UNIVERSITY OF BOTSWANA

Department of Mathematics and Science Education

Factors Affecting Mathematics Teaching and Learning at Junior Secondary Schools in Katima Circuit Zambezi Region: Teacher, learner, and administrator perspectives.

A Dissertation Submitted in Partial Fulfilment for the Award of

Degree of Masters of Education (Mathematics Education)

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APPROVAL PAGE

After the examination, this dissertation was approved having met the required standards of scholarship for the partial fulfilment for the Degree of Master of Education in Mathematics.

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Internal Examiner Date

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STATEMENT OF ORIGINALITY

This dissertation titled, Factors Affecting Teaching Learning of Mathematics in Junior Secondary Schools in the Zambezi Region: Teacher, learner, and administrator perspective is an original work of the author except where citation and reference has been made. It was completed by the author at the University of Botswana in October 2020.

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ABSTRACT

This study was motivated by the ambition to find out the factors that are liable for the persistent poor performance of learners in mathematics at junior secondary schools, despite the government's intervention. The study used a mixed methodology through the use of the survey design and a descriptive exploratory research design. In-depth face to face interviews with 16 participants who were teachers and learners in Katima Mulilo Circuit selected through purposeful sampling strategy. The study also made use of a close-ended questionnaire which was administered to 120 participants (teachers and learners) who were selected through stratified random sampling. This study revealed that misconceptions on the part of the learners are some of the factors affecting the teaching and learning of mathematics in Katima Mulilo Circuit. In addition, the study further established that lack of adequate teaching materials and resources also affects the teaching and learning of mathematics. The study also revealed that low teacher qualifications and low working experience in the teaching and learning of mathematics affects the success of the learners in mathematics in Katima Mulilo Circuit. The study revealed that there are several effects of the factors affecting the teaching and learning of mathematics in Katima Mulilo Circuit. The study found out that learners in Katima Mulilo are withdrawing from mathematics and from school as a result of not achieving any successes in mathematics. In addition, the study also found out that these factors are the leading factors of the currently faced negative emotional effects in mathematics teaching and learning. Furthermore, the study found out that these factors are leading to decreased learner enrolments in schools in Katima Mulilo and are also contributing to some of the currently experienced psychological impacts among the learners.

The study recommended that the provision of the teaching and learning resources need to be done in Katima Mulilo Circuit in order to improve the teaching and learning of Mathematics. In addition, the study also recommendaed that the improvement of syllabus coverage would also make an impact in improving the teaching and learning of mathematics in Katima Mulilo Circuit. Apart from that, the study also recommended that improvement of parental involvement would also improve the teaching and learning of mathematics in Katima Mulilo Circuit.

DEDICATION

This Dissertation is dedicated to: **My children:** Nasilele Uyoya, Balwizi Mubonenwa, Mubusisi Dithlong' Mubonenwa, Mike Mukungu Katupisa and Nanvula Katupisa who are my pride and joy.

My grandchildren: Reggie Lubinda, Innocent Mukubonda Chikamatondo Mutumba, Tylor Lubasi Simushi and Karen Nzinza Mubonenwa,whose presence is always an inspiration.

My Mother: Mrs. Sepiso Mubonenwa who is been my inspiration.

My Late Daughter: M's Bridget Namasiku Mubonenwa

My Late Husband: Mr. Michael Mukungu Katupisa

My Late Father: Mr. Fred Mubonenwa

For their encouragement, support, love during the time of my studies. Their presence has been an inspiration. There are and have been my joy and my pride.

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Karen

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CHAPTER 1

1. INTRODUCTION

1.1. Overview of the study

Mathematics is a subject that cuts across all subjects and it is essential in all fields of study in the academia (Karigi & Wario, 2015), because most of its concepts are found in all subjects at lower and higher education institutes (Ali, 2013). It is one subject that has concepts found in all subjects of the school curriculum and beyond to include vocational and career fields of all spheres (Ali, 2013). This versatile nature of mathematics makes it a subject that requires dexterity by learners for them to become well rounded citizens who can participate meaningfully in their societies. For instance, mathematics' vital role in preparing future sociologists, medical personnel, engineers, teachers and others for the economic growth of a country (Ali, 2013).

Furthermore, mathematics, one of the oldest fields of study and one of the very important components of study in human thought, has for the past two decades been regarded as a special subject in school curriculum (Karigi & Wario, 2015). It is a subject that is used as a screening tool for students who intend to pursue mathematically related courses and professions (Howson & Wilson, 1986 as cited in Nur (2010). The other benefit of mathematics is that, it provides clarity to a student, enabling them to justify procedures depending on their mathematical maturity (Tshabalala & Nchube, 2012). Students are able to say why a particular mathematical statement is true and are also able to state where a mathematical rule originated from. Thus, on a general note, students acquire skills that help them to make informed decisions through mathematics. It is also enjoyable and challenging and enables one to be critical in thinking in order to make informed decisions (Ali, 2013). Therefore, this calls for students to be prepared in mathematics in such a way that they are able to obtain and construct new knowledge on their

own. Students should be trained to become responsible, reflective, and reasonable, as they should think skillfully in order to decide what to do (making informed decisions) in order to contribute positively to society. In most of the parts of the world, including Africa, mathematics enjoys an admired place in school curriculum (Ali, 2013). This calls for learners to be mathematically proficient and for them to be mathematically proficient, learners must acquire high order thinking order skills that involve logical thinking and ability to apply what is learnt to both near and far contexts (Ali, 2013).

Namibia got her independence in 1990, education wise, learners have been performing poorly in mathematics, a repute inherited from the South West African Bantu education system (Kasanda, 2015). The poor performance reputation in mathematics initiated the loud cry by indigenous people who complained that mathematics was a difficult subject and not meant for black people (Kasanda, 2015). The indigenous people's loud cry stimulated by poor performance of the learners in mathematics country wide made the Namibian government to rapidly reform the education system. Within a short span of time, policies were drawn and many changes, such as the adoption of the Cambridge system in 1992. The Cambridge system adopted and launched in 1992, was based on the following pillars; equity, accessibility, quality and democracy with the purpose of suiting the needs of Namibian citizens. Mathematics was also one of the subjects that were included for reformation as a compulsory subject.

The haste decision made by government, brought about many voices from the regional education and the teaching community to challenge the decision (Kasanda, 2015). The resist was due to the fact that, not much preparation was done for a smooth transition. This was prompted by the new government's move to establish more and better schools and to break away from the South African Bantu system (Kasanda, 2015). Despite the change in the education system, mathematics

performance was still very low since the programmes that were effected did not redress the inherited problems of poor performance of learners in mathematics nor did it provide adequate training to teachers in training colleges (Kasanda, 2015). The programme was rushed through and educators failed to adequately equip student teachers to properly impart knowledge to learners (Kandumbu, 2005). The introduction of Basic Education Teachers Diploma (BETD) of suiting the needs of Namibian citizens, intended to train teachers, could not provide adequate with a purpose of training to teachers (Kasanda, 2015).

From 1997, the researcher served as a mathematics teacher at junior secondary school level (Grade 8 – 10). As a parent to children that are currently at the same level, the researcher realized that mathematics is a subject that most of the learners hate the most. Learners feel intimidated when mathematics is taught to them, such that learners pay little or no attention in learning the subject despite its importance.

Efforts towards the development of education particularly the improvement of mathematics performance in schools have been made hence a large percentage of the country's budget has since 1990 been allocated to the education sector, in particular, towards the improvement of mathematics, (Badmus, 2002; Bank Windhoek Media Release, (2013), making mathematics a compulsory subject from Grade 1 to Grade 12 was one of the strategies that the government had to put in place to improve learner performance in mathematics . One such policy was the language English becoming a medium of instruction. The challenges that were encountered were: lack of competent and qualified teachers, lack of teaching and learning materials, poor learning facilities, and higher learner-teacher ratios (Kapenda, 2007). This was done in response to the critical role that mathematics plays in the socio-economic development of the country, and

the world over (Zakaria & Bamidele, 2015). This is true because most of its concepts are found in all subjects at lower and higher education institutes (Ali, 2013).

Despite the efforts made by the government to change the education system, mathematics performance was still very low meaning all efforts made by government did not redress the inherited problem of poor performance in mathematics nor did it provide adequate training to teachers to curtail the poor performance in mathematics in schools Nationwide (Kasanda, 2015. Zambezi region was not spared as learner performance in mathematics at Junior Secondary Schools level in Katima Circuit, has been nose diving since Namibia got her independence in 1990. Therefore this research seeks to address factors affecting learner performance in mathematics in junior secondary schools in the Zambezi Region as a way of ensuring that they develop proficiency and all other desirable qualities promoted through learning mathematics for better or good performance.

1.2. Statement of the problem

The problem in this study is the repeated poor performance in mathematics by learners at Junior Secondary Schools in the Zambezi Region. Despite the vital role that mathematics plays in people's daily lives, and that mathematics is recognized worldwide, and because of this recognition, mathematics as a subject has been given a prestigious position in the school curriculum (Zakariya & Bamidele, 2015), which triggered the Namibian government to make mathematics a compulsory subject from grade 1 to Grade 12. Research has revealed that for the past decade, learners at junior secondary school level have been performing very poorly in mathematics country wide (Ipinge, 2014). If this problem is not addressed, future generations will not be able to compete on the world market, most of the learners will hate mathematics and

other subjects that are mathematics related despite the need for the subject in most if not all the professions, and so on (Ojose, 2015). Furthermore, the country will have a shortage of engineers, doctors resulting to the depletion of the country's budget which maybe constituted by the hiring experts from other countries (Ojose, 2015). In the Zambezi region no study has been conducted to investigate the factors that attribute to poor performance of learners in mathematics at junior secondary school level. It is in view of this gap that there is a need to conduct this study in the Zambezi region.

Table 1 below shows how poor the learners' performance at junior secondary school level in Katima circuit has been, between the years 2015 to 2019 (Zambezi regional statistics, 2015-2019).

Table 1: 2015 - 2019 Zambezi mathematics examination analysis

School	A	B	C	D	E	F	G	H	I	J	Average	Standard Error
2015	73	78.2	27	61.76	80.65	60	61.11	4.55	21.2	37.50	50.50	8.30
2016	82.7	62.2	21.42	35.2	3 1.1	39.1	4	26.8	27	9.4	34.20	7.87
2017	32.5	28	16.6	13	57.1	34.2	18.4	15.3	18	9.16	24.22	4.50
2018	4	16	8	31	3	2	2	3	1.21	4	7.42	2.96
2019	7.6	20	3.53	0	13.25	0	0	7.89	14	7.89	7.41	2.15

Table 1, Indicates the performance, in the form of pass percentage of school learners at Junior

Secondary School level in the Zambezi Region in Namibia. Despite the vital role that mathematics plays as the subject that cuts across all subjects (Ali, 2013), learner performance in

mathematics at junior secondary school level has been nose diving over the past years. Failure rate in mathematics has been on the increase since 1990 to date. In 2016 alone, 63% of learners obtained grades E to U in mathematics, which are unsatisfactory grades.

Poor performance at junior secondary level have been an area of concern for the general public, parents, learners themselves, teachers and curriculum developers. Efforts have been made by the government of the Republic of Namibia to train mathematics teachers so as to help curb the prevailing situation in the Zambezi Region (Kasanda, 2015). Intervention projects such as Integrated Teacher Training Program (ITTP) were introduced. The objectives of the ITTP project was to assist Namibia in preparing teachers on integrated programmes of in-service education to upgrade the skills of primary and secondary school teachers in Namibia (Kasanda, 2015). The project was implemented by UNESCO and was supported by the co-operation of UNICEF. The in-service and Assistance to Namibia Teachers (INSTANT) was brought in with the purpose of helping teachers to improve subject mastery in mathematics and physical science, the project was supported by the World University Service (WUC), a Danish donor (Kasanda, 2015). The Basic Teacher Diploma (BETD), which was aimed at equipping teachers to teach the Basic education level, (Grade 1- 10), was designed to develop professional expertise and competencies in order to promote reforms in the Namibian education system and to upgrade teacher qualification, enabling them to acquire professional attitudes, teaching skills, understanding and knowledge of the subject content, the aforementioned programmes were introduced respectively (Kapenda, 2007 & Kasanda, 2015). The Learner Centered Education approach was implemented in 1993, and was embraced in order to address the imbalances of the past, and to ensure equity and quality among Namibian learners (Kapenda, 2007).

Despite all the efforts that the government has been making, deterioration of student performance in mathematics has been observed in the past years. In order to effectively remedy the situation, factors that contribute to poor performance in mathematics must be identified. Research in Namibia on the causes of poor performance has been conducted, but there has been no solution to the deteriorating mathematics performance of learners.

1.3. Rationale of study

The researcher served as a teacher and offered mathematics at all the three levels of the junior secondary school level, (Grade 8, Grade 9 and Grade 10). The researcher observed that when a topic is taught in mathematics, learners seem to understand, but when given individual tasks based on the lesson just after being taught, most of them obtain below the minimum requirement grade which is a D. Experience has shown that mathematics needs constant practice without which it is difficult for learners to grasp concepts, let alone applying them. As such, teachers should instill the attitude of practice so as to improve performance in mathematics. Lack of practice breeds a phobia and dampens self-confidence which produces a negative response to the learning and doing of mathematical activities that interfere with performance (Whyte & Antony, 2012). Fear leads to affective and cognitive reactions. Cognitive reactions involve negative self-talk which is negative, blanking out, avoidance and distrust of ability, Affective reactions involve self-esteem loss, and fear of looking stupid and tense act (Whyte & Antony, 2012). Fear of mathematics teachers is brought about by both the overt and convert behaviors of mathematics teachers which in turn leads to fear for mathematics, hence by the time students sit to write mathematics paper during examinations, phobia will have gripped them and this leads to poor performance (Whyte & Antony, 2012).

Table 1 above shows mathematics performance in the ten targeted schools for a five-year period in the Zambezi Region. It is evident that learners have been performing very poorly and in most cases most schools were performing below the required pass score which is a D symbol.

The table above shows that in 2015, six schools out of ten performed above 50 percent. Performance deteriorated in 2016 to 2019. Such poor performance can be reduced upon implementation of methods herein suggested. Results from the study conducted by Zakariya and Bamidele (2015), revealed that the factors that attribute to poor performance include infrastructure, weakness in mathematics background, and emotional problems among others. This study seeks to investigate factors affecting teaching and learning at junior secondary school level in the Zambezi Region. Over the past two decades, learner's performance in mathematics has been deteriorating despite the efforts made by the government and other institutions to find ways on how the problem of poor performance can be curbed (Kapenda, 2007). The government of the Republic of Namibia, under the Ministry of Education, made mathematics a compulsory subject so that learners, parents, stakeholders see the importance of the subject in all spheres of life (Kapenda, 2007).

Furthermore, for Namibia to compete on the world market, its society must be mathematically literate. It came to light that, most of the people who decided not to take mathematics seriously suffer a lot since most if not all subjects in academia are mathematically related (Tshabalala & Nchube, 2012). For a person to be able to successfully complete any degree and to be able to withstand the 21st century challenges, one has to be mathematically literate. Mathematics is one of the entry requirements in most of the good paying jobs worldwide is expertise in mathematics. Furthermore, people who are not proficient in mathematics may not enjoy the most paying jobs in the world (Wooley-Wilson, 2013). This is supported by Milaturrahmah, Mardiyana and

Pramudya (2017) in stating that "in order to compete in the global economic system of the 21st century, a country must establish an education where students gain an understanding of science, mathematics, Engineering and computer," (p.1). Unless authorities come up with strategies that can help learners learn for conceptual understanding, there is little hope of having a citizenry that is mathematically literate.

