).

- **What may be appropriate intervention strategies that may assist teachers to change learners' stereotypical belief about mathematics?**

Data collection related to the above research question was done through questionnaires. This was based on the work done by Van Rooyen and De Beer (2006: 35).

3.4 Format and content of the questionnaire

The instrument used in the study is based on the work of Van Rooyen and De Beer (2006:36) who focused on the teaching of Science and also the work of Makgato and Mji (2006:253) where the study was on factors associated with high school learners' poor performance: a spotlight on mathematics and physical science. Picker and Berry (2000:86) were also incorporated and their focus was on investigating pupils' images of mathematicians. In this study items from the three studies were adopted and used to seek the teachers' views on learners' understanding of mathematics.

The researcher designed questionnaires which are divided into four major sections. Section A gathers bibliographical and demographical information about each respondent. This information is essential to understand the background information of the respondent.

Section B – The main objective of these questions is to gather information or data on investigating learners understanding of themselves as learners of mathematics in the FET phase. For each item, the respondents are asked to reflect on a five-point scale, their opinion:

1 = strongly disagree; 2 = disagree; 3 = uncertain; 4 = agree; 5 = strongly agree

Section C – These questions are constructed to collect data on the commitment and involvement of Mathematics teachers in the quest for quality results.

Section D – Interview questions.

3.5 Ethical statement

In order to comply with the ethical issues during the study, participants were assured that the following would be taken into consideration:

- Right to confidentiality – information was released to authorized persons; participants were assured that the information collected will not be publicized without their consent.
- Right to anonymity – it is concerned with the source of information
- Right to privacy – names of respondents are not published.
- Integrity – professionalism was not compromised during the process of data collection (Neil P, 2000:34).

3.6 Summary

The chapter focused on the methodological framework and the instruments used for data collection. Also discussed were ethical issues related to the study. Chapter focuses on the results through questionnaires and interviews conducted with the teachers. It reports on the findings.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

In chapter 3, the instruments used to collect data – questionnaires and interview were described within the context of various stages of the study. This chapter focuses on teachers' views about causes of learners not to choose mathematics and underachievement in the subject. The section also includes some of the intervention strategies created in order to assist teachers to change learners' stereotypical belief about mathematics.

Reporting in this chapter is divided into four parts. The first part focuses on biographical and demographic information of the respondents; the second part describes the teachers' views on learners understanding of themselves as learners of mathematics. The third part is concerned with teachers' level of commitment and involvement in producing quality results as mathematics teachers and the fourth part reports on interviews with teachers to acquire further elaboration on their views about learners understanding of mathematics.

4.1 Data Analysis and interpretation

SPPS version 17 was used to provide descriptive analysis of the data. Table 4.1 provides the biographic details on the respondents.

BIOGRAPHICAL DETAILS

Table 4.1: Background on teachers

Age of teachers						
	Below 30	30 -34	35 – 39	40 – 44	45 – 49	50 and above
Percentages	18	14	34	14	14	6
Gender for teachers						
	Female	Male				
Percentages	49	51				
Educational qualification						
	Diploma	Degree	Honours	Others		
Percentages	37	51	9	3		
Rank of job						
	PL 1	PL 2	PL 3	Principal		
Percentages	68	23	6	3		
Grade 10, 11 and 12 teachers						
	Grade 10	Grade 11 and 12				
Percentages	60	40				
Teaching experience						
	1 – 3 years	4 – 7 years	8 years and above			
Percentages	17	17	66			
School settlement						
	Rural	Urban				
Percentages	77	23				

Thirty-four percent (34%) of the teachers who participated in the study were between 35 and 39 years. Fifty one percentages (51%) of the teachers were male while the rest were female. Most of the teachers (about 90%) are professionally qualified.

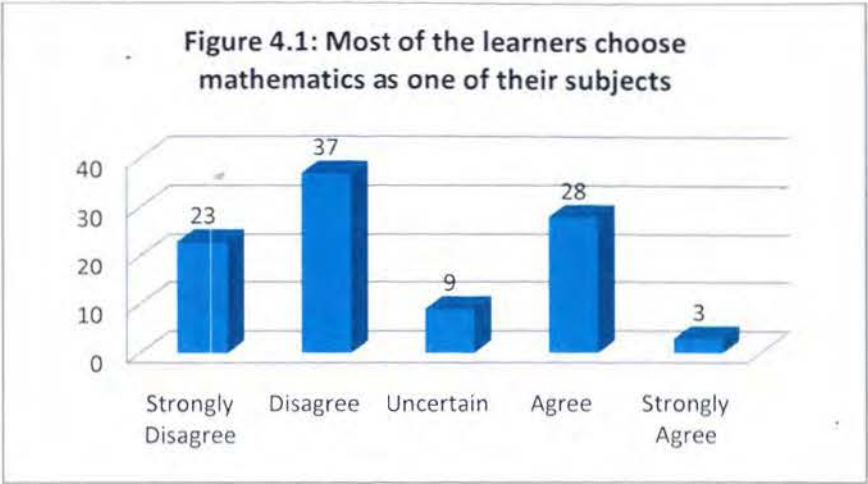
The majority of participants (above 60%) are classroom managers or practioners. About sixty percent (60%) of the teachers who participated in the study are teaching grade 10. Sixty-six percent (66%) Of the teachers who were part of the survey have more than 8 years teaching experience. The study was dominated by teachers from the rural schools. The rural school teachers are represented by 77%.

Table 4.2 Teachers' views on learners understanding of themselves as learners of Mathematics.

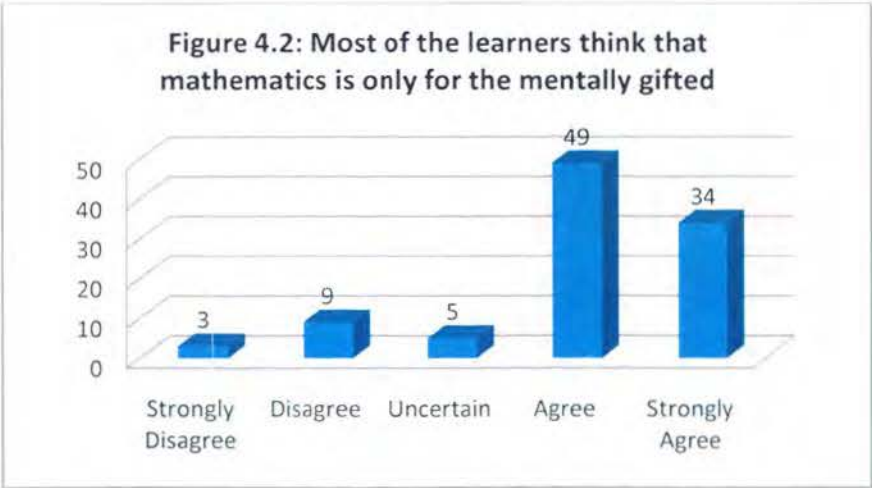
		SD	D	U	A	SA
1 Most of the learners choose Mathematics as one of their Subjects	%	23	37	9	28	3
2. Most of the learners think that mathematics is only for the mentally gifted	%	3	9	5	49	34
3. The majority of the learners perceive Mathematics to be an unattractive fields of study	%	9	34	14	31	11
4 Most of the learners under achieve, because of lack of prior knowledge in Mathematics	%	-	-	5	46	49
5 Most of the learners think that Mathematics is boring and Difficult	%	3	14	3	46	34
6 Inaccurate learners image of Mathematics teachers may hinder their studies in Mathematics	%	-	17	29	37	17
7 Learners view Mathematics as a rigid system of externally dictated rules governed by standard of accuracy, speed and memory shifts them from confidence to fear	%	3	6	20	57	14
8 Traditional method of teaching, where classes were highly organised, the syllabus rigid and the text books fixed, caused learners to believe that teachers do hard Mathematics	%	6	23	17	37	17
9 Mathematics classrooms should be more learner centred, so that learners should view Mathematics as an attractive subject	%	-	-	6	51	43
10 Learners view Mathematics as difficult because teachers also regard it as a difficult subject	%	20	29	17	20	14
11 Learners also think that Mathematics is for rich people	%	29	49	11	3	9
12 Lack of resources cause learners to think that they are not suitable to do Mathematics	%	14	31	9	26	20
13 Most teachers discourage learners to do Mathematics	%	31	20	9	34	6
14 Most of the teachers are not suitably qualified to teach Mathematics hence this causes learners to think that Mathematics is a difficult subject	%	6	20	28	37	9
15 Mathematics classroom should be more learner-centred and that Mathematics teachers should be a guide who opens the way for the learner s to create his or her own learning	%	-	3	14	34	49
16 Learners visualize Mathematics teachers as people who use intimidation and threats to make their learners learn material	%	14	43	26	11	6

4.1.2 Data interpretation

This section is organized in terms of items used in the questionnaire (see table 4.2). The responses are elaborated and illustrated further with additional graphs.



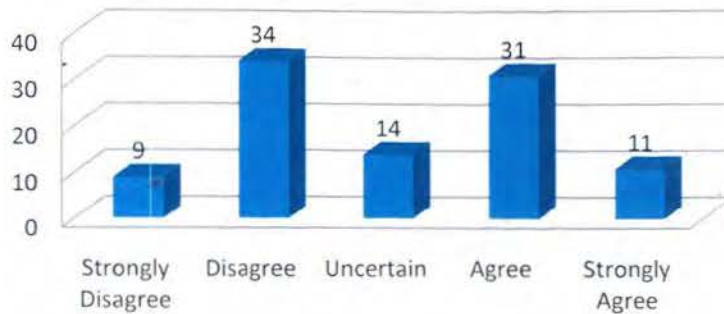
As highlighted by the graph in the figure 4.1, item 1 in table 4.2, the majority of teachers (60%) disagree with the statement. According to them very few learners choose Mathematics as one of their subjects. Nine percent of teachers could not provide their views on this statement. This may be attributed to the fact that they are still new in the field



As highlighted by the graph in the figure 4.2, item 2 in table 4.2, the majority of teachers (83%) agree with the statement that most of the learners think that Mathematics is only for the mentally gifted, 12% of the teachers disagree with the statement while 5% is uncertain.

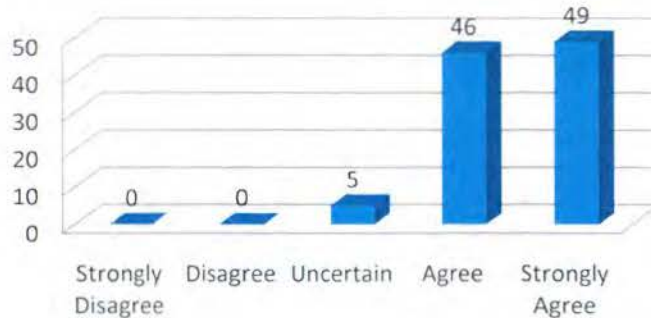


Figure 4.3: The majority of the learners perceive mathematics to be an unattractive fields of study

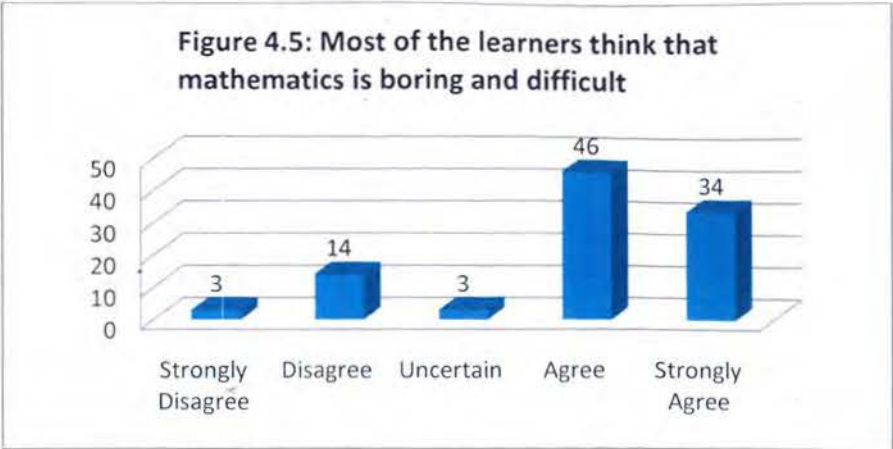


As highlighted by the graph in the figure 4.3, item 3 in table 4.2, the majority of teachers (43%) disagree with the statement that the majority of the learners perceive Mathematics to be unattractive fields of study, 42% of the teachers agree with the statement while 14% is uncertain.

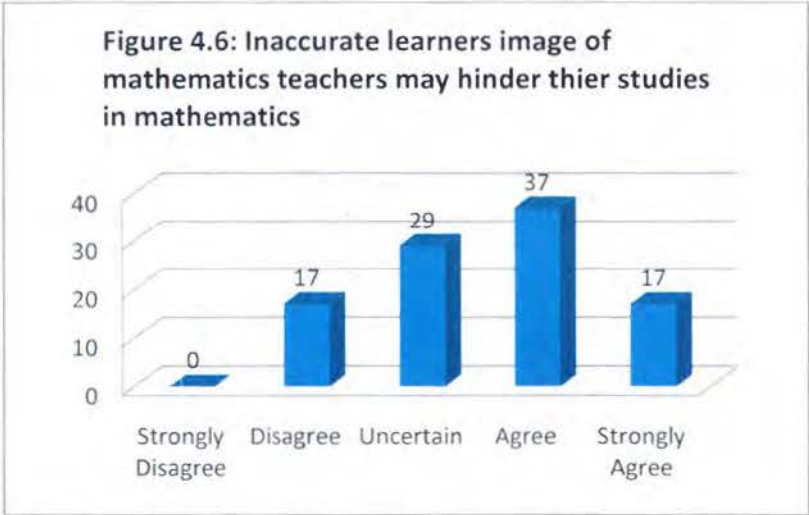
Figure 4.4: Most of the learners under achieve, because of lack of prior knowledge in mathematics



The above graph figure 4.4, item 4 in table 4.2, shows that the majority of teachers (95%) agree with the statement that most of the learners underachieve, because of the lack of prior knowledge in Mathematics while 5% is uncertain.

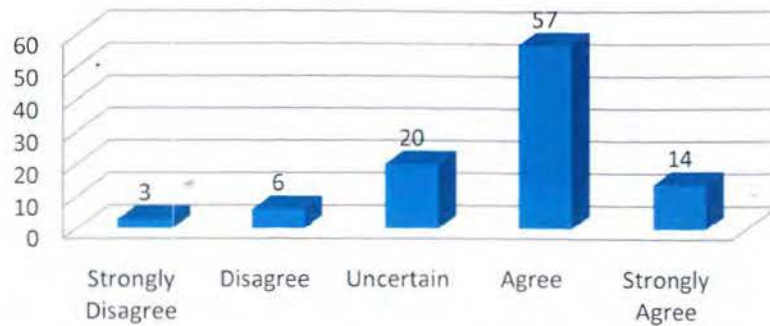


The above graph figure 4.5, item 5 in table 4.2, shows that the majority of teachers (80%) agree with the statement that most of the learners think that Mathematics is boring, 17 % disagrees while 3% is uncertain.