1.4. Purpose of the study

The purpose of this study is to investigate factors that attribute to poor performance of learners in mathematics, and to suggest strategies/recommendations that may help curb the problem that leads to performance in mathematics. Research with efforts to investigate factors that affect teaching and learning indicate that, individual, socio-economic, instructional and demographic factors have an impact on student/learners' mathematical achievement. It is therefore important to identify the factors that affect the teaching and learning of mathematics in order to inform new generations about what many people regard as a very difficult subject.

1.5. Research Questions

The purpose of this study is to investigate factors attributing to learner poor performance in mathematics in junior secondary schools in the Zambezi Region in Namibia. The study sought answers to the following research questions:

1. What are teachers' and learners' views on factors that affect their teaching and learning performance in mathematics at junior secondary school in the Zambezi Region?
2. What strategies can be used to improve the teaching and learning of mathematics in junior secondary schools in the Zambezi Region in Namibia?

1.6. Objectives of the study

The objectives of the study are to:

1. Identify factors attributing to poor performance of learners in mathematics in junior secondary schools in the Zambezi Region.
2. Suggest strategies to improve the teaching and learning of mathematics in junior secondary schools in the Zambezi Region in Namibia.

1.7. Significance of the study

The study will extend the scope of the existing studies in relation to factors affecting the teaching and learning of mathematics at junior secondary school. Learners, parents, policy makers, including stakeholders and researchers as well will acquire insights from the attitudes, opinions and teaching process that relate to teaching that promotes learning for understanding (Creswell, 2010). The study may also provide information on effective was to acquiring knowledge that the education sector may find useful to address challenges that teachers and learners encounter in classroom situations. The findings of this study may also assist school teachers and administrators to formulate teaching approaches to help learners to perform better in the Zambezi Region in Namibia.

1.8. Limitations

Schools that offer junior secondary school syllabus in the Zambezi Region were used as the sites for the study. Participating schools were randomly selected and a few schools were used as sample schools. However, because focus is on the factors that affect learner performance in mathematics at junior secondary schools in the Zambezi Region, the findings of the study may

not translate to learners in senior grades at the same school or even to learners in other regions of the country. This is so because the two groups of learners may be impacted by differing factors. The results though, might not only be widely applicable to the entire learner population, but may be used as a solution for learners in other parts of the world. Secondly, since interviews will be conducted by the researcher, it is unavoidable that, a certain degree of subjectivity in this study may be found.

1.9. Delimitations

The study will be limited to the 10 schools that offer grades 8 to 10 (Junior Secondary School) in Zambezi region. The junior secondary school education level comprises of the following grades: Grade 8, Grade 9 and grade 10. Most of the class groups in the Zambezi Region have learners from class A to I. Due to time constraints, 2 learners, per class per grade per school were selected. The average number of classes per grade per school is 3. It therefore, follows that the total number of learners selected per school is 10. The total number of learners in the 10 participating schools is 100. The study was based on the employment of questionnaires, interviewing and observing the teachers as well as checking learners' exercise books. Interviews and class observations can take a long time and therefore, it is better to limit the number of participants. This decision to limit the participants did not affect the research findings. The sample used was adequate to reveal the extent of poor performance in mathematics being investigated in this study.

1.10 Chapter layout

Chapter 1 Introduction and the overview of the study: This chapter presents the introduction, the overview of mathematics in Namibia. It also includes statement of the problem, rational of the study, the purpose of the study, objective of the study, research questions, significance of the

study, significance of the study, limitations, delimitations, chapter layout, definition of key words and chapter summary and the structure of the study.

Chapter 2 Literature review: Presents the comprehensive review of the literature and the theoretical framework that underpins the study on a general note.

Chapter 3: Research **methodology:** This chapter presents a description of the design and methodology that includes data collection methods, sampling, data analysis, timeframe and ethical considerations.

Chapter 4 Presentations and discussion of the findings: This chapter presents the discussion of the results followed by conclusion remarks of the findings.

Chapter 5 Summary, conclusions and recommendations: This chapter presents the summary of key results from the study, synthesis, recommendations/implications and conclusion and areas for further studies for the study.

1.10. Definition of Key Words

Understanding: Kilpatrick, Swafford and Findell (2001) defined understanding as "an integrated and functional grasp of mathematical ideas, students with conceptual understanding know more than isolated facts and methods," (p.118). This means that learners should acquire mathematical knowledge and skills, and be able to apply such knowledge and skills whenever need arises.

Education: Education is a process which takes place at learning institutions where one receives while the other one gives knowledge. Education is thus a process of training, teaching and learning in a school to improve developmental skills and knowledge (Jacobs, Vakalisa &Gawe,

2010). Also Mlozi, Kaguo and Nyamba (2013) defines education as a process of learning how to make decisions that consider the long-term future of ecology, economy and equity of all communities.

Poor performance: Poor performance, according to Aremu and Sokan (2003), is a performance that is judged by the examiner that shows drop below an expected standard. That means that, it is a state when learners fail to meet the required minimum expectations or set standard of performance in a given evaluation exercise).

1.11. Chapter summary

This chapter outlines the background of the study. It as well outlined the importance of mathematics as one of the oldest fields of study and an important component as it cuts across all subjects and its vital role in preparing future sociologists, medical personnel, engineers and teachers etc. Furthermore, the chapter discussed the role of mathematics in screening students who intend to pursue mathematically related courses and professions at higher institution of learning. Looking at its importance in education, the Namibian government makes mathematics a compulsory subject from Grade 1 to Grade 12. To facilitate effective and efficient delivering of mathematics to learners and to improve learner performance in mathematics, Namibian government made efforts to train mathematics teachers. Intervention projects such as Integrated Teacher Training Program (ITTP), the in-service and Assistance to Namibia Teachers (INSTANT), The Learner Centered Education approach and the Basic Teacher Diploma (BETD).

This chapter showed that despite this importance, mathematics passing rates at junior secondary schools in the Katima Mulilo Circuit has been significantly decreasing, with causes of this decline remaining unknown. Thus, this study tries to close this gap by identifying causes and potential strategies that can be implemented to improve poor permanence in mathematics at junior secondary schools in the Katima Mulilo Circuit, Zambezi Region, Namibia.

CHAPTER 2

2. LITERATURE REVIEW

2.1. Introduction

The previous chapter outlines the background of mathematics and the objectives of the study that investigated the factors affecting teaching and learning of mathematics in the Zambezi region. This chapter (Chapter 2) presents the comprehensive review of literature for the study. It starts off by presenting the theoretical lens for the study, the factors affecting teaching and learning of mathematics drawn from various countries, the effects of poor teaching and learning of mathematics and finally the various strategies that can be used to mitigate on poor teaching and learning of mathematics and these will be drawn from various sociological backgrounds.

2.2. Theoretical Foundation

Teaching and learning for understanding is a very effective classroom instruction approach which is inspired by the theory of constructivism. Teaching and learning for understanding was derived from the theory of Piaget's cognitive socio-moral development. It has an ancient history in anthropology, psychology as well as education and cognitive psychology. The following philosophers contributed to the teaching framework; Dewey, Ausubel, Vygostsky and Brunner as cited in Schunk (2012) amongst others. Teaching for understanding calls for teachers to impart the knowledge to students which enables them (learners) to exhibit what they can do and what they know to both near and far contexts (Jia, 2010).

Learners must be taught in such a way that they are able to construct and create knowledge, and there after assign meaning to what they experience and learn (Jia, 2010). It therefore means that, learners should be able to use the acquired knowledge in the construction of their own knowledge, and that they must be able to interpret the required knowledge. In order to yield /

produce large amounts of rich research fruits, including systematic studies, constructivism should be introduced because it has a guiding effect on education reform worldwide (Jia, 2010). That means learners should be able to analyze other issues based on practical conditions, yet constructivism agree that no knowledge can live on its physical form and out of specific entity. With regard to learning, knowledge can be constructed through the interaction between the object and the subject. This is achieved when learners relate old knowledge to new knowledge, which includes amongst others coding, processing and construction of their own unique understanding which is based on their previous experiences (Jia, 2010). In this case teachers should change their roles from being indoctrinators and initiators to being guiders for learners, designers of teaching environment and academic facilitators for learners. Learner's experiences, previous knowledge, learning habits, methods, and thinking mode are what should be considered by the teacher at the beginning of each lesson as a growing point for new knowledge (Jia, 2010).

Constructivism theory is partly based on Piaget's theory and it is a theory of learning where learners construct their own learning through interaction with the phenomenon. It is believed that learners make sense of the phenomenon as they come into contact with it. They evaluate its evidentiary merits, experiences and as they attempt to make sense of it within the acceptable context which is prior knowledge. It is a theory that is grounded on observations and scientific study (Cohen, Manion, Morrison & Wyse, 2010) making it to be highly regarded. Constructivists regard learning as a process which is active. This is where learners construct and internalize new concepts, knowledge and ideas that are based on the learner's own past and present experiences and knowledge is constructed and not received by learner's cognitive processes and structures (Cohen, *et al*., 2010). Constructivism view point is mostly based on different methodologies that

are used in teaching to lead learners to relate their learning to real life situations. It also involves the scientific method that enables learners to acquire knowledge through discussions, and in this case a teacher acts as a facilitator when learners are on task, (Cohen, *et al*., 2010).

Some of the characteristics of constructivism are that: knowledge is not passively received, but it is actively assembled by a learner, in the same vein, learning is self-directed and is active. It also involves high order of thinking skills that enable a learner to make sense of the world (Cohen, *et al*., 2010. p, 182). Jacobs, Vakalisa and Gawe, (2010) contends that "Constructivism is based on the belief that learners should be helped to construct knowledge that is meaningful and useful in their own lives". This means that the knowledge that the learners gain must be used in their daily lives since the learnt or mastered skills must be important than the content. Conceptual understanding is required for knowledge to become meaningful to be used in learners' daily lives for improved performance, particularly conceptual understanding of a subject like mathematics that is applicable in all aspects of life.

Learners are assisted to develop new knowledge through an active construction process, and to go beyond rote learning, which is memorization (Miranda, Nakashole, & Chirimbana, 2013). Constructivism is a theory that blends well with learners understanding of mathematics and therefore this study is underpinned by this theory.

2.3. Factors affecting learner performance in mathematics

2.3.1Teacher's mood, knowledge and personality

Many countries the world over are concerned about learner performance in mathematics at secondary school level (Zakaria & Bamidele, 2015). The performance seems to be generally

declining for the majority of countries. For example, the 2004 Kenya National Examination Council (KNEC) report emphasized that 'for many years performance in mathematics has been declining hence the need for immediate intervention. In Kenya there is an unhealthy education system competition and much emphasis is on teaching for examination instead of teaching for understanding and that there is no correlation between curriculum content and the time allocated to cover the content' (p. 4).

Furthermore, in Kenya, as noted by Omwenga (2014) 'there is a missing link between secondary and primary school education, lack of parental support and also a severe shortage of textbooks and teachers' use of poor teaching methods, teachers promotion that are based on qualification rather than performance based, lack of supervision by heads of institutions are also some of the school based factors that affect teaching and learning (p, 5)'. It should be noted that Kenya is not the only country encountering this problem of school based factors impacting negatively on learner performance in mathematics. Many countries, Namibia included, find themselves facing the same problem of learner performance being impacted negatively by school based factors. School based factors are many and one such a factor is that of conceptual understanding since it is highly influenced by what takes place in the actual teaching or during classroom instruction in a school set up.

One such school based factor that has an impact on learners performance is the role played by the teacher. Nur (2010) contends that 'in order to have a conducive environment for learners, a teacher should play a key role by creating a positive classroom climate that encourages learners to be at ease and comfortable when participating in different kinds of learning and teaching activities'. It is the teacher's mood, knowledge personality, and skills that mold the whole classroom climate and that teacher are either instruments of inspiration or torture (Nur, 2010).

The entire above mentioned are considered as teacher related school based factors. However, as revealed from the study by Pin (2015) that employed a mixed methods approach to find out the existing barriers in the teaching and learning process of mathematics Grade IX-X "the problems are multifaceted and require an effort from all stakeholders". In another study by Avong (2013), it was discovered that a shortage of qualified teachers is one of the greatest factors that cause poor performance in mathematics at senior secondary school level in Atyap Chiefdom of Zangon Kataf and Kaura Local Government Area (LGA) in Kaduna state, Nigeria. The findings from these schools indicated that teacher related factors and resource materials are very crucial in determining learner performance (Avong, 2013). It would be interesting to investigate whether this will be the case for schools in Katima Mulilo Circuit Zambezi Region as investigated through the current study.

2.3.2 Teaching for examination

There is a significant role that the approaches to learning play in determining the outcome endeavors of education (Ahmed, Ahmed, Waheed, Shoaib & Khan, 2014). The three elements that influences learning in learners are: Learners themselves, the subject and the teaching strategies, teaching strategies have a significant impact on the academic achievement of learners and on the quality of learning. In-depth teaching strategies are more successful as opposed to surface teaching strategies (Mayya, Rao & Mamnarayana, 2004).

Due to preferred teaching for examination, other important aspects to develop in learners like problem solving skills, critical thinking skills, creativity skills, lifelong learning skills are undermined, despite these being skills needed for the 21st century, which attribute for deeper understanding of content through inquiry based learning and experiential learning. Education is a process of acquisition of knowledge (Meyer, 2002), Education has two attached goals, as these

are transfer of knowledge (Application) and retention of knowledge (Remembering). Learners in schools are forced to at the end of the year to memorize specific answers for them to pass due to time wasters during the course of the year.

While teaching for examinations can enable learners to see the material from different perspectives and provide feedback that students can then use to improve their understanding (Miranda, Nakashole, and Chirimbana, 2013), indepth learning for meant to help learners apply concepts learnt from school into real life situations enabling them to understand concepts better is lost. Teaching for examination deals with having to know the structure of question papers and how much time the examination is allocated something that may result in learners not remembering in future since they would have not been taught to master the concepts. Teaching for examination is a preparatory work that should be done, but should not overlook in-depth teaching for learners to understand what they learnt (Killen, 2010). Research indicate that teaching for understanding is key and comes first (Kasanda, 2015; Killen, 2010). Teachers teaching activities should be derived from schemes of work, and these tools should be checked by the principal of the school periodically (Jacobs, Vakalisa & Gawe, 2010).

2.3.3 **Socio economic status**

Performance is chiefly a yield of mental and economic satisfaction with a particular thing. If a person is mentally and socially satisfied, then positive results will reflect on his/her performance in almost everything (Nigel & William, 2015). According to Jeynes (2002), the socio-economic standing of a learner is evaluated by adding together parents' educational level, occupational standing and income level. Studies indicate that, low SES attain fewer grades and tend to be more prone withdrawing from school. Parents economic prosperity, play a vital role in directing

the performance of learners in mathematics, it ultimately enhance the learners level of performance towards learning. In a classroom situation, teachers treat learners who have a strong economic background in a different manner compared to learners with low economic profile. Furthermore, learners with strong economic background, bring to class expensive items such as: Lunch boxes, food, calculators, pens even phones. Making the low income group feeling left out and thinking on how to have what others have, in the process they are left out in learning since the do not pay attention to learning.