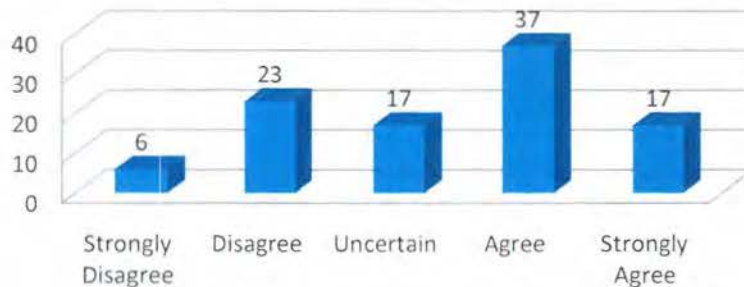
As highlighted by the graph in the figure 4.6, item 6 in table 4.2, the majority of teachers (54%) agree with the statement that inaccurate learners' image of Mathematics teachers may hinder their studies in Mathematics, 17% of the teachers disagree with the statement while 29% is uncertain.

Figure 4.7: Learners view mathetics as a rigid system of externally dictated rules governed by standard of accuracy, speed and memory shifts them from confidence to fear



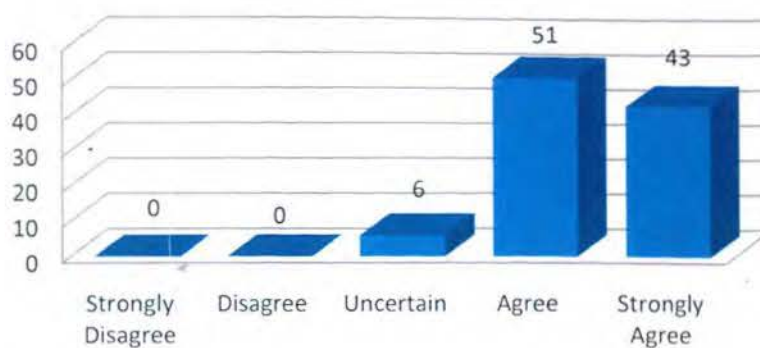
As highlighted by the graph in the figure 4.7, item 7 in table 4.2, the majority of teachers (71%) agree with the statement that learners view Mathematics as a rigid system of externally dictated rules governed by standard of accuracy, speed and memory shifts them from confidence to fear, 9% of the teachers disagree with the statement while 20% is uncertain.

Figure 4.8: Traditional method of teaching, where classes were highly organised



As highlighted by the graph in the figure 4.8, item 8 in table 4.2, the most teachers (54%) agree with the above statement, 29% of the teachers disagree with the statement while 17% is uncertain.

Figure 4.9: Mathematics classrooms should be more learner centred

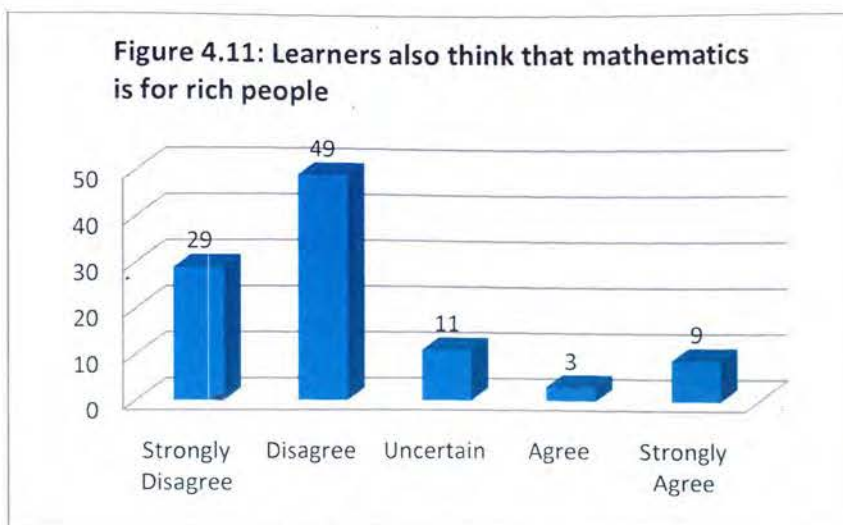


As highlighted by the above graph figure 4.9, item 9 in table 4.2, most teachers (94%) agree with the above statement while 6% is uncertain.

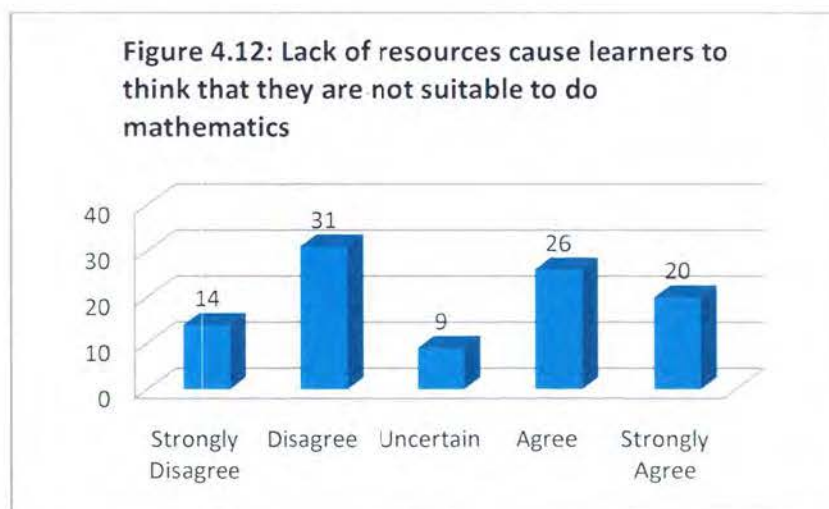
Figure 4.10: Learners view mathematics as difficult because teachers also regard it as a difficult



The above graph figure 4.10, item 10 in table 4.2, shows that the majority of teachers (49%) disagree with the statement that learners view Mathematics as difficult because teachers also regard it as difficult subject, 34 % agrees while 17% is uncertain.

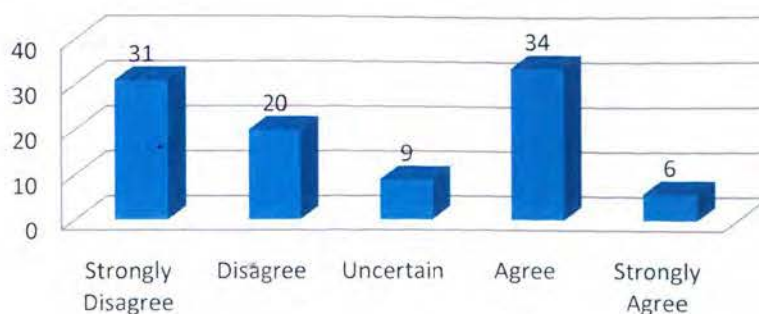


The above graph figure 4.11, item 11 in table 4.2, shows that 78% of teachers disagree with the statement that learners also think that Mathematics is for rich people, 12 % agrees while 11% is uncertain.



As highlighted by the graph in the figure 4.12, item 12 in table 4.2, 46% of the teachers agree with the above statement, 45% of the teachers disagree with the statement while 9% is uncertain.

Figure 4.13: Most teachers discourage learners to do mathematics



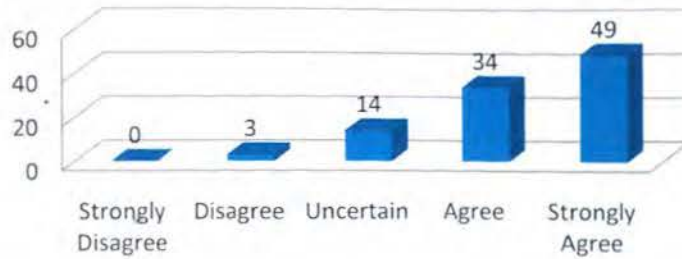
As highlighted by the graph in the figure 4.13, item 13 in table 4.2, 51% of the teachers disagree with the statement that most teachers discourage learners to do Mathematics, 40% of the teachers agree with the statement while 9% is uncertain.

Figure 4.14: Most of the teachers are not suitably qualified to teach mathematics



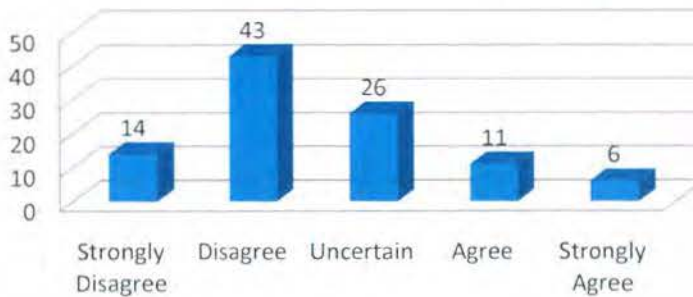
The above graph figure 4.14, item 14 in table 4.2, shows that 46% of the teachers agree with the above statement 26% disagrees while 28% is uncertain.

Figure 4.15: Mathematics classroom should be more learner-centred and that mathematics teachers should be a guide



The above graph figure 4.15, item 15 in table 4.2, shows that the majority of the teachers (83%) agree with the statement that Mathematics classroom should be more learner-centred and that Mathematics teachers should be a guide who opens the way for the learners to create his or her own learning, only 3% disagrees while 26% is uncertain.

Figure 4.16: Learners visualize mathematics teachers as people who use intimidation and threats to make thier learners learn material



As highlighted by the graph in the figure 4.16, item 16 in table 4.2, the majority of teachers (57%) disagree with the statement that learners visualise Mathematics' teachers as people who use intimidation and threats to make their learn material, 17% of the teachers agree with the statement while 2% is uncertain.

Table 4.3 Teachers' level of commitment and involvement in producing quality results

		Yes	No
1. Mathematics make learners communicate appropriately using description in words, symbols and graphs	%	97	3
2. Do most teachers monitor learners work constantly	%	63	37
3. Teachers should have resources such as computers and calculators	%	97	3
4. Teachers should encourage learners to discover principles by themselves	%	91	9
5. Teachers should use manipulative models wisely to help learners form conceptual relationships	%	94	6
6. Teachers should avoid mindless drill and practice in mathematics	%	60	40
7. Do teachers apply the new method of teaching, Outcomes Based Education	%	43	57
8. An teacher should act as a facilitator and not a transmitter of knowledge	%	91	9
9. Teachers should treat learners as people who are confident, hard working and independent	%	89	11
10. A solid foundation in Mathematics can help learners understand the world around them, such working out a discount in shops	%	100	-

From table 4.3, the following interpretations can be made:

- The overwhelming majority agrees that mathematics make learners communicate appropriately using description in words, symbols and graphs.
- Most of the teachers agree that teachers constantly monitor learners' work.
- Teachers believe that the availability of resources such as computers and calculators teachers will enhance teaching process.
- More than 90% of the teachers support the statement that teachers should encourage learners to discover principles by themselves.
- More than 90% of the teachers agree that teachers should use manipulative models wisely to help learners form conceptual relationships.
- Sixty percent of the respondents agree with the statement that teachers should avoid mindless drill and practice when teaching Mathematics.

- The majority disagrees with the statement that teachers apply the new method of teaching, Outcomes Based Education.
- More than 90% agrees with the statement that an teacher should act as a facilitator and not a transmitter of knowledge
- 88% of the respondents agree with the statement that teachers should treat learners as people who are confident, hardworking and independent.
- All teachers interviewed agree that foundation is key to the learning of mathematics.

4.3 SUMMARY

The chapter discussed data analysis and interpretation, graphs were also used to interpret data.

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

According to Van Rooyen H and De Beer F(2006:viii), in many instances learners perceive Mathematics as “difficult” and either avoid the subject or drop it as soon as they are allowed to. South Africa (SA) is performing poorly in the Third International Mathematics and Science Study (TIMSS) compared to other countries. The government needs an abundance of people whose background requires mathematics if we are to find the skills we need to run large development projects, transport schemes, municipalities, energy plans and much more. President Jacob Zuma is quoted to have stated that the country cannot achieve the level of growth without many more people with a solid grounding in mathematics and science (McCarthy & Bernstein, 2010: 4).

Our education system had a curriculum which was content-based and rewarded learners who could reproduce information acquired through rote learning. Teachers used to teach content and acted as transmitters of knowledge, transferring information into the heads of the learners. When teachers knew that content areas were not to be examined in matric they left them altogether. The traditional teaching approach tended to be theoretical, examination driven and content based.

Competent and committed mathematics teachers are a key factor in addressing the challenges. They need training in Outcomes Based Education, National Curriculum Statement and also in subject content. In 1998, a new curriculum was introduced in South African schools. This curriculum places an emphasis on producing learners who are critical thinkers, capable of solving problems and are responsible for their own learning (De Beer & Van Rooyen, 2006: viii).

They further indicated that the new curriculum aims to produce learners who do not only have the knowledge, but also skills, attitudes and values which will produce competent, responsible and thinking citizens.

A national strategy to address problems related to the teaching of mathematics was developed in South Africa. The strategy has eight priorities one of which is the preparation of qualified and competent teachers in every mathematics classroom.

5.2 Critical questions, findings and recommendations

This section is structured according to the research questions below:

- What are the teachers' views on the cause(s) of learners' not to choose Mathematics as one of their subject?
- What are the teachers' views on the causes of underachievement by learners?
- What may be appropriate intervention strategies that may assist teachers to change learners' stereotypical belief about Mathematics?

5.2.1 What are the teachers' views on the causes of learners' not to choose mathematics as one of their subject of study?

Findings

The majority of teachers agree with the statement that most of the learners think that Mathematics is boring. Teachers also indicated that learners regard Mathematics unattractive field of study because they lack good foundation in the subject.

Teachers believe that learners lack motivation. Learners become motivated when they achieve the required outcome (Van Rooyen & de Beer *et al*, 2006:6). They further indicated that motivation of learners is brought about by content which is relevant to the world in which they live as well as by interesting teaching methods where they are actively involved.

When learners feel that teachers really care, and make lesson fun, they become more interested in learning. Cooperative learning should be promoted as much as possible as working together in groups also motivates learners.

Recommendations

- Teachers should create an environment that will stimulate and encourage learning by means of planning properly, organizing classrooms in such a way that they will

contribute to positive learning and motivating learners and hence minimizing inappropriate behavior.

- Teachers should know their learners. Learner-centred means knowing about the differences amongst the learners in the classroom. They must know the learners' cultural background, belief and practices. Teachers will then be able to plan and implement suitable Mathematics lessons that meet the needs and interests of individuals in their classes.
- Cooperative learning should be promoted as much as possible as working together in groups also motivates learners.

5.2.2 What are the teachers' views on the causes of underachievement of learners in mathematics?

Findings

During the interview, some teachers indicated that the way teachers portray mathematics to learners is so difficult to understand. There is no link of what they are doing in class to real life situation. Some indicated that learners are lazy to think for themselves but allow other people to think for them.

The teaching of mathematics by teachers who are not confident in the subject as well as lack of motivation of learners by the same teachers contributed immensely towards underachievement of learners in the subject. The laying of solid foundation is of key importance to Mathematics learners.

Recommendations

- Teachers should know the difficulties learners experience and what cause these difficulties. Some areas of Mathematics are difficult for learners to understand. Reading the relevant Mathematics books will enable teachers to find out and understand what the problem areas are.

5.2.3 Which specific intervention strategies may be created in order to assist teachers to change learners' stereotypical beliefs about mathematics?