The study by Wang and Li (2014) indicates that students with high socio-economic status (SES) achieve higher than those students from low socio-economic status. In the same vein, Spaull (2011) asserts that 'there is a big performance gap between learners with low socio economic status (SES) as compared to those learners with high socio economic status in South Africa' (p. 1).The results of the study by Wang and Li (2014) indicate that SES for Chinese students exerts significant influence on their achievement in education. These SES factors include amongst others: Family income and parent's education that stand out as the most contributing factors among others. The social and economic situation in China, especially the imbalanced distribution of educational resources between and within rural and urban areas could magnify the role of SES in mathematics achievement (Wang & Li, 2004). Although China may not necessarily be comparable to Namibia in many respects, the issue of parents' socio economic status may be of relevance within the Namibian context.

A study by Mbugua, Kibet and Nkonke (2012) in Ghana showed that students' parents/guardians education background plays a very vital role in the education of their children. This is so because highly qualified parents are likely to play a good role of being role models to their children and that when parents are actively engaged in their children's education they exert positive influence

in them. Cultural constraints such as family income, beliefs, early marriage have been observed to have negative impact on student achievement in Namibia and other countries. Results indicate that children from insecure environments such as those with female genital mutilation, early marriages and cattle rustling bring about lack of confidence and concentration and in the process, signs of emotional problems become visible (Mbugua, Kibet & Nkonke (2012).

A qualitative study done by Kyari and Ayodele (2014) in Nigeria examined the socio-economic status effect of early marriages in North Western Nigeria as a case study showed that early marriage does not give celebration when not done properly. However, marriage is regarded as a milestone and celebration for adult life, unfortunately early marriages give no such cause of celebration because the boys' and girls' childhood is cut shot, which in return yields negative consequences. The study revealed that in many ethnic groups in the world including Nigeria, early marriages have been a common practice. However, it has contributed to a series of consequences for the society and youth girls. Early marriages for both girls and boys contributed to a series of negative consequences such as: Emotional impact, psychological and intellectual impact which in the end cut off the chances of personal growth, education and employment opportunities. Despite the negative impact on the girls, families and the girls' children, including society suffer the consequences of early marriages (Adedokun,et al., 2012). The emotional impact can result in low performance at junior secondary school level, hence this study.

2.3.4 Learner's and Teachers attitude

Learners' attitudes behaviors affect student achievement, which is thought to have a critical role for students in reaching their objectives and sustaining their existence in the long term

(Omwenga, 2014). Attitude shuts out a learner's mind from learning. Attitude may be due to discouragement by parents, peers, and even teachers.

Bohner (2002) as cited in Mahomed & Waheed (2011) defines attitude as" total evaluation of an object" which entails that each and every student evaluates the subject mathematics in their own way which therefore leads to opposing/differing attitudes towards the subject and in the end leading to differences in performance among learners". A study that was conducted in Maldivion shows that learners attitude in mathematics has no effect on their performance. The results revealed that, Maldives learners though their performance is very low, they have a fairly positive attitude towards mathematics as a subject (Mahomad & Waheed, 2011). However, a study by Sa'ad, Adamu and Sanding (2014) indicates that the negative attitudes of students towards mathematics contribute immensely to student's poor performance in mathematics. This could have been influenced by the perceptions from the previous individuals who would have experienced difficulties in the teaching and learning of mathematics. The study was conducted in Azare Metropolis and 5219 students and 326 teachers were targeted. The sampling method used was disproportionate stratified sampling, which was used to select 61 teachers and 300 students. The questionnaire was self-designed and data was summarized using frequencies and percentages (Sa'ad, Adamu & Sanding, 2014). The difference between the two studies could be that, the results of fair attitudes by Maldives learners could have been so because of the motivation from teachers and also the positive attitude by both learners and teachers. On the other hand the learners from Azare Metropolis indicate the negative attitude of students towards mathematics, which could be constituted by the teachers and learners negative attitudes, teachers' lack of willingness to help learners and teachers' lack of content knowledge (Zan & Martino, 2005).

Teacher's attitude generally refers to his or her disposition about mathematics though they may be other factors as well, attitude encompasses a teacher's level of enthusiasm, resourcefulness, willingness to help, and knowledge of the content (Zan & Martino, 2005). It is therefore a measure of a disliking and liking or a tendency of avoiding or engaging self in mathematics activities. Attitude towards mathematics involves a trend on mathematics anxiety (Mensah, Okryere & Kuranchie, 2013). Negative attitude of both teachers and learners towards mathematics as a subject play an important role in the overall learner performance (Pia, 2015). Maintaining a positive attitude improves the teacher's ability to help learners learn for conceptual understanding.

Cotton (1984) contends that 'standards for classroom behavior are explicit. Teachers should let the learners know that there are standards for behavior in the classroom, and consistent, equitable discipline is applied for all students'. Furthermore, Personal interactions between teachers and learners should be positive; teachers should pay attention to learners' interests, problems and accomplishments in social interactions both in and out of the classroom. Teachers should also show learners that they really care for them (Cotton, 1984).

Incentives and rewards for learners are used to promote excellence and to build a strong motivation, learners should be informed about rewards and what they need to do to get them. Rewards are chosen because they appeal to learners (Karigi & Wario, 2015). Rewards should be related to specific learner achievements. Some rewards may be presented publicly, some should be presented immediately, while others delayed to teach persistence (Karigi & Wario, 2015). Incentives and rewards for learners when they perform well assist them to guard against developing negative attitudes towards learning for conceptual understanding.

The role played by teacher personality in teaching and learning of mathematics is very vital to the performance of the learner. The personality's entails instructional behaviors display by the teacher towards the learning and understanding of the learner. The attributes of the teacher's personnel are attributes of peculiar qualities, traits, mental or moral nature/strength and status that make one person or group different from another. Successful teachers' characteristics are those that have a significant impact on students' learning and achievement. In this study, the effects of teachers' mood, knowledge and personality on learner's performance were identified. The prediction was that if the is poor relationship between the mathematics teaches and learners due to mood, knowledge and personality, then transfer of knowledge from the teacher to the learners will be poor and eventually lead to poor performance.

2.3.5 Learners/teacher ratio

A high ratio of learners to the teacher makes teaching and learning to achieve good performance difficult. Such a high learner /teacher ratio leads to failure for the teacher to give individual attention (Chirimbana, 2014). This has a high negative impact on learners with respect to learning facilities and receiving individual attention resulting in less learner-centred class activities. The high learners to teacher ratio would likely result in sabotage of attention for each learner by the teacher. The result of such a status quo would likely have a negative impact on learners' performance since inadequate assistance would be given by a teacher in such large classes.

2.3.6 Teaching methods

The teacher's teaching method or model and the classroom atmosphere greatly affect students' performance. A properly arranged method and environment is likely to motivate learners (Even & Bruckheimer, Univalence:a critical or non critical Characteristics of functions., 2004). Students will pay attention and follow the properly arranged teaching method and environment hence become interested in learning or regulated self-learning. The method of teaching must be able to address the students' personal needs (Jalbani, 2014). The tertiary learning institute for education in the Zambezi Region has been trying to adequately train teachers so that they offer quality teaching as quality teaching can be seen in the teaching methods used by the teachers (Mbugua, Kibet & Nkonke, 2012). Survey has shown that quality teaching in the region falls short. Rote learning methods of teaching dampen the learners' zeal to learning for conceptual understanding, hence the poor performance.

The teaching of mathematics strongly relies on the teachers' exposition which is accompanied by the practice of fundamental skills and strategies to be implemented which are dependent upon the factors that affect teaching and learning of mathematics (Baldirstone D. , 2000). In most of the classrooms worldwide drill work is mostly used to help learners master the skills and procedures. For quality education to take place a shift from this rule based approach which tends to limit a learner in achieving high scores should be done away with and teaching and learning for conceptual understanding must be the primary focus (Brodie K. , 2013). The class must be turned into an engagement environment. Learners need to be guided through an inclusive array of examples, resources and strategies (Andrew, 2015) if conceptual understanding is to be achieved. Kasanda (2015) contends that, 'there is unfair distribution of teaching and learning materials in

the country. Urban schools are mostly preferred as compared to rural and peri-urban schools (p.2)'. In another study done in Australia by Andrew (2015) it was revealed that "the bulk of time is spent helping the students develop insight. Activities and tasks are presented to provide learners with experiences that provide opportunities for new understanding. Once students gain understanding, then there is need for some time to be spent on practice," (p. 4). This entails that, when a lot of time is spent on mathematics as a subject, learners develop a need to practice activities which may lead to the acquisition of conceptual understanding and better performance.

Several teaching methods and strategies of mathematics have been suggested and implemented; this includes teacher-centered, learner-centered, content-focused and interactive/participative methods. The teacher may adopt any method according to the specific unit of syllabus, available resources and number of students in a class. Whatever method the teacher select it should be effective. Several effective strategies have been suggested, including hands-on, using of visuals and images, finding opportunities to differentiate learning, asking students to explain their ideas, Incorporating storytelling to make connections to real-world scenarios and showing and telling new concepts

2.3.7 Teachers' knowledge of the subject

Teachers' knowledge of the subject – research has confirmed that teacher quality has an impact on learners' performance (Pia, 2015). Thus, high quality teachers should be a prerequisite for cultivating learning of mathematics for conceptual understanding and improved performance in secondary schools generally. This has had a great negative impact on the learners leading to their poor performance. In another study done by Chirimbana (2014) it was exposed that teachers who have low knowledge levels in the teaching and learning of mathematics face challenges in

teaching the subject and thereby leading to learners' poor performance in mathematics. Such teachers are likely to be the ones who make the learners have perceptions which are negative towards the learning of mathematics thereby impacting on the performance of the learners negatively.

Teachers' knowledge on the subject is a factor that determines the quality of the teachers (Kasanda, 2015). A teacher with sound knowledge on the subject presents topics in an easy way for learners to grasp concepts (Killen, 2010). It is therefore vital for the training institute to recruit on merit, and work on improving on the knowledge that already exists. Identifying prior knowledge on the subject should start from junior secondary school, where teachers identify learners' background knowledge in order to teach for conceptual understanding which is also referred to as teaching for assimilation (Killen, 2010).

2.3.8 Overcrowded classrooms

Overcrowding creates an unpleasant environment. Such an environment is characterized by hot temperatures, unpleasant odors and discomfort. These characteristics cause loss of concentration. The Lowveld temperatures in Namibia are high, and when this compounds with a crowded classroom, the environment becomes unconducive for teaching and learning for conceptual understanding. When temperatures are high, learners doze thereby losing concentration (Brodie K. , 2013). It is also difficult for teachers to give individual attention in crowded classrooms.

A study conducted by Ojonubah (2015) observed that overcrowded mathematics classes negatively affect students in mathematics learning. The sample in Ojonubah's study consisted of 62 students and 4 mathematics teachers. The sample was drawn from primary, secondary and tertiary institutions. Questionnaire and test questions were the instruments used to collect data statistically. It was observed that, mathematics classes that are overcrowded, negatively affect

student learning, which also affects the quality of education (Ojonubah, 2015). Likewise, the study by Shah and Inamullah (2012), indicates that "Overcrowded classes in turn cause teacher and learners to suffer and it also revealed that overcrowding was coupled with other negative learning factors that cause physiological problems (infectious diseases, reduction of quality air which affect the health of an individual). Overcrowded classes in turn, also results in lack of textbooks, classroom space and lack of chairs. Social behavior such as aggression are triggered by these environmental factors such as temperature as it is indicated in this study that natural light enhances performance (Shah & Inamullah, 2012). In overcrowded classrooms, effective teaching and learning is not possible. Many teachers face discipline, instructional, physical and educational problems (Igbal & Khan, 2012). It was observed that overcrowding is one of the factors that contribute to indiscipline which often leads to poor performance in mathematics. Meaning, the quality of education is lowered down due to the aforementioned factors.

2.3.9 Parental involvement in education

Parental involvement in education - Lucy Le Mare (2014) asserts that

> *" parents' involvement in children's education has several forms. Parents who are behaviorally involved participate in activities such as attending school functions and volunteering at the school. Parents who are cognitively involved expose their children to stimulating activities and materials, e.g., WI-FI, calculators etc. such as reading books or visiting cultural institutions. Parents who are personally involved communicate positively with their children about school matters. They convey that they value school and expect their children to as well.'* (pp 67)

Lucy Le Mare creates an understanding that learners' attitudes towards school become more positive when parents are involved. It is when parents begin to be involved in such a manner that

they will interact with teachers and work on ways of how they can impart conceptual understanding, both from home and from school. Parents' personal involvement has a higher impact on the learners' learning for conceptual understanding and scoring high marks as compared to behavioral involvement.

Parental involvement in education – when parents begin to get involved in their children's education, they will take responsibility of learners' needs. For parents to get involved, teachers will have to play a vital role of engaging them to put them on an eye opening program that will make them realize and appreciate the importance of education that may lead to acceptable classroom behavior. Since independence, parents in the Zambezi Region have hardly been involved in their children's education. This may create a casual attitude in learners towards learning for better performance, hence the need for teachers to begin to engage parents. Where campaigns on parental involvement are held, parents may begin to be involved in their children's mathematics education to an extent of forming School Development Committees (SDC). This will mean deeper parental involvement and issues affecting teaching and learning that may result in better performance in the Zambezi Region can be looked at from a community point of view.

2.4 Strategies to mitigate on the factors contributing to poor performance in Mathematics at junior secondary level

Several studies have come up with strategies on how to assist learners in mathematics and to improve mathematics performance, for instance Jameel and Alib (2016) propose that, teachers need to be true guiders and facilitators for teaching mathematics to their students. Teachers need to impart new knowledge in a clear and charming way by using multi Audio-Visual (A.V) Aids (Ibid). Mathematics cannot be taught and learnt in the passive way, but through active involvement, therefore as the researchers recommend that the students need to be actively engaged in the learning of mathematics rather than just being listeners and observers of the

teaching of the subject in their classes (Ibid). In another study, several strategies are suggested like alignment of teaching methods with the assessed learning needs and capabilities of students, being able to realize the importance of recognizing learning styles, identifying students' differences, and adjusting the teaching methods accordingly (Michael, 2015). All these strategies by Michael (2015) are meant to improve performance while yet another strategy of video recording, various mathematical teaching concepts and techniques have been suggested to improve the teaching and learning process. Stigler and Hiebert (2004) recommend that, teachers should record what their learners are learning while teaching and share that knowledge with their colleagues. In Namibia what is known about poor performance is largely based upon empirical studies that investigate how academic and behavior goals to find the effect of setting academic and behavioral goals in the Science Foundation program of the University of Namibia conducted by Chirimbana (2013). The strategy that can be implemented from the findings of his study indicates that, the use of academic and behavioral goals significantly improve the mathematics performance of the students. However, Chirimbana (2013: p. vii) then specifies that "some factors such as the students' level of competence should be taken into consideration and that specific teaching method should be used in order to get maximum results in a goal oriented classroom environment".

Mbugua, et al., (2012) take a firm stand that mathematics performance of learners can be improved by precondition of proper staffing, teaching and learning materials, curriculum, motivation and attitudes, and fees and levies. On the other hand, Gitaari, et al., (2013) postulated that, ways of improving performance of students in mathematics include creation of positive attitude towards mathematics, administering of more examinations and quizzes, provision of adequate teaching and learning materials, motivation, completion of the syllabus on time,

provision of adequately trained mathematics teachers, using variety of teaching methods as well as monitoring of lesson by the school administration. Karue and Amukowa (2013) assert an opinion that the provision of instructional materials, library, laboratory and other physical facilities, developing good rapport with parents by the head teachers, reducing students and teacher ratio of manageable size are some of the ways of improving performance in mathematics.