The majority of teachers have no idea on how they may address this aspect. Most of them comment on extra lessons. About fifty seven percent (57%) of the teachers indicated that they do not apply the new method of teaching which is Outcomes Based Education (OBE).

During the interviews, some teachers indicated that using OBE is not fruitful, they indicated that learners lack the capacity to learn on their own. Some indicated that formal drill work with basics is necessary before a learner can discover anything on his/her own. Furthermore, some indicated that OBE should not be applied because most of the time learners are left on their own with no guidance.

Recommendations

The new South African curriculum requires Mathematics teachers to change their practice in nine ways. Van Rooyen and de Beer *et al* (2006:19) list these nine basic requirements as follows:

- Education should be outcomes-based
- Teachers should be facilitators of learning
- Learning needs to be learner-centered
- Learning should be activity-based
- The curriculum should be activity-based
- The curriculum should be relevant
- Skills development should be a focal part of the curriculum
- Group work should be promoted
- Continuous assessment should be used to foster learning
- Learning should be integrated across learning areas or subjects.

The above requirements are therefore discussed and elaborated.

5.2.3.1 Education should be outcomes based.

According to Van Rooyen and De Beer (2006:20), outcomes state what learners should be able to do after a lesson and are not just a list of activities done during the lesson. They further argue that outcomes must include not only knowledge but also skills and attitudes to

be developed. In addition, teachers should formulate their own detailed outcomes to direct their lessons

5.2.3.2 Teachers should be facilitators of learning

It is worth noting that the curriculum expects teachers not to be transmitters of knowledge, but that they should assist the process of learning. Facilitating involves a balance between explaining concepts and allowing learners to construct their own understanding. In order to facilitate, teachers need to plan lessons to achieve the outcomes, be well prepared in terms of the content knowledge, and provide the necessary resources for meaningful learning to take place. The teacher should not just leave the learners to discover things for themselves, or send them to the library.

Teachers need to consolidate lessons to ensure that all learners have covered everything and that the concepts that learners develop are those currently accepted by mathematics. Most of the teachers misunderstand the word facilitation; they believe that learners should not be told anything and that learners must find out everything for themselves.

Some common problems identified by researchers amongst other are that a number of mathematics teachers have inadequate knowledge of the content they have to teach. Good facilitators must be prepared for all their lessons, regarding both content and teaching method. A common strategy teachers are using is to get different groups to do different activities on different aspects of the topics. The groups always do not get time for feedback. It is the facilitators' job to ensure that all learners are exposed to the required mathematics concepts.

Facilitation requires enough time of planning and preparation. During lessons, teachers should be alert to problems, they must circulate to assist and encourage learners, and they must provide suitable input where needed.

5.2.3.3 Learning needs to be learner-centered

According to Van Rooyen and de Beer (2006:25), learner-centeredness focuses on recognizing and catering differences between learners. They further explained that teachers must be aware of the variations that exist in the class in terms of cultural backgrounds, beliefs and practices, home language, pace of learning, styles of learning, and methods of

demonstrating achievements. It is therefore necessary that teachers should plan lessons that take these differences into account.

5.2.3.4 Learners should be activity – based

Most teachers do not realize that there is a difference between activity-based learning and activity-focused lessons. Doing activities does not mean that learning is activity based. Activity-based means that activities should be the starting point of learning, and should be used to help learners develop their Mathematical understanding.

5.2.3.5 The mathematics curriculum should be relevant.

Lessons can be made relevant in the following ways:

- What is taught could relate to learners' real-life situations and expectations
- What is taught should be linked to learners' prior knowledge
- Relevance can mean to things learners may need to know in their future lives
- Learning can be relevant to the South African context.

5.2.3.6 Skills development should be a focal part of the curriculum

Skills are competencies which can be learned developed and improved. The skills to be developed should be stated as outcomes in teachers' lesson preparations and thus should be targeted in the lessons. Ongoing practice is needed in order to perfect a skill, and skills should be well integrated with content and not taught in a vacuum.

5.2.3.7 Group work should be promoted

Most of the South African teachers associate most the curriculum with group work. New curriculum requires that group work should be promoted. Some teachers believe that as long as learners sit in groups, they are doing group work. Group work should feature in classroom practice, but not all teaching and learning has to use this approach. It must involve purposeful and meaningful activities to achieve outcomes.

It is further argued that group work should allow all learners to participate actively in shared tasks. Group work can be used to develop social skills and the communication involved in group work helps learners to construct knowledge. It is worth noting that successful group work will require monitoring and guidance by the teacher.

5.2.3.8 Continuous assessment should be used to foster learning.

According to Van Rooyen and de Beer (2006:30), it has been discovered that so much assessment is being done, that teaching and learning are suffering. Assessment should play an integral part in successful learning, by identifying for learners their strengths and weaknesses and keeping them informed of their progress as the year progresses. Assessment should happen continuously throughout the year and not just at the end of a long period. It should be used as a strategy to promote learning. Although a range of activities should be assessed regularly throughout the year, not every activity should be assessed.

5.2.3.9 Learning should be integrated across learning areas or subjects

Teachers need to make effort to ensure that links are made between different subjects. This approach shows learners that a topic should never be studied in isolation.

In order for teachers to make changes they need to understand the reasoning behind the changes. Besides, teachers must be able to implement the desired changes within constraints of classroom realities.

They also need to receive adequate training and support, including the chance to trial ideas in safe environment. Being part of the well-managed school system which promotes favorable ethos conducive to good teaching and learning will change the attitude and beliefs of teachers and as such learners will have a positive attitude towards mathematics.

5.3 Recommendations

- Teachers should know the content they have to teach. Research shows that many teachers in South Africa do not know or understand the content they have to teach. Teachers should ensure that they master the mathematics they are expected to teach. It is advised that they use several different references for reading up on the content.
- Teachers should encourage learners to explore and reflect on a variety of strategies to learn mathematical concepts more effectively.
- Teachers should know the policies of education system in which they work. Education department issues circulars or amendment on its policies.

- Teachers should be part of a well-managed school system which promotes favorable ethos conducive to good teaching and learning, (Van Rooyen & De Beer, 2006:31).

5.4 Conclusion

In this study the researcher had addressed the issue of teachers' view on learners understanding of Mathematics in the Mahikeng Area Office. The primary purpose of schooling is to assist learners develop knowledge, skills and attitudes needed to interact with the world in a successful way. A positive learning environment provides opportunities for learning to engage in experiences that involve cognitive, psychomotor and affective domains of learning. This leads to balanced and holistic learning that is aligned with nature and structure of Mathematics. This type of learning is at the core of the approach (Van Rooyen & De Beer, 2006:49).

References

- Atherton, JS (2005). *Learning and Teaching: Aspects of Cognitive Learning Theory*.
<http://www.learningandteaching.info/learning>.
- Biggs, JB (1999). *Teaching for Quality Learning*. Buckingham: SHRE and Open University Press. UK.
- Boomer, G. (1992). *Negotiating the Curriculum: Education for the 21st century* (pp4-14)
- Brewerton, P. (2002). *Organisational Research Methods*. Sage:London
- Comfrey, J (1990). What *constructivism implies for teaching*. Constructivism views on teaching and language of mathematics, (pp. 107-122).
- Constructing scientific knowledge in the classroom. *Educational Researcher*, 23:5-12.
- De Beer, J. & Mtombeni, JP (1999). *Teaching Natural Sciences: How to Excel in Science Teaching*. Pretoria: Collegium.
- Department of Education (1992). *Perspectives of Education*
- Department of Education (1996). *South African Schools Act 1996*.
- Department of Education (1997). *Curriculum 2005. Lifelong Learning for 21st century*. Pretoria: CTP Books.
- Department of Education (2001). *National Strategy for Mathematics, Science and Technology Education in General and Further Education and Training*.
- Department of Education (2003). *National Curriculum Statement*.
- Department of Education (2002). *Revised National Curriculum Statement Policy, Grade R-9 Mathematics*, Pretoria, South Africa.
- Department of Education (2000). *Why some "disadvantaged" schools succeed in mathematics and science: a study of "feeder" schools*. Pretoria: Government Printer.
- Department of Education (1992). *Teachers Manual for Grade 7*, Pretoria
- Department of Education (2001). *National Strategy for Mathematics, Science and technology Education in General and further Education and Training*. Pretoria: Government Printer.

- Driver R, Asoko H, Leach J, Mortimer E & Scout P (1994). *Developmentally*. New York, NY: Longman
- Education For All (EFA) (2000). *Assessment 2005*. Available at [http:// education.Pwv.gov.za/documents/170.pdf](http://education.Pwv.gov.za/documents/170.pdf): 12 July 2009.
- Educational Studies in Mathematics, 22, 309-331
- Entwistle, N J& Tait, H (1996). 'Approaches and Study Skills Inventory for Students'. *Center for research on Learning and Instruction*. University of Edinburgh.
- Erasmus, P. (2002). *Developing remedial strategy in mathematics for Tswana speaking learners*. Unpublished MEd dissertation, University of Pretoria.
- Flannery, MC (1989) 'Human Biology'. In *The American Biology Teacher*, April 1989.
- Flannery, MC (1991) *Bitten by the Biology Bug: Essays from the American Biology Teacher*. Virginia National Association of Biology Teachers.
- Fosnot, C (1989): *Enquiring Teachers, Enquiring Learners: Constructivists approach for teaching*. New York: Teachers College Press
- Good, T & Brophy, JE (1990) *Educational Psychology: A Realistic Approach*. New York: Longman.
- Gower P (2008). Mail and Guardian, *New national tests for little ones* Vol. 24 No 12. March 20 – 27.
- Gunter, MA, Estes, TH & Schwab, J (1990) *Instruction: A Models Approach*. Needham Heights: Allyn and Bacon.
- Howie, SJ. (2001). *Third International Mathematics and Science Study Repeat (TIMSS-R)*. Pretoria: Human Science Research Council.
- Howie, SJ. (2003). *Language and other background factors affecting secondary pupil's performance in Mathematics in South Africa*. *African Journal of Research in Mathematics Science and Technology Education*, 7: 1-20
- Huitt, W (2003). *A transactional model of teaching-learning process*. Valdosta: G.A. Valdosta State University.
- Jacobs M (2003). *Teaching-learning Dynamics: Participative approach for OBE*. Durban University of Zululand.



Jaworski, B. (1994). *Being mathematical within a mathematical community,* in M. Sedlinger (ed), *Teaching Mathematics*, Routledge/Open University, London, pp. 218-231.

Johannesburg: The Joint Education Trust, pp. 131-162.

Khan M ,(2004). For whom the school bell tolls: disparities in performance in senior certificate mathematics and physical science, *Perspectives in Education*, 22(1), 149-156.

Lindfords, J (1984) *How Children Learn of How Teachers Teach*. London: The Folmer Press.

Mahlomaholo, S, Piper J& Piper H. (2009). *Educational Research and Transformation in South Africa*. Science Africa: Platinum Press.

Makgato M & Mji A, (2006). South African Journal of Education, *Factors associated with high school learners' poor performance: a spotlight on mathematics and physical science*. Vol. 26(2)253-266.

Maree JG& Erasmus CP ,2007. *Mathematics skills of Tswana speaking learners in the North West of South Africa*. University of Pretoria, South Africa.

Maree, J G. 1997a. The development and evaluation of a study questionnaire in mathematics (Unpublished PhD thesis, University of Pretoria).

McCarthy J& Bernstein A, 2010, Sunday Times, *Maths and Science are keys to growth*. South Africa.

Mji, A & Mbinda, Z. 2005. *Exploring high school science students perceptions of parental involvement in their education*. *Psychological reports*, 97:235-336

National Research Council, Mathematical Science Education Board: 1989, *Everybody Counts: A Report to the Nation on the Future of Mathematics Education*, National Academy Press, Washington, DC

Neil, P (2000). *Qualitative versus quantitative research*, New York: Norton.

Owings, C.A, and Follow, E. (1992). *Effect of portfolio assessment on student's attitude and goal setting abilities in mathematics*. Michigan

Participative approach for OBE Durban University of Zululand

Piaget, J. (1983). Piaget's theory. In P.H.Mussen (Ed) *Handbook of child Psychology: volume1, History, Theory and Methods* (pp 103-128)

- Picker, S.H. & Berry, J.S. (2000). Investigating pupils' images of mathematicians. *Educational Studies in Mathematics*, 43, 65 – 94
- Pratzer, F.C. (1994). *Time to create the future. Journal of industrial Teacher education*, 31:3-4.
- Ramnarian, U. (2003). A strategies-based problem solving approach in the development of mathematical thinking, *Pythagoras*, 57, 32 – 35
- Ramsey, J. (1993). 'The science education reform movement: Implications for social responsibility'. *Science Education*, 77(2): 235-25.
- Rock, D. and Shaw, J.M. (2000). *Exploring children's thinking about mathematics and their work, teaching Children Mathematics* 6(9), 550-555.
- Roe, A. (1952). *The Making of a Scientist*. New York: Dodd, Mead.
- Saljo, R. (1979). 'Learning in the learners perspective. Some common sense conceptions'. *Reports from the Institute of Education*. University of Gothenburgh.
- Sanders, M. & Kasalu, L. (2004). 'Lack of understanding of policy as a factor affecting the theory-practice gap in implementing Curriculum 2005'. In A. Buffler and R. Laugksch (Eds.) *Proceedings of the Twelfth Annual Conference of the Southern African Association for Research in Mathematics, Science and Technology Education*. January 2004. University of Cape Town, Cape Town: 917-925. Second Ed. South Africa
- Sentson, C. (1994). The effect of language of presentation on pupils' performance in a mathematics test, *South African Journal of Education*, 14(3), 109 - 115
- Shock, N.H. (1973). 'Analysis of the relationships which exist between the cognitive and affective educational objectives'. *Journal of Research in Science Teaching* 10:4.
- Shulman, L.S. (1986). 'Those who understand: Knowledge growth in the teacher'. *Educational Researcher*, 15(2):1-22.
- Simon, M.A. & Schifter, D. (1991). *Towards a constructive Perspective*.
- Slavin, R.E. (1997). *Educational Psychology: Theory and Practice*. Needham Heights: Allyn & Bacon.
- Smith, K. (1993). *Becoming the "guide" on the side. Educational leadership*,

South Africa

Teacher Education and Mathematics. Confronting Precautions. Volume 13(1).

Thelen, D. (1993). *Perspectives in Education*. 1993. Volume 14(2).

Utle, J. and Showalter, B. 2007. Focus on Learning Problems in Mathematics.
Preservice Elementary Teachers' as Mathematics Teachers.

Van der Walle, J.A. (1990) *Elementary School Mathematics: Teaching*

Van Rooyen, H & De Beer, J. (2006). *Teaching Science*. Macmillan South
Africa Publishers (Pty) Ltd. Gauteng.

Vinjevolt, P. (1999) *Teaching and learning in South African Schools*.

Zemelman, S (1993). *Best Practice. New Standards for teaching and learning in
America's Schools*. Ports mouth; NW: Heinemann.

APPENDIX A

LETTER

North West University
Faculty of Education
Private Bag X2046
2735
01February 2010

Dear respondent

I am J.M Malindi and am studying Masters of Education in Mathematics and Science at the North West University in the Faculty of Education. I am conducting a research in part fulfillment of the requirements to complete the degree.