2.5 Summary

This chapter presented a comprehensive review of literature for the study. It started off by presenting the theoretical lens for the study followed by the factors affecting teaching and learning of mathematics drawn from various countries. These factors are mainly are about what happens in the classroom, how teaching is conducted and what is needed. Finally this chapter presented various strategies that can be used to mitigate on poor teaching and learning of mathematics and these will be drawn from various sociological backgrounds

The instructional theory underpinning this study is inspired by constructivism, and it directs that learners must be taught in a way that they are able to create knowledge and assign such knowledge to what they experience and learn (Jia, 2010). It came to light from the review of the literature literature that, for many years learners performance in mathematics worldwide has been declining, Namibia and Zambezi in particular not an exception, hence the need for investigation (Zakaryia & Bamindele; Omwenga, 2014; Nur, 2010, & Avong, 2013).

Factors such as low socio-economic status, teaching for examination, teacher's mood, knowledge and personality, teachers and learners' attitude, teaching methods are some of the factors found to be affecting learner performance in mathematics at the targeted schools (Mbungua et al., 2012). The next chapter presents the methodology employed in this study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

The purpose of the study was to investigate factors that attribute to poor performance of learners in mathematics, and to suggest strategies/recommendations that may curb the problem. In this chapter, the methodology, procedures and strategies used to collect data from participants in participating schools are described.

It is generally understood that both quantitative and qualitative methodologies can be used in human science research as this is done unconsciously or consciously (Fouche & Delport, 2002). This is so because human beings are complex in nature necessitating to be investigated with most appropriate methodologies to achieve valid results.

In light of that, this study will follow a mixed methods approach by using both quantitative and qualitative research methods, with the purpose of exploring the factors that attribute to poor performance of learners in mathematics at junior secondary schools in Katima Circuit, Zambezi Region. Mixed methods design is useful as it captures the best information of both quantitative and qualitative approaches. Different research measures were applied in order to observe the phenomenon at different angles. Creswell, (2003) asserts that "this model is well known to all researchers and that it might lead to confirmed and validated findings, which is regarded as another advantage of the mixed methods approach". All research should be aimed at producing valid findings, including this current study.

The importance of the methodology lies in guiding the research and allows others to see how data was generated. In view of this, Baker (2007) suggests that 'methodology is the general approach the researcher takes in carrying out the research project, it is thus, a range of methods and procedures used to investigate a given phenomenon'. In view of this, different sections such as research design, sample and population, sample procedures, ethics and data collection procedures, piloting and data analysis are outlined in this chapter to show the methodology followed for this study.

3.2 Research Design

Burns and Grove (2004) provide the following definition of a research design: "The degree of control that the researcher manages to exert over his or her environment". The study followed a mixed methods approach by conducting qualitative design in the form of interviews and a quantitative, descriptive design in the form of a questionnaire. The purpose of a survey design is to make generalizations from a sample to the entire population such that inferences are made about attitude, behavior and characteristics. The interviews as a qualitative component was selected for this study in order to help the researcher acquire in-depth knowledge regarding the issues under investigation and to have a clear understanding of the phenomenon. Qualitative design has limitations as well, such as lack of scientific accuracy and that the study may not be generalized to the entire population. Despite the limitations of the qualitative design, the researcher was of the view that the use of interviews might assist the researcher in forming a range of views which can help to overcome and increase the possibility of generalizability with the given sample (Wisker, 2002 , as cited in Maree, 2012).

For the quantitative part, a survey design in the form of a questionnaire was employed, due to its advantage that of, when questionnaires are properly constructed, evidence of high measurement

of validity and reliability manifest (Creswell, 2012). A survey design has a limitation in that a lack of detailed, insider observation may lead to disapproval (Mouton, 2001 as cited by Maree, 2012). For the purpose of this study, the sample included, School principals, mathematics teachers and learners at selected schools. In order to prevent the limitations of the design (Qualitative and Quantitative), "the research design employed in this study was a mixed method design, which was used to investigate the factors that affect the teaching and learning of mathematics at junior secondary school level in Katima Circuit, Zambezi Region. The mixed method design employed in this study used a survey method. The research design is a systematic way of study used to understand a scientific problem, it (research design) reveals the study type, descriptive, exploratory, experimental, and interpretive or others (Creswell, 2017). Design is defined by Burns and Groove (2004) as 'the degree of control that the researcher manages to exert over her or his environment,". This entails that a design is a plan or a general strategy for carrying out a study, it describes the goals and the structure including the tools to be used by the researcher to collect data (Gay, Mills & Airasian, 2009). The design gives power to the researcher to have control over the time slots that respondents were observed, given questionnaires to respond to and interviewed, the type of data collection instruments to be used and the sampling strategy (Christensen, Johnson, & Turner, Educational Research, 2012). Erickson & Curl (2002) defines research design "as the researcher's overall approach and justification of the use of such an approach with regard to the problem under investigation" (p. 57).

A design is an approach that is used to obtain relevant evidence (Baker T. , 2007). This is where the researcher has to specify the type of evidence that is required to answer the research questions. A research design in most cases deals with logical problems, but it does not deal with

logistical problems. Therefore, a design is a structure of enquiry. The other important role of a design is to minimize the chances of illustrating inferences that are not correct from data. Secondly, the evidence collected should enable the researcher to test theories and to answer questions as clearly as possible (Erickson & Curl, 2002). A design is a blue print that helps one to conduct a study with maximum control over influences that may interfere with the strength of the findings and it is a plan that describes to the researcher when, how and where data is to be collected and analyzed (Boyle & Boffetta, 2009). In this study, methodological triangulation was employed where both qualitative and quantitative approaches are combined and used (Robson, 2010).

Therefore, this study followed a mixed methods approach or design by using a quantitative descriptive survey method which is in the form of a questionnaire and a qualitative research strategy where interviews were used in order to describe and explore the factors that affect teaching and learning of mathematics at junior secondary school level. The qualitative dimension of the study utilized a descriptive exploratory research method. While the quantitative dimension of the study used the survey method. Cresswell (2017) identifies two types of mixed methods research designs which are the convergent parallel and the explanatory sequential method. In the convergent parallel method both the qualitative and quantitative methodologies and instruments are administered at the same time, while in the explanatory sequential one of the two is administered and the findings are analyzed leading to the development of the second method. The current study employed the convergent parallel mixed method where both qualitative and quantitative instruments were administered same time to the various groups.

Mixed methods were employed in order to describe and to explore the factors that affect teaching and learning of Mathematics at junior secondary school level in Katima Circuit, Zambezi

Region. According to Gay, Mills and Airasian (2011:67) "a mixed method research design entails the use of both qualitative and quantitative methods in a research. The sole aim is to build a synergy and to strengthen that which exists between the two (quantitative and qualitative) with the hope to understand the phenomenon more fully than is possible using either qualitative or qualitative methods alone", This means that, the two methodologies, quantitative and qualitative, have no overlapping weaknesses and have complementary strength. This gives a comprehensive look of a research problem from many perspectives and it offers a holistic picture when results are analyzed.

3.3 Research Methods

Descriptive survey research method seeks to provide an explanation of a phenomenon in its natural setting without any modifications made to the situation (Baldirstone D. , 2000). It is a scientific method that tries to provide answers to such questions with when, how, what, and where without asking why. While the exploratory survey method seeks to provide a peculiar elucidation of an unknown circumstance in its natural setting, trying to gain new insights about the idea and for the purpose of increasing knowledge about the idea (Erickson & Curl, 2002). The two research methods supports each other in that they provide a synergy on the weakness posed by any one of the methods under study (Christensen, Johnson, & Turner, Educational Research, 2012). Exploratory research is the initial research into a hypothetical or theoretical idea, while descriptive research helps to fill in the research community's understanding of the initial exploratory studies. Exploratory research tries to connect ideas to understand cause and effect (Babbie E. , 2005). In the current study the use of the two research survey methods helped the researcher to explain the general performance of the learners in mathematics without necessarily manipulating any variables in the study but rather trying to understand the issue of

factors contributing to learners' poor understanding of mathematics in Katima Mulilo Circuit. In order to understand research problems, a mixed method approach was applied and data collection was obtained at the same time, (Creswell, 2003). Creswell outlines the purpose of a survey with reference to Babbie "as to generalize from a sample to a population so that inferences can be made about some characteristics, attitude or behavior of this population," (p. 154). A survey research with a purpose of getting information about the current situation and finding out the characteristics that are exact from a phenomenon under-study was used, (Maree, 2012), where results obtained from descriptive studies can be analyzed statistically, (Awoniyi & Alege, 2007). The value and strength of a descriptive study is that information collected from representative groups is used to make inferences to the whole population, meaning the behaviors, characteristics, opinions of the represented group will be generalized to the larger population, (Awoniyi & Alege, 2007). If a survey questionnaire is well designed there will be high evidence of validity and reliability, (Maree, 2012).

3.4 Target Population

Population is defined by Maree (2012) as 'a group of individuals consisting of all the sampling units relevant to the research questions' (p.87). Gay, Mills and Airasian (2009) asserts that 'population is the larger group from which the sample will be selected,' (p. 108) which entails that a population should have one or more characteristic in common that are of interest to the researcher to constitute a target population. Katima Mulilo Circuit became the target population because of the continued dismal performance in mathematics at junior secondary school level. In addition, the learners follow the same curriculum and subjected to the same mode of assessments. The teachers are administering the curricula and the assessments. The targeted

population comprised of all the 10 junior secondary schools in Katima Mulilo circuit, which included teachers offering mathematics at junior secondary school level.

3.5 Sampling technique and Sample size.

Maree (2013) refers to sampling 'as a process used to select a portion of the population for a study,' (p. 79). The study was conducted in Namibia in the Zambezi Region, one of the fourteen regions in Namibia. The study engaged junior secondary schools in the region. The region was selected due to its dismal mathematics performance, the poor performance that brought concerns to stakeholders, parents and non-governmental institutions (Kasanda, 2007). Creswell (2012) stresses the following accounts with regard to mixed methods processes: "asserting that quantitative data often involves random sampling, so that each individual stands an equal probability of being selected and the sample can be generalized to the larger population. In qualitative data collection, purposeful sampling is used so that individuals are selected because they have experienced the central phenomenon".

The proposed study was conducted by applying both non-probability and probability sampling, using purposeful and random sampling to select participants. Purposeful sampling was used by the researcher in order to select a few participants; in this case participants were handpicked based on the required characteristics in order to get the required traits (Maree, 2010).

Firstly, simple random sampling (Quantitative) was conducted using the following criteria:

The schools were purposely sampled and they involved grades 8 to10 classes. Schools were purposely sampled because they were within reach. The participating schools are those schools where learners' poor understanding of mathematics was observed to be low. Due to a high number of class sizes, convenience and simple random sampling were used in this study to select participating classes and teachers. Convenience sampling is done in situations where

elements are selected based on the fact that they are easily and conveniently available (Maree, 2012).

Secondly, purposeful sampling (Qualitative) was conducted in order get a sample with suitable characteristics. Participants were drawn from grades 8, 9 and 10 (Junior Secondary phase). The sample included both male and female learners and teachers. The sample also included school principals.

The study was conducted by using both non-probability and probability sampling which entails that a combination of random sampling (quantitative) and purposive sampling (qualitative) was used to select the sample. Simple, random sampling (Quantitative) was advantageous because every member in the population stands a chance of being selected (Baldirstone D. , 2000). The advantage of purposive sampling (qualitative)was that the sampling decisions were not confined to the selection of participants as it also includes the settings, events, incidents and activities (Babbie E. , 2005). In the current study, 120 participants (100 learners and 20 teachers) completed the closed ended questionnaire while 16 participates (6 teachers and 10 learners) were purposefully sampled to participate in the interview. These entails that quantitative tool had 120 participants while the qualitative tool had 16 participants.

3.6 Data collection strategies

3.6.1 Linking research questions to data collection techniques

The table below shows the research question and the instrument used to answer the research questions.

Table 2: Linkage between research questions to data collection tools.

Research question	**Instrument**	**Purpose**
1. What are the teachers' and learners' views on factors that impact on their teaching/learning of mathematics in junior secondary schools in the Zambezi Region in Namibia?	Interview(Teachers and leaners) Questionnaire (Teachers and leaners)	To investigate the socio-economic factors that affect learner's performance in mathematics.
2. What strategies can be used to improve the teaching and learning of mathematics in junior secondary schools in the Zambezi Region in Namibia?	Questionnaire (Teachers and leaners)	To find out the strategies that can be used to improve the teaching and learning of mathematics in junior secondary schools in the Zambezi Region in Namibia

The table above indicates that, almost all questions were answered by using both the qualitative and quantitative instruments with the purpose of complementing and triangulating, meaning using the strength of qualitative data to offset the quantitative data weakness with regard to the findings (Gay, Mills & Airasian, 2011). Data was generated using questionnaire and interviews. Both the qualitative and quantitative data provided data to answer the research questions in the Table.

3.6.2 Qualitative techniques

Face to face interviews

The researcher conducted semi-structure interviews, which are face to face with the purpose of generating qualitative data through participants' views, experiences and opinions regarding the factors that attribute to learner poor performance in mathematics at Junior Secondary phase, in Katima Circuit, in the Zambezi Region. An interview schedule/guide comprising of close ended questions was developed to direct the researcher during the interview. The face to face interviews enabled the researcher to gain participants cooperation by forming a relationship with them, with a purpose of facilitating the production of high rates of response (Leedy & Ormrod, 2010).

3.6.3. Quantitative techniques

Two types of questionnaires were designed, one for teachers and the other one for learners. The advantages of a questionnaire is that, it provides the researcher with an opportunity to clarify the questions, and that the accuracy of a questionnaire can be checked (Maree, 2012). The disadvantage of a questionnaire is that, the primary researcher does not have control on the conditions on which the questionnaire is administered (Maree, 2012).

Questionnaires and interviews were used to collect data from learners and teachers on factors affecting the teaching and learning of mathematics in Katima circuit, Zambezi Region.

3.6.3.1 Questionnaire

Questionnaires are instruments that are widely useful, as they can collect numeric data that is structured and can be administered in the absence of the researcher (Cohen, *et al.*, 2011). In the

same vein questionnaires enable a person administering them to give clarity to questions that are not clear and also helps to explain the purpose of the study (Cohen, *et al.,* 2011; Maree, 2012). In this study questionnaires were used because they are easy to fill and that at first sight patterns can be sported (Maree, 2012). A questionnaire was administered to both teachers and learners to collect data. The questionnaire was used to gather information about the teachers' qualification, gender, age, highest qualification, and duration they served as mathematics teacher, classroom management, attitudes towards teaching mathematics, and effects of lack of teaching and learning resources and ways on how teachers can teach and learners learn. The questionnaire was used to gather information about the various strategies that can be used to mitigate on the factors that inhibit learners' success in the teaching and learning of mathematics (Appendix A).

Learners completed the questionnaire to collect biographic information of the learners, such as age, gender, responsibility and the school they go to. The learner's questionnaire measured the general student perceptions experienced by learners, and classroom factors that influence poor performance of learners in mathematics at junior secondary schools in Katima Circuit, Zambezi Region (See Appendix C).

3.6.3.2 Interview guide for teachers

The teacher's interview guide (Appendix B) a qualitative data collection tool was used to obtain information that the researcher could not be obtain using a questionnaire, the tool provided in-depth data, required to meet the specific study objectives (Gay, Mills & Airasian, 2009). An interview guide was therefore used to capture responses word for word using a voice recorder (Robson, 2010). The interview was used to answer the questions first two research questions on the factors and the effects. Here, the participants expressed their views and opinions in detail.