The purpose of the research is for academic reasons. I therefore humbly request you to participate in completing the questionnaire. All the information gathered will be treated as highly confidential.

Thanking you in advance

.....
J.M Malindi



education

Lefapha la Thuto
Onderwys Departement
Department of Education
NORTH WEST PROVINCE

Cnr. Thelesho Tawana & Modiri
Molema

Private Bag x 10
Mmabatho 2735
Tel.: +27 (18) 384-3233
Fax: +27 (18) 384-0212/3234
E-mail: blekoma@nwpg.gov.za

MAFIKENG AREA PROJECT OFFICE

Enquiries : N.M.Kokong
Cell : 083 632 6928
Tel : 018- 3846007

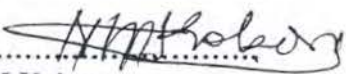
Date : 17 February 2010

To Whom it may concern

This serves to inform you that permission to conduct research is herewith granted. The conditions attached are as follows:-

1. It shall not interfere with teaching and learning at schools.

Hoping that you find this in order.


.....
N.M.Kokong
Mafikeng Area Office Manager



"Portrait of Excellence"
"All hands on deck to speed up change"

APPENDIX C

Questionnaire to be completed by High School Mathematics teachers

SECTION A

BIOGRAPHICAL

Kindly answer the following questions by putting (X) in the appropriate block.

1. AGE

Below 30 years	
30 – 34	
35 – 39	
40 – 44	
45 – 49	
50 – 54	
55 and above	

2. GENDER

Male	
Female	

3. EDUCATION QUALIFICATIONS

Diploma in Mathematics	
Degree in Mathematics	
Honours in Mathematics	
Masters in Mathematics	

Other (Specify)	
-----------------	--

4. RANK

PL1	
PL2	
PL3	
Principal	

5. GRADE PRESENTLY TEACHING

Grade 10	
Grade 11	
Grade 12	

7. TEACHING EXPERIENCE

1 – 3yrs	
4 – 7 yrs	
8 yrs and above	

6. TYPE OF SETTLEMENT WHERE THE SCHOOL IS SITUATED

Urban	
Rural	

SECTION B

PLEASE RATE THE FOLLOWING ITEMS ON SCALE 1 – 5. INDICATE BY PUTTING (X) IN THE APPROPRIATE BLOCK

		Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
01.	Most of the learners choose Mathematics as one of their Learning Areas					
02.	Most of the learners think that mathematics is only for the mentally gifted					
03.	The majority of the learners perceive Mathematics to be an unattractive fields of study					
04.	Most of the learners under achieve, because lack of prior knowledge in Mathematics					
05.	Most of the learners think that Mathematics is boring and difficult					
06.	Inaccurate learners image of Mathematics teachers may hinder their studies in Mathematics					
07.	Learners view Mathematics as a rigid system of externally dictated rules governed by standard of accuracy, speed and memory shifts them from confidence to fear					
08.	Traditional method of teaching, where classes were highly organised, the syllabus rigid and the text books fixed, caused learners to believe that teachers do hard Mathematics					
09.	Mathematics classrooms should be more centred, so that learners should view Mathematics as an attractive Learning Area					

10	Learners view Mathematics as difficult because teachers also regard it as a difficult Learning Area					
11	Learners also think that Mathematics is for rich people					
12	Lack of resources cause learners to think that they are not suitable to do Mathematics					
13	Most teachers discourage learners to do Mathematics					
14.	Most of the teachers are not suitably qualified to teach Mathematics hence this causes learners to think that Mathematics is a difficult Learning Area					
15.	Mathematics classroom should be more learner-centred and that Mathematics teachers should be a guide who opens the way for the learners to create his or her own learning					
16	Learners visualize Mathematics teachers as people who use intimidation and threats to make their learners learn material					

SECTION C

1.	Mathematics make learners communicate appropriately using description in words, graphs, symbols and graphs	
2.	Do most teachers monitor learners work constantly	
3.	Teachers should have resources such as computers and calculators	
4.	Teachers should encourage learners to discover principles by themselves	
5.	Teachers should use manipulative models wisely to help learners form conceptual relationships	
6.	Teachers should avoid mindless drill and practise in Mathematics	
7.	Do teacher apply the new method of teaching, Outcomes Based Education	

8.	An teacher should act as a facilitator and not a transmitter of knowledge	
9.	Teachers should treat learners as people who are confident, hard working and independent	
10.	A solid foundation in Mathematics can help learners understand the world around them, such working out a discount in shops	

COMMENT WITH YES (Y) OR NO (N) BASED ON THE FOLLOWING STATEMENTS OF QUESTIONS.

SECTION D – INTERVIEW TOOL FOR TEACHERS

Kindly respond to the following questions. Write you response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

.....

.....

.....

.....

2. What self – perceptions do teachers have of themselves as Mathematics teachers?

.....

.....

.....

.....

3. In your view, why do learners regarding Mathematics as boring and difficult?

.....

.....

.....

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

.....

.....

.....

.....

5. How do learners understand themselves as learners of Mathematics?

.....

.....

.....

SECTION D

APPENDIX E

Kindly respond to the following questions. Write your response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

Most learners do mathematics because they have heard that many fields of study & work opportunities need maths.

2. What self-perceptions do educators have of themselves as Mathematics educators?

Maths educators if given chance and work under good conditions without the departmental pressure will work effectively.

3. In your view, why do learners regard Mathematics as boring and difficult?

They don't have enough skill or background in Maths.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

No. learners given chance to work in a group, do not really do it. They only rely on the bright ones. This OBE turned maths learners to be lazy.

5. How do learners understand themselves as learners of Mathematics?

They are just there to get information from their educators and do not reflect positively what they have been taught.

Kindly respond to the following questions. Write your response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

Learners regard Mathematics as an unattractive Learning area because they think Mathematics is difficult and it is only for intelligent people.

2. What self-perceptions do educators have of themselves as Mathematics educators?

Educators regard themselves as facilitators and are also learning ~~for~~ on some other topics in Mathematics.

3. In your view, why do learners regard Mathematics as boring and difficult?

Learners seem to lack that courage to solve problems. They want a Learning area where they will write, read and memorise.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

Up to this point it has not bear fruits, as it requires critical thinking skills which learners seem not interested in.

5. How do learners understand themselves as learners of Mathematics?

Learners regard themselves as intelligent and unique in a way when they do Mathematics, because Mathematics is not done by most of their peers.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

No, they regard maths as a difficult subject and is for clever or mentally gifted.

2. What self – perceptions do educators have of themselves as Mathematics educators?

As maths educator one should be a hardworker eager to learn new things everyday.

3. In your view, why do learners regard Mathematics as boring and difficult?

They regard maths as difficult and boring because they don't understand maths and they do not know that maths can fun.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

Yes, because learners are encouraged to do things for themselves e.g. by investigating, they are no longer just sitting there and receives the information from the teacher, but they are part (involved) in a lesson.

5. How do learners understand themselves as learners of Mathematics?

SECTION D

Kindly respond to the following questions. Write your response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

Most learners do mathematics because they have heard that many fields of study & work opportunities need maths.

2. What self-perceptions do educators have of themselves as Mathematics educators?

Maths educators if given chance and work under good conditions without the departmental pressure will work effectively.

3. In your view, why do learners regard Mathematics as boring and difficult?

They don't have enough skill or background of Maths.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

No. learners given chance to work in a group, do not really do it. They only rely on the bright ones. This OBE turned maths learners to be lazy.

5. How do learners understand themselves as learners of Mathematics?

They are just there to get information from their educators and do not reflect positively what they have

SECTION D

Kindly respond to the following questions. Write your response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

Yes because the whole country is regarding learners who are doing Mathematics very highly.