3.7 Data collection procedure

Interview Schedule

An interview schedule is a face to face data collection tool in which an interviewer collects information based on opinions, behaviour and problems that attribute to poor performance of learners in mathematics at participating schools. It has an advantage of helping a learner to understand his or her environment and self-such that he/she modifies strategies in the researcher as guiding personnel specified the questions called structure interviews. The tool has an advantage of collecting data that no research tool can collect. Its limitation is that, the information collected cannot be standardized from one person to the other (Maree, 2012).

3.8 Ethical Considerations

Babbie, (2005) asserts that, "Anyone involved in research needs to be aware of the general agreements about what is proper and improper in scientific research". It was therefore important for the researcher to abide and follow the ethical guideline, since the study involved individuals (Human participants) the researcher paid attention to the following ethical principles:

3.8. 1 Permission to carry out the study:

A formal request to carry out the study was made to The Director of Education Zambezi Region before data was collected. Data was only collected by the researcher after full permission to undertake this study was granted by the director of Education Zambezi Region and the school principals for the schools which participated in the study.

The researcher also sought consent from the Ministry of Education Arts and Culture, Zambezi Region and from potential respondents to take part in this study (Appendix C, D and E). The researcher clearly explained the nature of the research to participants before they get involved. All participants were assured of confidentiality and anonymity and no names and any other

identity information appeared in the research report. The written responses on the paper from the interview were secured in personal file where people do not access the information without permission from the researcher and they were destroyed by means of burning after the research was done. Responses and drafts on soft copy were kept safely in the personal laptop secured with a private password.

The researcher requested permission from the Regional Director, Ministry of Education, Zambezi Region. A research permit was obtained from the Ministry of education, which allowed the researcher to conduct the study in Katima Circuit. During the school visits, the researcher gave questionnaires to teachers and learners. Data was also collected from learners and teachers interview guide and questionnaires (Teachers questionnaire and learner's questionnaire). The minterviews were conducted by the researcher.

3.8.2 Informed consent and Voluntary participation.

School principals, teachers and learners were provided with a consent letter which outlined the purpose of the research, describing the research process as well. Participants and respondents were requested to read through the consent letter, and the assurance of the participant to take part in the study. Participants were also informed that, they may during the process of the study withdraw if they so wished.

A written consent was sought from all participants after an explanation on the purpose of the study had been given by the researcher prior to participation. This was a sign of respecting their autonomy. The informed consent form used by the researcher in the study has been attached (see Appendix E).

3.9 Trustworthiness (Qualitative)

Mugo (2017) presented the model of ensuring the trustworthiness of qualitative data that was applied in this study. The four characteristics to ensure trustworthiness are truth-value, applicability, consistency and neutrality.

3.9.1 Truth-value.

Truth-value asked how confident the researcher is with the truth of the findings based on the research design, informants and the context in which the study was undertaken. It is concerned with whether the findings of the study are a true reflection of the experiences of the study participants (Mugo, 2017). Truth-value is established by the strategy of credibility and, for the purpose of this research, the researcher used the following criteria: Interviewing techniques. This researcher made use of various interviewing techniques during the interview, for example probing, verbal and non-verbal expressions, restating and summarizing in order to enhance the credibility of the study.

3.9.2 Applicability

Mugo (2017) defines applicability as the degree to which the findings can be applied to other contexts and settings or to other groups. Applicability is established through the strategy of transferability. In order to achieve transferability, the researcher provided a dense description of the research methodology employed.

3.9.3 Consistency

Consistency of data refers to whether the findings would be consistent if the enquiry were replicated with the same subjects or in a similar context (Mugo, 2017). Consistency is established through the strategy of dependability and it was achieved by using the independent coder. The researcher and the independent coder were independently coding the data and

subsequently had consensus discussions with the study leader on the themes and concepts presented as research findings.

3.9.4 Neutrality

The fourth criterion is neutrality. It refers to the extent to which the study findings are free from bias Mugo (2017) proposes that neutrality in qualitative research should consider the neutrality of the data rather than that of the researcher, which suggests conformability as the strategy to achieve neutrality. The researcher tried to maintain neutrality by not giving her own opinions when the participants were attending to the research questions in the interview.

3.9.5 Transferability

Transferability is the extent to which the reader is able to generalize the findings of a study to her or his own context and addresses the core issue of "how far a researcher may make claims for a general application of their theory" (Gasson, 2004). The researcher ensured transferability by providing information that showed that the study was restricted to teachers, learners in Zambezi Region mainstreamed secondary schools only who contributed to the data, indicated the number of participants (15) involved in the study, the data collection methods that were employed and the number and length of the data collection sessions. Transferability in qualitative research is achieved when the investigator gives adequate information about the self (the researcher as instrument) and also the research context, processes, members, and researcher-participant connections to make it possible for the reader to decide how the findings may transfer (Trochim, 2015).

3.9.6 Dependability

Dependability deals with the core issue that "the way in which a study is conducted should be consistent across time, researchers, and analysis techniques" (Gasson, 2004). Thus, the process

through which findings are derived should be explicit and repeatable as much as possible. In ensuring dependability, through the research design and its implementation the researcher gave an in-depth methodological description, fully describing the operational detail of data gathering, addressing the minutiae of what was done in the field. This allows the study to be repeated. Dependability was ensured by an in-depth chronology of research activities and processes; influences on the data collection and analysis; emerging themes, classifications, and analytic memos (Peat, Mellis, Williams, & Xuan, 2014). In the current study this was achieved by transcribing the study findings and then grouping the emerging themes in the study and aligning such themes to answer the research questions in the study.

3.9.7 Confirmability

Conformability addresses the core issue that "findings should represent, as far as is (humanly) possible, the situation being researched rather than the beliefs, petty theories, or biases of the researcher" (Gasson, 2004). With the issue of confirmability, the researcher recognized and acknowledged shortcomings and limitations in the study's methods and their potential effects. This aspect was achieved by making sure that the answers to the research questions emerged from the collected data rather than from the researchers own intuition or knowledge.

3.9.8 Self-reflexivity

Self-reflexivity is the process of becoming self-aware. Researchers make regular efforts to consider their own thoughts and actions in light of different contexts (Baldirstone D. , 2000). Reflexivity, then, is a researcher's ongoing critique and critical reflection of his or her own biases and assumptions and how these have influenced all stages of the research process. In the current study, self-reflexivity was achieved by continually critiques impressions and hunches, locates meanings, and relates these to specific contexts and experiences (Baker T. , 2007). The act of

reflection enabled the interviewer to thoughtfully consider this asymmetrical relationship and speculate on the ways the interviewer-interviewee interaction may have been exacerbated by presumptions arising from obvious sources, such as certain demographics (for example, age, gender, and race), or more subtle cues such as socio-economic status, cultural background, or political orientation (Cox, 2015). The researcher used mutual collaboration and social critique techniques to understand the interviewee during the interview. In the current study self-reflexivity was developed by herself by constantly asking herself what she had learned during the process of collection of data and also asking herself whether the collected information was sufficient enough to answer the research question of the study.

3.9.9 Peer examination.

The researcher also sought input from colleagues who were well-versed qualitative researchers and who clarified the study by asking them questions and generally shedding light and making suggestions (Blaikie, 2014). Mugo (2017) finds this method profitable. The researcher also has an expert qualitative researcher as a study leader. This was done to make sure that those participants who were not well conversant with English language would participate comfortably.

3.10 Validity and reliability of Research Instruments

Maree (2012) defines reliability "as the consistency or repeatability of a measure or an instrument "p. 147).

3.10.1 Validity of the instruments

Cohen, Manion and Morrison (2011) defines validity as 'demonstration that a particular instrument in fact measures what it purports to measure or that an account accurately represents' those features that it is intended to describe, explain or theorize' p.179). Therefore, validity is

intended to check if the instrument is doing what it was constructed for. Three instruments were submitted for scrutiny to the supervisor and an opinion on piloting the instrument was given. Three schools with similar characteristics were used to pilot the instruments and later the instrument content was improved in order for the researcher to collect required information to answer the research questions.

3.10.2 Reliability of the instruments

Cohen, Manion and Morrison (2007) refers to reliability as a measure of consistency over time and over similar samples" (p. 200). Which entails that reliability refers to the consistency of the instrument after repeated trials. In this study, the instruments were piloted on teachers and learners who were not part of the sample. This enabled to check whether the instruments could be used to collect data for the study.

To ensure trustworthiness, the following external validating model containing four characteristics was employed, as this included amongst others, internal validity, external validity, reliability and objectivity.

Durrheim and Wassenaar (2002) opines that credibility is the assurance that the researches conclusions stem from the data. To determine if there were discrepancies in the findings, methodological triangulation was employed for this study, whereby the interpretation of the findings were done by mixing qualitative and quantitative styles of data. Credibility can be accomplished by tactics to help ensure honesty in informants when contributing data (Cox, 2015). In employing this, the researcher prolonged engagement with participants. Each participant who was approached was given the opportunity to refuse to participate in the study so

as to ensure that the data collection sessions involved only those who were genuinely willing to participate. Participants were encouraged to be frank from the beginning of each session, with the researcher establishing a rapport in the opening moments.

- External validity is achieved when generalizations are made by the research from as sample to the entire population (Maree, 2012). Accurate statements were made, and special attention was given to factors such as intervention, situation, time, measure and subjects that could have affected generalizability.
- Reliability was used by the researcher to examine the consistency of a group measuring instrument used in a study. Reliability is important because it is a basis for validity and it measures whether or not a study instrument obtains the same results each time (Maree, 2012).
- Objectivity, refers to the required distance between the research and the participant in order to avoid bias, (), for the researcher not to be influenced by the participants and the researcher not to influence the study, the researcher kept a reasonable distance.

3.11 Authority of the Researcher

The researcher is a teacher by profession, but currently working as a Marketing Officer for the University of Namibia, Katima Mulilo Campus, Zambezi Region, in Namibia. The researcher has been working for the Ministry of Education in Namibia and is well versed with the processes and dynamics of the Ministry of Education system since I have been working in Namibia as teacher for several years.

3.12 Data analysis

Data analysis is a process of revealing vital information about the respondents; revealing trends that the researcher did not know; identifying data relationships in data that enables one to have a clear understanding of a population under-study in order to make informed conclusions (Maree, 2010).

Firstly, quantitative data was analyzed and presented in the form of tables, graphs and charts (Creswell, 2012). The rationale behind data analysis is to analyze all data that was gathered from the survey questionnaires and interviews in order to come up with informed conclusions. Different data collection instruments were used since data from one source may not yield the desired outcomes enabling one to use information from the sample to generalize to the entire population (Maree, 2012). All the responses from the teachers and learners in the study were read carefully, codes were identified by the researcher and the identification of subthemes and themes were done, and these themes which emerged in the study were aligned to answer the research questions of the study. For information keeping purposes, the number of people who were targeted to answer the questionnaires was captured in the face of the current study. As the questionnaires were returned by respondents, records of the numbers of the respondents that returned the questionnaires and the numbers of those that did not return questionnaires were captured in the form of percentages as this enables to determine the response bias (Creswell, 2003). Data was tabulated, grouping variables and this appears in the results and discussion section.

3.13Triangulation of the findings

Triangulation of methods is proposed for this study, findings will be interpreted by mixing qualitative and quantitative styles of data and research. The researcher triangulated the findings

from the questionnaires (Quantitative) and the face to face interviews (Qualitative) in order to enable the validation and verification of the findings.

3.14 Pilot study

A month prior to conducting the actual research, the instruments (teachers' questionnaire, learners' questionnaire and teachers interview guide) were piloted or field tested on mathematics teachers and learners who did not form part of the targeted sample. The purpose of the pilot study was to detect shortcomings of the questionnaires, enabling the researcher to refine the data collection instruments, alter or work on the problems before the actual study commenced (Robson, 2010). The results of the pilot study collected indicated that, some of the questions were not well allocated on the Likert scale and alterations were done to validate the instruments in order to yield the desired data.

3.15 Chapter summary

This chapter presents the methodology employed in this study, particularly research design and methods used to collect information leading to factors affecting teaching and learning. Mixed methods design was employed, with the purpose of obtaining relevant evidence (Baker, 2007). In order to understand the phenomenon, qualitative and quantitative methodologies and instruments were administered at the same time to various groups in order to understand the phenomenon fully. Face to face interviews (Qualitative), teachers and learners questionnaires were used to collect data. Permission to conduct research at targeted school was obtained from the Regional education office, as well as a consent letter for participants. This chapter discussed at great depth the various research designs which were used in the study and how each design was relevant to the current study. More so, this chapter explored issues of data trustworthiness which were attributes necessary for the qualitative component of the study, reliability and validity, the

quantitative part attributes were discussed. Ethical considerations were taken into account; piloting of instruments in order to check for validity and reliability, in a bid to ensure that the findings of the study are genuine and trustworthy.

The next chapter presents the presentation and the discussion of the findings of the study, literature will be used to elucidate these findings in order to locate them in line with the reviewed literature.

CHAPTER 4

PRESENTATION AND DISCUSION OF THE FINDINGS

4.1 Introduction

This section presents the findings from the various themes which emerged from the study. Data presented includes the description of the collected data into some form of explanations, understanding or elucidation of the people and situations under study. This involves spiralling and displaying the data from the interviews into findings, which provide useful information, suggesting conclusions, and supporting decision-making (Anyon, 2009). The data were analysed thematically and presented in themes and sub-themes which were aligned with research questions of the study. Thematic analysis was performed through the process of coding in six phases to create established meaningful patterns as described by Braun and Clarke (2007). The answers from the respondents were grouped into three themes corresponding to the research questions. Theme one comprised of causes of or factors contributing to poor performance of junior secondary school learners in Mathematics at the selected schools. Theme two comprised of potential strategies that could alleviate poor performance of junior secondary school learners in Mathematics at the selected schools. Sixteen (16) respondents were further selected for interview on the causes of poor performance in mathematics (Table 3).

4.2 Socio-demographic profile of the respondents who participated in the questionnaires

One hundred and twenty (120) participants took part in this study, 100 (83.3%) grade 8-10 learners, 14 (11.7%) mathematics teachers and 6 (5%) administrators (Principals and Head of Department) (Table 3).

Table 3: Number and responsibility of the participants who took part in the questionaire.

Responsibility	Frequency
Learner	100
Mathematics teacher	14
Principal	2
HOD	4

4.2.1 Gender

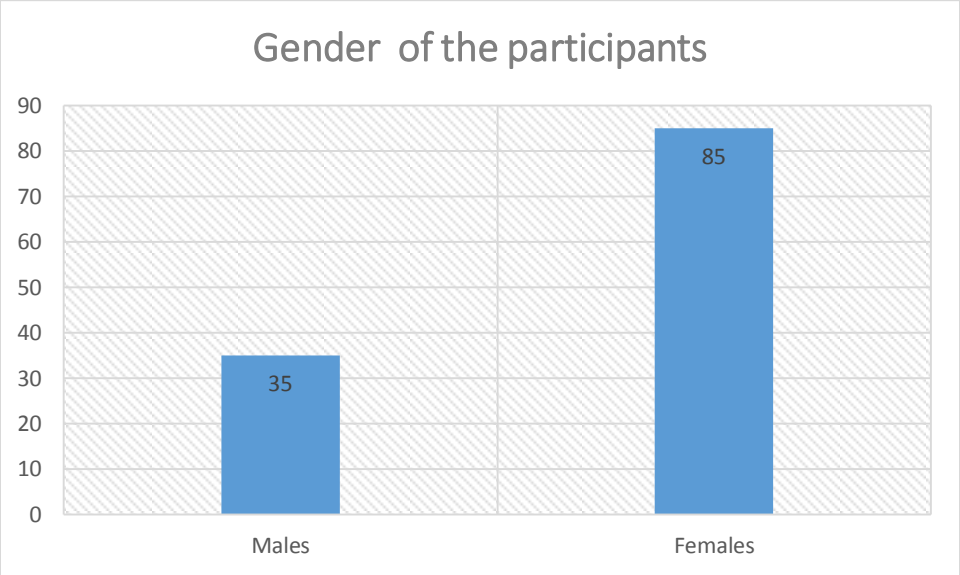

Figure 1: Gender of the participants

Thirty five 35 (29.2%) of the respondents in the study were males and 85 (70.8%) were females Figure 1). These findings are a true reflection of the Namibian gender distribution (National Planning Commission, 2016).

4.2.2 Age of the participants

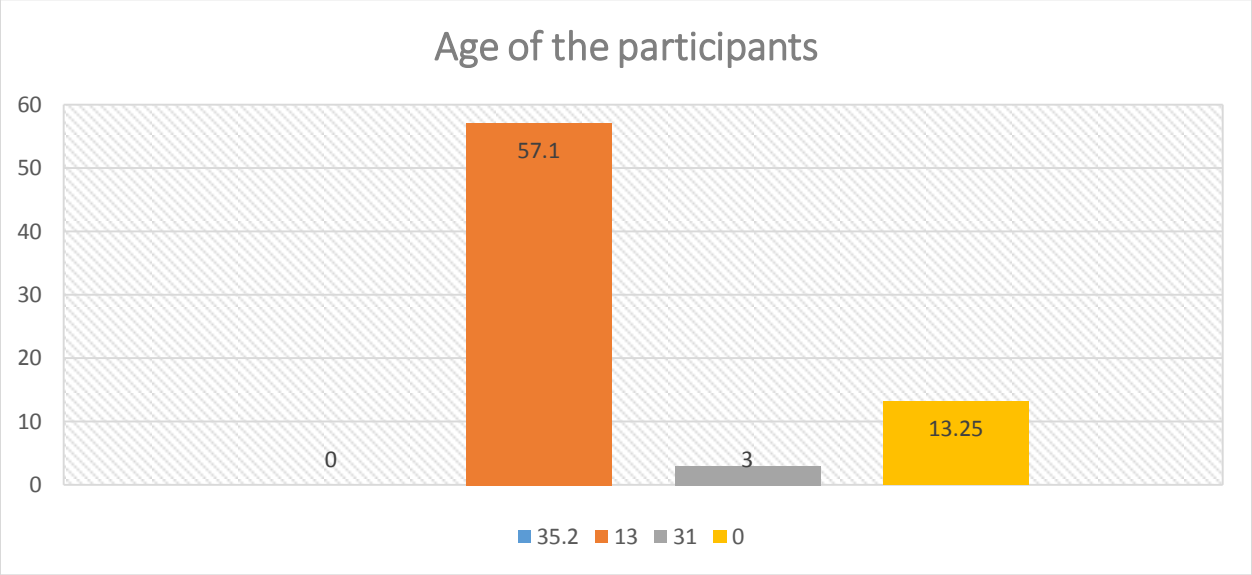

Figure 2: Age of the participants

Figure 2 shows that 97 (80.8%) participants in the study were aged less than 18 years, 10 (8.3%) participants were aged between 19 and 31 years, five (4,2%) participants (teachers) were aged above fifty years and three (2.5) were aged between 32 to 50 years. . It was expected that at least 100 (83.3%) of the responded would be less than 18 years, since the learners are expected to be 16 years at grade 10. These findings seem to reflect that out of all the learners in the study, there are some who are repeating and/or started school late. Chirimbana (2013) found that most learners are getting older because they continue repeating a certain grade level due to poor performance in mathematics and english as the main promotional subjects.

4.2.3 Causes of poor performance in mathematics at junior secondary schools in Katima Mulilo Circuit.

4.2.3.1 Responses from questionnaire survey

To answer theme one: causes of poor performance in mathematics of Junior schools in Katima Mulilo Circuit, learners and mathematics teachers were subjected to different but related sub-themes (Table 4) and as such the response to sub-theme by mathematics teachers and learners were analysed separately. The researcher's explanations and analysis are integrated with the literature, which serve as authentication of the themes and sub-themes (Ader, 2016). The themes were recognised and acknowledged through sequential phases which are data familiarization, data coding, searching for themes and thematic development, reviewing themes, defining and naming themes and finally writing up the themes. The data were then presented in themes with transcribed quotations of the respondents being included to support the findings.

Table 4: Sub-themes for theme one: Causes of poor performance in mathematics of junior schools in Katima Mulilo Circuit reported by mathematics teachers and learners

Mathematics Teachers	Learners
1.Lack of resources	1.Late coming
2. Over crowdedness	2.Teachers boycotting classes
3.Lack of experience	3.Lack of feedback from teachers
4.Too much work load	4.No individual interest
5.Poor learner respect/discipline	5.Remadial classes given by teachers
6.Are parents invited in their children's learning	6.Are parents involved in learners learning
7.Do teachers give remedial classes	7.Teachers not sticking to the syllabus
8. Teach what is not in the relevant syllabus	8.Boolieng(low self-esteem and no confidence)
9. Objectives	
10.Negative attitude of learners	
11.negative attitude of learners towards the subject	

There was a significant association between the subthemes and responses for both mathematics teachers and learners (Fisher exact, $P < 0.05$ for both Learners and mathematics teachers). Out of the eleven (11) sub-themes subjected to mathematics teachers only six (6) were considered to be major causes of poor performance, while only six (6) out of eight (8) causes subjected to learners were considered as major causes of poor performance. These are in the order of ranking as reported by respondents: for teachers- workload (100%), overcrowded (100%), lack of resources (100%), lack of experience (100%), negative attitudes by learners (93%) and lack of remedial classes (86%). For learners the following causes in order of importance were reported; low self-esteem and no confidence (100%), Teachers not sticking to the syllabus (100%), Remedial classes given by teachers (100%), Teachers not sticking to the syllabus (100%), lack of parents involvement in learners learning (95%) and Lack of feedback from teachers (70%). The results presented above seem to be in agreement in most causes of poor performance reported by mathematics teachers and the learners. Four main areas of concerns includes factors related to the teaching environment, factors related to the teacher and factors related to the student parents and to some extend factors related to the student. The major causes of poor performance due to poor teaching environment included overcrowded and lack of resources. The major causes of poor performance due to the teacher included lack of experience, which have contributed to teachers' low self-esteem and no confidence. Teachers' low self-esteem and no confidence might have also led to teachers not giving remedial classes.

4.2.4 In depth interviews with participants

The purpose of the study was to find out the factors affecting the teaching and learning of mathematics at junior secondary school level in the Zambezi Region, Namibia. The researcher provided the supportive literatures from chapter 2 to support or refute the claims of the

participants. Participants' view/verbatim responses are provided as a proof for the claims they made. Moreover, participants identified lack of parental interest in supporting their children both at home and school as a barrier, beliefs that mathematics is a difficult subject, mental calculation is not well developed, poor concentration, gap in knowledge created by the poor English communication as a result it become a barrier to effective and meaningful conceptualization of Mathematical concepts.

Table 5: Demographic and responsibility of respondents who participated in the interviews

Participants	Responsibility	Gender	Educational level	School
1	Learner	Male	Grade 8-9	D
2	Learner	Male	Grade 8-9	E
3	Learner	Female	Grade 8-9	J
4	Learner	Male	Grade 8-9	G
5	Learner	Female	Grade 8-9	H
6	Learner	Male	Grade 8-9	I
7	Learner	Male	Grade 8-9	J
8	Learner	Female	Grade 8-9	B
9	Learner	Male	Grade 8-9	A
10	Learner	Female	Grade 8-9	B
11	Teacher	Male	Degree	C
12	Teacher	Male	Degree	A
13	Teacher	Female	Degree	F
14	Teacher	Male	Master Degree	C

Based on the participants' responses during the in depth interviews, it was found that, lack of parental interests in assisting their children and beliefs that Mathematics is difficult, and if not enough practice is done at home adds to some of the factors that seem to affect the teaching and learning of mathematics in Katima Mulilo Circuit in Zambezi Region. Furthermore, learners are not challenged to participate in class activities.

Teacher 11 stated that, *"Lack of parental interest and belief that Mathematics is difficult*".

Also teacher participant 14 reckoned that, *"learners do not want to practice Mathematics at home, whereas, Mathematics is a practical subject, therefore, if learners do not practice enough, the teacher will not know where their weaknesses are"*.

"*Mental calculation is not well stimulated as some learners are addicted to calculators by relying too much on it for every simple method they could master in Mathematics"* (learner participant 5).

Learner participant 6 however, is about the feeling and thought that, "*level of concentration, paying attention if not properly lead to low performance".*

However, learner participant 8, added that, "*if learners do not ask a teacher and do not listen during the lesson when the teacher is teaching, it leads to misunderstanding".*

In addition, learner participant 9 argues that, "*shyness in learners/ hesitation to ask questions could lock their potential to be heard".*

(Learner 10) contend that, "*disagreement between the teacher and the learners lead to misconception*", which will be discussed further in details in sub theme 1.1. What has astonished the researcher is that, learner 2 points out the gap in knowledge that, "*learners need to master English and in that way it reduce the language barriers while the teacher teaches"*.

Although Mathematics is taught in English as a medium of instruction, it has impeded understanding of those learners that has poor commands of English. English is the medium of instruction at Junior Secondary School Phase, poor performance in English hinder effective communication English or impeded understanding especially in Mathematics word problem solving. In support of the above views, according to Mateya, Utete and Ilukena (2013) opined

that the majority of the teachers of Mathematics the high failure rate in Mathematics are also evident in other subjects, such as English and Science. This evidence has linked the poor performance in these subjects to what is called cross-curricular which is emphasized in the National Curriculum for Basic Education (NCBE) (Ministry of Basic Education, Art and Culture, 2015).

Furthermore, literature also backed these assertions above, with Ojimba (2012) stating that, there is students' negative attitude toward mathematics, undue emphasis on the coverage of the mathematics syllabus at the expense of meaningful learning of mathematics concepts and inadequate facilities and mathematics laboratories.

Poor performance in Mathematics of learners triggered the researcher to conduct further inquiry based study to determine what exactly causes poor performance in Mathematics. Katima Circuit performance at grade (8-10) indicates a drop. According to the statistics available at Katima circuit and school level, Mathematics performed with 35.2% A-C, a drop by -0.9% from 2017 JSC results in comparison to national score of 27.5% A-C in 2018 national examination (Mwandingi, 2016: p. 18). To provide the detailed performance of Mathematics at the school where the researcher is teaching, the results for 2015 to 2018 indicated 18.6%, 19.2%, 35%, and 25.8% respectively (Mwandingi, 2016). Also, what is highlighted by (teacher participant 11) is that low turnout by parents and lack of parental involvement. That is also in addition to what Participants at various schools selected for this study indicated that they face numerous challenges in the process of learning Mathematics teaching and learning delivery processes. The following citation from the participants supports these claims:

"*Our parents don't seem to be concerned with the learning of their kids and this seems to be one of the reasons why the learners are not performing well in mathematics in our circuit at grade 8-10 level" (Teacher 11).*

This fact was echoed by school principal 15 who said *"most of the learners are not staying with their parents and have too much freedom with no one to guide them through the learning of mathematics."*

4.2.4.1 Sub-theme 1.1: Misconceptions

This sub-theme provided views of the participants on what a misconception is perceived to be accepted among learners or Mathematics teachers which might be wrong and need to be corrected as such. Furthermore, a comprehensive literature supporting the views or contradicting it is analysed here too.

"*There is a higher level of misconception among learners that Mathematics is difficult and it cannot be studied "* according to (Principal participant 15).

In other (teacher participants 14) indicated that, "*the misconception stemmed from early years at primary level where learners could possibly not attain the basic competencies"*.

Teacher participant 13 was of the opinions that, "*the culture of fear among learners is hindering their perception to deepen the mathematical philosophy".*

In addition to that, learner participants added their voices that, some develop developed negative attitudes towards Mathematics understanding from the teachers as well as peer learners who discourage them. Learners responded as follows:

"*There is still time I feel like, I will never learn anything mathematics"* (participant 2).

Another participant added that, *"I have encountered many challenges with Mathematics subject since my primary education, sometimes I feel like it is not my favorite subject at all"* (participant 8).

Furthermore, another participant provided verbatim (participant 10) also echoed the same sentiment of other participants that "*I failed several times Mathematics Especially Algebra*, *why do I feel like Mathematics is not for me?"*

Empirical evidence above also supported by (Baldirstone (2000) who attributed poor performance in mathematics to parental attitude, interrupted teaching, poor teaching and miscalculate. Furthermore, more misconception surrounding understanding mathematical concepts remains a terrain of fear as some participants express that, poor/low understanding will demoralize many learners to learn. On the other hand, Brodie (2013) supported the claim by pointing out that, lack of meaningful library and laboratory, qualified teachers, home environmental factors and family backgrounds as well as little participation of parents in the education of their children as the main causes of poor performance in mathematics. In support of this view also Chirimbana (2013) attributed poor performance in mathematics to parental attitude, interrupted teaching, indiscipline, poor teaching and miscalculate.

4.2.4.2 Sub-theme 1.2: Lack of teaching and learning materials

This subtheme provided the verbatim responses from the participants on the lack of teaching and learning materials. Here participants believe that teaching and learning materials are one of the factors that have contributed to poor performance in Mathematics at grade 8-10 level. Also body of literature reviews has been provided to support the participants' reviews.

Almost every participant narrates their own experiences of the situation at their school. Although schools may differ in their needs and wants in terms of teaching and learning materials there are general patterns of similarity. For instance, almost every participant has alluded to the need to have a functional computer lab where learners can engage themselves with internet source where they can learn a lot and discover simpler methods of approach in calculations.

One of the participants added that, sometimes "*I feel like the school is not exposing us to more supportive learning material like computer games, reading more books with challenging Mathematical calculations all the school provided with a library"* (Participant 2).

Participant 12 also commented that, "*our school need new facilities like library, computer lab and to acquire new books as reference materials."*

Participant 15 said that, "*it will be more appropriate if a fund for the school library, science lab and computer lab can be secured than our school will be fully equipped"*.

Moreover, Collins (2000) pointed out that lack of meaningful library and laboratory, qualified teachers, home environmental factors and family backgrounds as well as little participation of parents in the education of their children as the main causes of poor performance in mathematics. Most participants further alleged that, to build a strong foundation in Mathematics schools do not possess the following; libraries, mathematics laboratories, lack of teaching games and mathematical sets. Because of such a shortage of resources, teachers often do not get adequate exposure on the usage of such resources to be able to use them effectively. This lack of resources undermines teacher preparation for lessons. It also leaves learners with no opportunity to practice certain mathematics skills like using scientific calculators.

(Teacher 12) expressed that "*to some certain degrees some teachers misinterpret the syllabus, give less practical activities. In the same vein".*

(Principal 16) is of the same opinion with evidence that, "*whenever she goes for classroom observation teachers sometimes are found with no daily preparation. As a result of teachers' unpreparedness in some extreme cases where learners still lack basic skills of Mathematical calculations can contribute immensely to poor performance".*

Admittedly (teacher 14) revealed that "*poor performance in Mathematics is fueled by lack of supervision and monitoring of mathematics and that, bad attitudes is observed by teachers".*

4.2.4.3 Sub-theme 1.3: Qualifications and Work experiences

This subtheme provided an overview of participants on qualifications and work experience that could be the factor that contributes to poor performances (Channon J. , Smith, Head, Macrae, & Chasakara, 2003). Participants are of the views that, qualifications and work experience determine the competencies of the teacher to perform as per the expectations. A comprehensive supportive literature reviewed also revealed that teachers with higher qualifications and teaching experiences boost performances in Mathematics.