2. What self-perceptions do educators have of themselves as Mathematics educators?

They feel very important since they are teaching a subject which is regarded as very important for most careers and which is also looked upon as a very difficult subject.

3. In your view, why do learners regard Mathematics as boring and difficult?

Because they are lazy to think and they allow other people to think for them.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

No — Most of the time learners are left on their own with no guidance.

5. How do learners understand themselves as learners of Mathematics?

They feel very frustrated.

SECTION D

Kindly respond to the following questions. Write your response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

No, most learners because of foundation view mathematics as a difficult subject hence not attractive to their cognitive thinking.

2. What self-perceptions do educators have of themselves as Mathematics educators?

Most mathematics educators have a tendency that they know more than learners hence they view learners as tabularas (empty vessels) which needs filling.

3. In your view, why do learners regard Mathematics as boring and difficult?

The way educators portray Maths to learners is so difficult to understand. They just introduce the x & y right from introduction hence confuses the learners because no link to the daily activities.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

It depends with the type of educators we have in the country. If we have quality educators it works but mind of the normal distribution curve, not all educators are good teachers.

5. How do learners understand themselves as learners of Mathematics?

If given a good background (foundation) they can view Maths as a sub-set of all subjects but if foundation is bad they view Maths as difficult and only gifted ones can do it.

SECTION D

Kindly respond to the following questions. Write your response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

To a certain extent yes. They regard it as attractive because of the career and tertiary opportunities.

2. What self-perceptions do educators have of themselves as Mathematics educators?

Firstly, they regard their own strategies as the best, and secondly that mathematics learners will only perform well if they work hard and that brighter learners are the only ones qualified to do mathematics as a subject at school level.

3. In your view, why do learners regard Mathematics as boring and difficult?

Firstly because they sometimes not get sense of some mathematical concepts, secondly, mathematics is discipline itself, so they are not disciplined. Thirdly because mathematical ideas are not linked to real life situations.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

Yes of course, because they discover some concepts themselves, and self-discovery lead to better understanding and better conceptualization.

5. How do learners understand themselves as learners of Mathematics?

As the future mathematicians who have a huge challenge of bringing in new ideas, developments to mathematics itself and to the country at large.

SECTION D

Kindly respond to the following questions. Write your response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

No. The way learners were taught from as early as foundation phase makes it difficult to regard Mathematics as an attractive learning area. Educators teaching Maths should be people qualifying to teach Maths.

2. What self-perceptions do educators have of themselves as Mathematics educators?

Too much work is being done by educators and not learners. Educators are the only one accountable for poor performance, learners as well should be held responsible for their performance.

3. In your view, why do learners regard Mathematics as boring and difficult?

Too many things are clouding learners' minds, they don't have time to practice and therefore expect to learn by just lessoning & attending as many classes of Maths as possible.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

No, teachers are still familiarizing themselves with the method, therefore there are not always confident with some of the concepts.

5. How do learners understand themselves as learners of Mathematics?

They don't really understand themselves as learners of Mathematics. You find some of the learners doing Maths because of the parents' influence.

SECTION D

Kindly respond to the following questions. Write your response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

Most of the learners who are mathematics literate are the one who regard mathematics but those who are under performing they fail to regard. Maths learners have to know which field to follow after completion of matric.

2. What self-perceptions do educators have of themselves as Mathematics educators?

You have to master the content as you understand yourself learners have to practice maths on daily basis and offer extra classes which is wrong teach the basic make sure that the learners understand the basic then mathematics will be simple to learners.

3. In your view, why do learners regard Mathematics as boring and difficult?

Because they don't want to work on themselves they don't give their books enough time.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

The new method of teaching is fruitful but it allows the learners to work on themselves the teacher is able to see where does an individual goes wrong and if assessment is given.

5. How do learners understand themselves as learners of Mathematics?

They must have discipline and regard maths as hard worker.

SECTION D

Kindly respond to the following questions. Write your response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

No, most believe it is difficult and unpleasant.

2. What self-perceptions do educators have of themselves as Mathematics educators?

That they should get used to being "trapped" and feel "trapped".

3. In your view, why do learners regard Mathematics as boring and difficult?

Because their Pre & basic knowledge when getting to Grade 10 is almost non-existent.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

Not in Maths ^{at the moment.} Formal drill work with basics are necessary before a learner can ever discover anything on his/her own. The old way in Maths worked much better.

5. How do learners understand themselves as learners of Mathematics?

Learners in Maths are totally lost in our country. Get back to basics and prepare them for University entrance.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

Learners are aware of an opportunity they have in future by doing mathematics. They consider it as good learning area but lack of basics in lower grades hamper their enthusiasm.

2. What self-perceptions do educators have of themselves as Mathematics educators?

Mathematics is an interesting subject and easy if proper basics are given to learners in appropriate time.

3. In your view, why do learners regard Mathematics as boring and difficult?

Mathematics learning and teaching in primary level are inadequate. There is no tool to test the ability of learners in this level. Proper assessments should be done in primary level.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

It is not fruitful at all. The learners lack the capacity to learn themselves and assess themselves. There is no external evaluation of learners from grade ONE TO grade ELEVEN.

5. How do learners understand themselves as learners of Mathematics?

Learners do not understand much by themselves.

SECTION D

Kindly respond to the following questions. Write your response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

No, because they are not working and practicing it harder

2. What self-perceptions do educators have of themselves as Mathematics educators?

perceptions of knowing a content and lack confidence and self-esteem on imparting it to learners

3. In your view, why do learners regard Mathematics as boring and difficult?

Because in most cases, educators do not have ways to make the subject fascinating and interesting and relating it to the real world.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

not in most cases, Because it is time consuming and teachers will want to finish the syllabus in time and forced to traditional way of teaching?

5. How do learners understand themselves as learners of Mathematics?

They are much happy, thinking that they are more intelligent as compared to their peers who are not learning mathematics and they find confidence to themselves as v. i. confidence to their educators

Kindly respond to the following questions. Write your response in the space provided.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

Most learners do regard Mathematics as an attractive Learning Area and they know that careers involving Mathematics are highly paying but attitudes affect them negatively.

2. What self-perceptions do educators have of themselves as Mathematics educators?

Some perceive themselves as knowledgeable people while others are not confident in with the subject. Regards Mathematics as a better subject and that Maths educators should be highly regarded.

3. In your view, why do learners regard Mathematics as boring and difficult?

Peer influence.
Peer pressure, know many people that they regard to be better than them who did not make it in Mathematics and as such they think it is difficult. It also has to do with negative attitude.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

It is fruitful in certain areas like financial Maths where they can experience the practicality of the calculations they do at school!

5. How do learners understand themselves as learners of Mathematics?

They view themselves as people who are burdened with figures that ~~do~~ not have give them a hard time.

1. Do you think learners regard Mathematics as an attractive Learning Area? Please elaborate.

No, they think that it is not attractive and it is a very difficult and a not easy subject.

2. What self-perceptions do educators have of themselves as Mathematics educators?

Problem-solving educators because Mathematics is a mother of all learning areas.

3. In your view, why do learners regard Mathematics as boring and difficult?

They want questions to be phrased the same ^{way} it was asked in the class. If phrased different then they don't know where to start, only to find that Mathematics is not a subject to be crammed and not a single problem (exercise) is enough.

4. Is the new method of teaching in South Africa (Outcomes Based Education) fruitful to learners? Please elaborate.

Yes, no memorising is encouraged & AT LEAST LEARNERS HAS TO INVESTIGATE & DIS INFORMATION ON THEIR OWN.

5. How do learners understand themselves as learners of Mathematics?

AS PROBLEM SOLVERS & SOMETIMES THEY THINK THAT THEY ARE THE MOST INTELLIGENT THAN OTHERS BECAUSE THEIR ADMISSION