"Teachers must challenge themselves with new skills and knowledge to be able to provide a better technique in teaching learners Mathematics at an advanced level" (Participant 13).

This fact was further strengthened by participant 15 who indicated that, *"Sometimes, their problem is the weakness of inexperienced teachers to approach well experienced teachers in the field of Maths and Science to tap from their wisdom and their pedagogical approaches".*

On the same note, participants 7 reinforced that *"Sometimes I have a tendency to question whether our teacher really understand the contents for Mathematics. Or even ask myself why almost half of the class is still struggling?"*

According to Even and Bruckheimer (2004), teacher knowledge is supreme and repeatedly discussed as being encompassed of three elements: content knowledge, pedagogical knowledge, and didactical knowledge. Similarly, Shulman (1987) refers to these same categories, respectively, as subject matter knowledge (SMK), pedagogical knowledge (PK), and pedagogical content knowledge (PCK). Furthermore, Joel and Ruhan (2006) explicate that content knowledge pertains to mathematical concepts, use of mathematical techniques, mathematical reasoning, proof, and so forth. PK is subject independent and deals with general principles of education, such as theories of learning; sociological, psychological, and ethical aspects of education and its functions (Baldirstone D. , 2000).

There is a strong agreement between qualifications and work experiences. This can be attested by in the comments expressed by the participants. (Teachers 12 & 13) who had different opinions on the issue of qualifications,

(Teacher 14) strongly verified that "*the more the teacher gives easy work, the less learners feel challenged to grow mentally in most cases it creates doubts whether such teacher has received adequate training before qualifying to be a professional teacher"*.

While (Teacher 14) opined that "*sometimes poor performance in Mathematics is caused due to lack of pedagogical skills by the teachers, to demonstrate higher order of thinking capacity that infuse critical thinking among learners themselves".*

The above opinions indorse the literature context which state that, it is very important for teachers to be highly trained and highly skilled as (Brodie, 2013; Chirimbana, 2013) didactical knowledge that will shape conditions and ways of mathematics teaching and learning. But the main challenge is, are teachers well equipped to give relevant knowledge and skills as content for mathematics requires? The proof of eating is in the pudding, which is to say, that there are cases and evidences that suggest that, there are still teachers who are refusing to upgrade their qualification, attend courses and seminars that will improve/shape up teaching methodological skills. Furthermore, Channon, Smith, Head, Macrae, *et,al.*, (2003) put it this way, in order to capture both the relationship and the peculiarity between knowing something for oneself and being able to enable others to know it is when didactical knowledge well acquired knowing the mathematics, knowing teaching, and knowing how to teach mathematics.

4.2.4.4 Sub-theme 1.4: Poor learner discipline

This subtheme provided verbatim expressions by participants on learner's indiscipline in school as well as to a less extent at home and how it affects or influence learning. Participants and literature reviewed revealed that barriers to learning is largely too contributed by lack of discipline among learners (Geoge D. , 2014). This indiscipline is compounded with little effort in classroom management and for the disciplinary committee at school not doing enough to address to the indiscipline cases.

The majorities of the learner participants delve misbehavior into more details, and found out that bad manners towards other classmates or the teacher might make learning nothing in the lesson (Chirimbana, 2013). A learning environment becomes more favorable when the teacher has disciplined learners. Absenteeism, social problems, misbehaving while the teacher is teaching,

are some of the common indiscipline behaviours that leads to poor performance as identified by the teacher, principals and learners' participants.

(Principal 15), indicated that, "*dealing with indiscipline decisively create an aura of harmony between the staff members and learners.*"

(Principal participant 16) recalled that, "*in the past discipline of learners used not to be the problem since many of the learners were fearful of the authority and power that learners have towards teachers*."

"This is not the case today, since many of our learners misbehave starting from home, disrespecting their parents and then when they come to school they do not longer fear teachers" (Principal 15).

Similarly, the views above equate to Peters (2016) who states that, indiscipline and negative attitudes has always been setbacks and demote participation of the learners.

On the same point (learner 8) reiterated that, "*whenever some learners misbehave in classroom, there is always disturbances and bad influences to even learners that are motivated to learn".*

The same views were expressed by (teacher 13), that, *"sometimes a good learning environment become disruptive whenever there are unruly learners"*.

This in a nutshell, is proved enough that, indiscipline in schools has become a major threat to good performance in any subject for as long as there is no disciplinary action taken against misbehaving learners.

4.2.4.5 Subtheme 1.5: Teachers high workloads

Workloads are one of the factors that continue overburdening the teachers especially when they work in an environment that is overcrowded and not conducive. Participants in the study had these to say about workloads.

(Participant 11) argued that, *"sometimes when you give a lot of activist to the learners it is your responsibility as a teacher to mark learners' activities and provide them with feedback this take up a lot of time because a class might be crowded."*

On this note Participant 12 expressed that, "*teachers should not be overburdened with a lot of administration work but their focus should about the teaching facts as well be there to give compensatory lessons to learners."*

This was echoed by (Participant 13) who noted that, "*workload has killed the motivation and the appetite for teachers to be focused."*

On this note, Participant 14 put forwarded that, "*it is critically important teachers plan effectively and efficiently for time on task and so that time management cannot be ruled out."*

It was also agreed upon by (Participant 15) who asserted that, "*as principal, it is my responsibility to make sure that my staff members especially the novice teachers are properly trained as well as conducting an internal workshop that enable to handle workloads with ease."*

On the same note, Participant 16 also claimed that, *"workloads might be something that they will not do away with, however, proper planning and diligence will lead to success in Mathematics."*

Literatures on workloads confirm by providing in-depth analysis of the view that protuberant causes of poor performance in mathematics are: (1) Acute shortage of qualified professional mathematics teachers (2) Exhibition of poor knowledge of mathematics content by many mathematics teachers (3) Overcrowded mathematics classrooms (4) Students negative attitude toward mathematics (5) Undue emphasis on the coverage of mathematics syllabus at the expense of meaningful learning of mathematics concepts (6) Inadequate facilities and mathematics laboratories (Ojimba, 2012).

4.2.5 Theme 2: Effects of poor performance by learners in Mathematics at JSC

This theme discusses and provided empirical evidence of the effects of poor performance by learners in Mathematics at grade 8- 10 levels. Similarly, the views of the participants confirmed that indeed there is lack of interest in learning Mathematics as such teachers should instil and motivate learners to do better in Mathematics. Some participants responded on the issue as follows:

"Learners developed phobia for Mathematical challenges they are exposed to everyday. They losing interest at this school" (Participant 11)

(Participant 6) added that, "*teamwork is not fully utilised as result, cooperative learning is not taking place in Mathematics lessons*."

"*I observed several lessons for Mathematics teachers and made a number of recommendations on how they can enhance their teaching to be better however teachers do not consider the inputs. As a result, learners are repeatedly failing. This kind of attitudes has led to even some learners losing faith in the teachers' approach."*(Participant 16)

"There is seems to be no proper teamwork in the department which created disunity and fall from grace to disgraceful results" (Participant 13)

"There are some of us who are fully committed to do better, however some learners with negative attitudes are giving us bad influence"(Participant 9)

Literature reviewed offered some form of remedial and concepts to improve on effects. Discussion under this theme recommend that, learners' interest and passion should be sustained in continuing learning mathematics by rewarding learners for good efforts. Learners should be assisted to develop Mathematics clubs where strategies on how to do better in Mathematics with the assistance of the teachers provided. It is discovered that, if learners' poor performance has led to many learners drop out of schools since the requirements to pass are not met, then such learners repeats over and over until they lose interest. This view again is supported by two school principals, who responded on the issue as follows:

(Principal 15) argue that, *"if Mathematics teachers can organize themselves and create a club for Mathematics teachers focusing on profession learning community of the same colleagues within the circuit, it will help to boost performance."*

"Games, Mathematics Quizzes, computer game, projects, investigations are some the activities that Mathematics teachers should forge ahead with" according to Principal 16.

*"There are negative effects associated with poor performance such as such Grade repetition, high failure rate that bring the motivation of the teacher to teach, "*as observed by Teacher 12.

In addition, Teacher 13 recall that "*whenever a learner repeats a subject there is negative feeling developing in such a learner which drastically make a learner lose interest in learning.*"

Furthermore, the 14th participant teacher revealed that*" thinking capacity is diminishing, finding it difficult to carry out the research on the exact solution to myriads of the problems, and that mathematics is a language art that even some teachers failed to engage with their learners."*

On the other hand, principal participants, learner participants and teacher participants agree on a number of common answers such as;

"Effects are on low achievements, if learners fail, it will demote the Circuit in ranking as of now the circuit results are not so good."

"Learners will start losing hope eventually, dropping out of school due to high failure will be eminent threat to right to access quality and equitable education (learner participant 10).

Most significantly (teacher 13) enlighten the view of other participants that, *"when the performance going down, it forces more and more researches to conducted to get to the bottom of the root cause".*

According to learner participant 2 "*if learners continue to perform poorly they develop a negative mind-set."*

Additionally, best performing teachers in Mathematics should share their strategies. In views of the above, Chirimbana (2013) suggested four strategies for improving the performance of students in mathematics as follows: groupings into students' ability during teaching of mathematics in the classroom; the strategy of constructivism should be absorbed in teaching mathematics, that is for learners to learn and sustain their learning they must be in control of

their learning. He also added that use of instructional aids and games as well as using computer-aided instruction are the strategies that can be used to improve performance of students in mathematics.

4.2.5.1 Subtheme 2.1: Withdrawal of interest to learn Mathematics

Under this subtheme a comprehensive discussion centred on withdrawal of interest to learn Mathematics by learners. Participants are of the views that "fear" is the main problem as the students start to dislike mathematics and even go to an extent of disliking the Mathematics teacher which eventually leads learners to lose faith and withdraw. Participants responded about the theme as indicated below.

(Principal 15) opined that, "*Since Maths is tough from Grade 1-12, as a compulsory subject it brought some "fear" into learners who are not good with numbers, they start to have negative feelings of withdrawal and would never want a pass."* He added again that, "*students have withdrawn their interest to discover, explore and investigate anything that has to do with quantities just because of fear and being afraid to be labelled. When a learner starts to withdrawal they no longer have the capacity show eager, motivated, resilient and determined to learn.*"

Therefore, in this context to substantiate the views above assertions and to apply *Walberg's (1981) theory of educational productivity*gives us correct position to reflect on the right to seek of the 11 most influential domains of variables, of which 8 involved social-emotional influences: classroom management, parental support, student- teacher interactions, social-behavioral attributes, motivational- effective attributes, the peer group, school culture, and

classroom climate (Brodie, 2013). This theory is applicable in the sense that it gives appropriate steps in finding the right strategies to implement from the study using the recommendations.

4.2.5.2 Subtheme 2.2: Psychological Impact

This subtheme provided comprehensive details of the psychological impact on children if learners continuously fail the subject. Mathematics being a requirement in some courses at tertiary level, it will not go down well if learners' foundation is not fully concretized or reinforced with best pedagogical approach to remedy their fate (Carrell & Hoekstra, 2009). Therefore, participants offered alternative approaches to restore learners' dignity. A psychological explanation revealed by behaviourists in stating 'that learning is a change in an observable behaviour and it happens when the communication occurs between the two events, a stimulus and a response (Collins, 2000)'. Furthermore, it contributes to understanding of how people learn also the conditions through which people learn. On this issue, participants responded as follows:

Negative impact on the learners' psychological aspects, (Principal participant 16) were continued by participant 16 that, "*the overall performance of the learner is affected; learners may develop the notion that they are not good in Mathematics, leaners may not be able to choose career of their choice if they do not pass mathematics."*

Accordingly, (Learner 6), reveal that*, "in most cases whenever learners have failed a task, it leads to completely withdrawal which result in a learner being rebellious to carry out with correction."*

A brilliant answer from one of the learners (Learner 10) is that, "*it has a psychological effect sometimes when a learner gets stuck with Mathematics he/she can develop hate feelings towards*

the teacher, eventually when the learner starts to dislike the teacher, it multiply into disliking the subject as well."

The assertion above upholds and substantiated the following; Parents should not expect too little or too much from their children. Ernest (2009) argues that, too much pressure can lead to failure and dislike of mathematics.

4.2.5.3 Subtheme 2.3: Emotional Negative effects

Beneath here is the discussion about emotional negative effects, participants elucidate that the main effects of negative emotions are that it leads to poor performance. The main concern here is also poor interpersonal relationship when learners are not getting along well with others (Collins, 2000). Literature reviewed correspondingly addressed more on learners' emotions and its effects on performance. Some responses of participants on the issue were as follows:

> *"The culture in Mathematical domain of learning should be maintained to distil fear so that learners accept the right of attitudes for best learning practices*." (Participant15)

> *"Learners seem not to be prepared mentally and physically to challenge the intellectual capacity*" (Participant 13)

> *"When I reflect back at the lesson, I question learners' fear so much. I create a scene at the back of mind to try to find a solution to their problems but it seems to be insurmountable*" (Participant 15)

Poor interpersonal relationship will start to develop, poor performing learners will feel isolated, rejected, dump and eventually withdraw completely from the task as (Principal 15) elaborated

that *"When one become emotional, it causes depression and stress to both the learner and the parents or parent.* "On the other hand,"

"Emotional intelligence is what most learners need to learn in order to associate with others and learn from each other"(Participant 12).

The above assertions are in support with Gomez-Chacon (2003) who stated that,

> "*I consider that the group, with its culture, its communication system and its institutional structure (accepted to be basic social and anthropological phenomena in mathematical education), is as important as the personal dimension, with its intra-individual aspects of cognition and of psychological relationships. I claim to have verified that a critical integration of these perspectives assists our understanding of the complex interaction of the affective, cognitive and cultural factors which play a role in learning mathematics."(p.2)*

The findings above are in line with the findings of Brodie (2013) who stated "failing mathematics creates so many negative emotional effects among most learners in schools who may find themselves not being able to fully uleash their academic and professional potential as they get blocked by failing mathematics."

4.2.5.4 Sub-theme 2.4: Decreased learner enrolments due to withdrawal

Enrolment of learners at school has been always a subject of contention for sometimes now. Therefore, when it comes to the decrease in enrolment, the root cause of this is drop outs. According to various participants on the issue, their views are as follow;

> (Participant 1) remarked that, "*learners are losing interest in Mathematics because they failed in numerous topics that they attempted."*

(Participant 2) narrated that, *"Sometimes I felt giving up on learning Mathematics because all along with my friends and classmate always talk of Mathematics as a difficult subject."*

(Participant 4) opined that*, "The problem with Mathematics is that, most of my classmates do not perform well, they are demotivated to learn. Again, there are times when some withdraw from group work activities."*

(Participant 7) stressed that, *"Some learners are not progressing to the next grade because they either fail Mathematics or English and these subjects are compulsory in calculating the minimum required points for one to be promoted to the next grade. As a result, these have led to most learners dropping out of school."*

(Participant 9) maintained that, *"at the beginning of the year school enrolment is higher but when in the middle of the second or last term of the year there are always learners who want to drop out or have dropped out."*

(Participants 11) is of the opinion that*, "learners are not motivated enough to study Mathematics. The other factor is that learners' background knowledge in Mathematics is not sufficient enough as a result learners' new knowledge is not assimilated."*

(Participant 15) contended that, "*parents are not putting more effort to assist their children with even homework or projects. This alone has led to learners withdrawing and the enrolment to decrease."*

In conformity with the above assertion, Ernest (2009) affirmed that "most students participate in academic and non-academic activities at school, and develop a sense of belonging – their friends are there, they have good relations with teachers and other students, and they identify with and value schooling outcomes". But many students are not engaged. They do not believe their school experience has much bearing on their future, and they do not feel accepted by their classmates or teachers (Collins, 2000). Gradually these students withdraw from school life, and become disaffected from school. Some disaffected students are disruptive in class, and exert a negative influence on other students.

The table shows that 100 participants who completed the questionnaire were learners and 14 were teachers for mathematics and four were HODs for mathematics while two were school principals all selected from various schools in Katima Circuit in Zambezi Region. These findings reflects that the participants who were involved in the study were quite knowdledgeable but the issue under study since they are all involved in the teaching and learning of mathematics in one way of the other. The findings supports the claims of Bless , Higson-Smith and Kagee (2006) who recommended that study participants need to be those participants who are quite knowledgeable about the issue under study rather than just picking individuals who do not have an idea of the matter being researched on.

4.3 Strategies that can be used to improve the teaching and learning of mathematics in junior secondary schools in the Zambezi Region in Namibia.

There was a strong association between potential strategies to improve the teaching and learning of mathematics at junior secondary schools in the Zambezi Region in Namibia and participants responses (Fisher exact test: $P < 0.05$). Provision of teaching resources (81%), followed by Improving syllabus coverage periods (80%), improvement of parents' involvement in learners' education (78%), Changing teaching strategies (73%), learners' motivation (73%) and Improving

on learner behaviors (72%) were reported by respondents as the potential strategies that can improve performance in mathematics at junior secondary schools in the Zambezi Region in Namibia.

4.3.1 Provision of more teaching resources

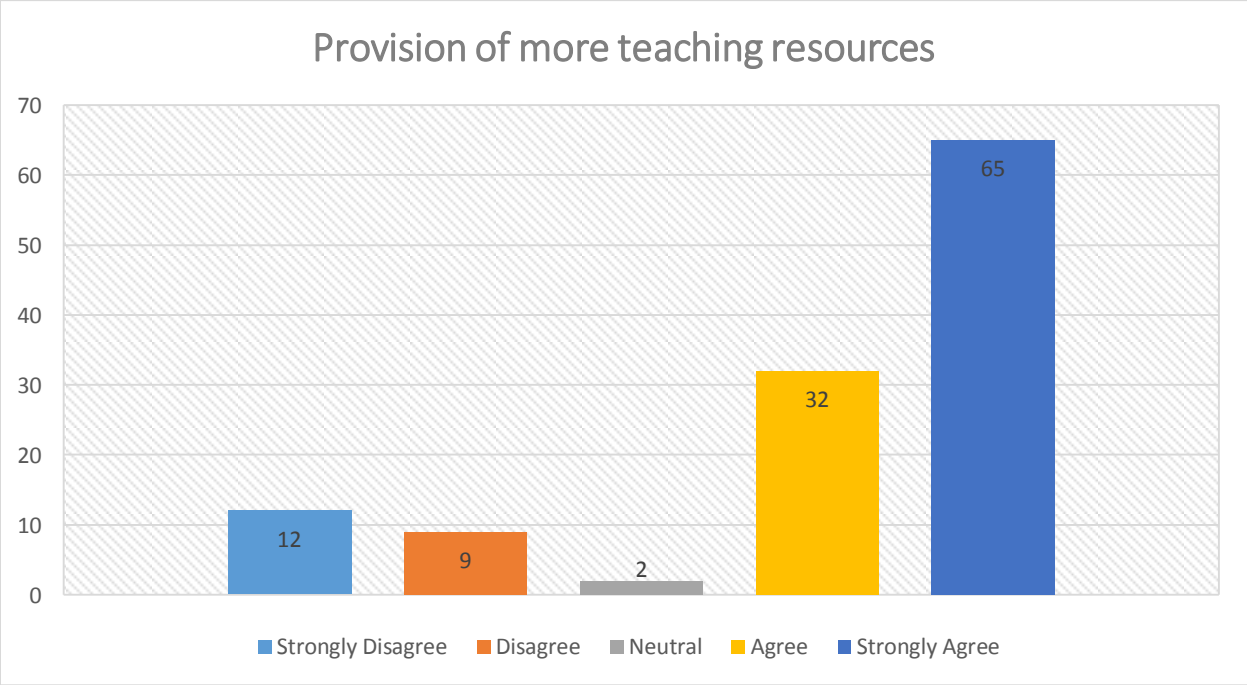

Figure 3: Provision of more teaching resources

Ninety seven Sixty five (81%) participants agree that provision of more teaching resources would mitigate on the predicaments encountered in the teaching and learning challenges in

mathematics in Katima circuit. These findings validate the findings of Ernest (2009) who recommended that teaching resources are needed in the teaching of mathematics if successful teaching and learning is to be achivied. On this note, Chirimbana (2014) also argued that most schools in Namibia are under resourced and this could be one of the main factors contributing to learners poor perfomances in schools. Providing learning resources will equip and easy teachers to cope with mondern changes and provide quality teacheing to learners. It will also motivate learners to engage with morden technology.

4.3.2 Improving on parental involvement

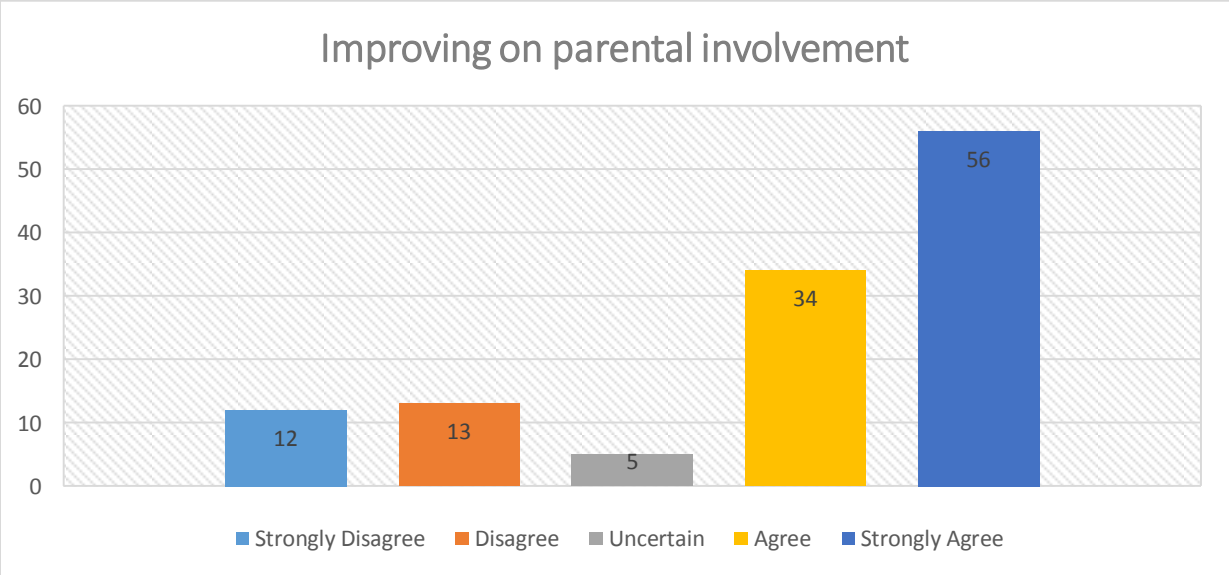

Figure 4: Improving on parental involvement

Figure 4: shows that 56 participants strongly agree that improving on parental involvement in the teaching and learning will improve the learners' performance, 34 agree, 13 disagree, 12 strongly disagree, five were uncertain about this assertion. After combining the responses, it is found out that, 90 agree while 25 disagree. These findings support the earlier findings of Chirimbana

(2014) who stated that parental involvement play a critical role in the upbringing of the children at home. On this issue, Ernest (2009) cited that many parents have almost handed over their parental role /responsibilities to the teachers and school authorities forgetting that the school alone cannot be able to provide all the necessary support to the learners without the involvement of the parents. Some parents are illiterate thus, their effort is not making any significant change to improvement of the academic activities of the child. A school that creates a good networking between the teachers and parents on one-on-one mutual agreement contract, it eventually spill the beans to induce parental involvement. In essence, the term "parental involvement" includes several different forms of participation in education and within the school. Parents can support their children's schooling by attending school functions and responding to school obligations (parent-teacher conferences, for example). They can become more involved in helping their children improve their school work by providing encouragement, arranging for appropriate study time and space, modelling desired behaviours (such as reading for pleasure), monitoring homework, and actively tutoring their children at home. Parental involvement in their children's education appears to be a constant in children's academic achievement and social adjustment (Joel & Ruhan, 2006).

4.3.3 Improving syllabus coverage periods

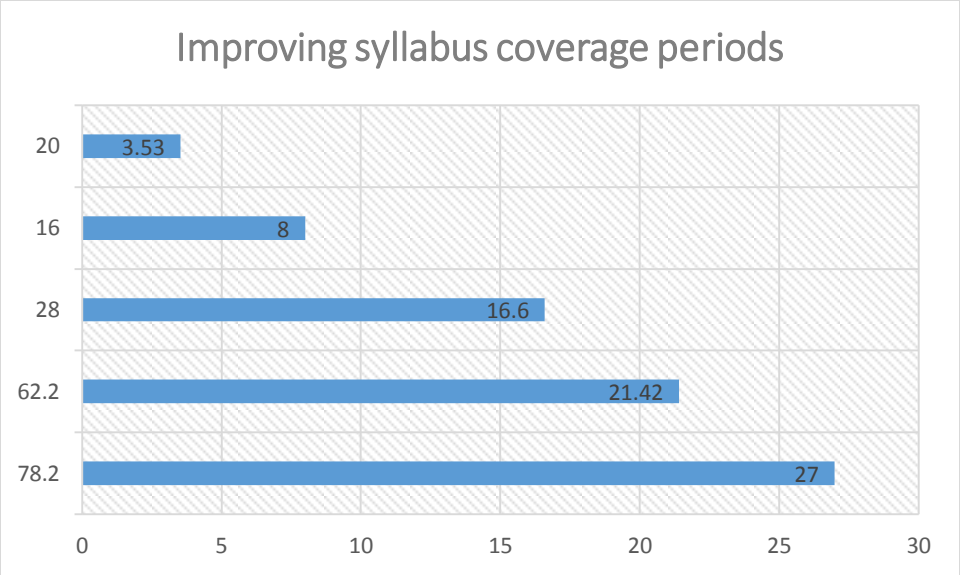

Figure 5: Improving syllabus coverage periods

The figure shows that 67 participants strongly agree that improving syllabus coverage periods would improve the teaching and learning of mathematics at Katima Circuit among the grade 8-10 level, 24 agreed, 12 disagreed, nine disagree, and eight were neutral. After the responses were combined it was found out that 91 participants agree and 21 disagree with the assertion. These findings support the findings of Even and Bruckheimer (2004) who indicated that the syllabus is an important ministerial document that guide how competencies and learning objectives of Mathematics can be achieved through teaching the right subject content as prescribed by the National Curriculum for Basic Education (NCBE). The syllabus completion is a key important factor in fulfilling the curriculum intents, objectives as well as making sure that learners achieve their basic competencies /learning objectives as set in the syllabus for Mathematics for junior secondary level. On this note, Brodie (2013) recommends that teachers should plan well, cater for the slow learners, learners with educational needs should set up plan or program for holiday classes, evaluate and reflect whether they are on the right track. The most critical component and controversial issue is that many learners have developed phobia for Mathematics because of the pressure and the stress they have on the process of learning topics in Mathematics at the pace

outlined on the schemes of work and the syllabus and the inadequacies of time and attention given to learn (Brodie, 2013; Chirimbana, 2014).

4.3.4 Changing teaching strategies

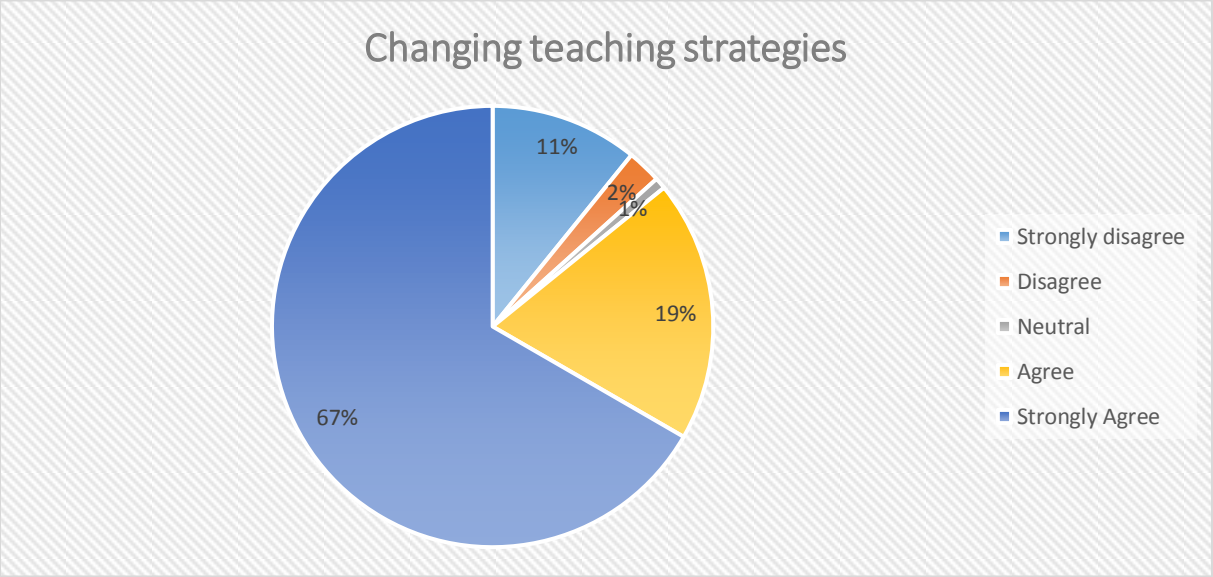

Figure 3: Changing teaching strategies

The figure shows that 67% of the participants strongly agree that changing teaching strategies would help improving the teaching and learning of mathematics at grade 8-10 level in Katima Circuit, 19% agree, 11% strongly disagree, two percent disagree and one percent was neutral. After these responses were combined, it was found out that 83% agree and 13% disagree. These findings substantiate the findings of Miranda, Nakashole and Chirimbana (2013) who indicated that afternoon classes and study must be strengthened with more activities given to learners to do with practices in groups. Every activity given to learners must be marked as well as feedback must be given to the learners. These researchers further argue that the school must come up with Mathematics Clubs that brings learners together to compete when the teachers organize Maths games and competitions and that the schools within the circuit should organize a Mathematics symposium whereby learners can be taught for a period of time during the holidays. This should

particularly involve learners who are struggling most of the time. On the same issue, Brodie (2013) recommends that holiday classes should continue, more participation of all learners must be involved, and more teachers should join the institution of higher learning to further their study. The regional directorate should organize workshops and seminars for subjects of concern, which may include Mathematics.

4.3.5 Improving learner motivation strategies

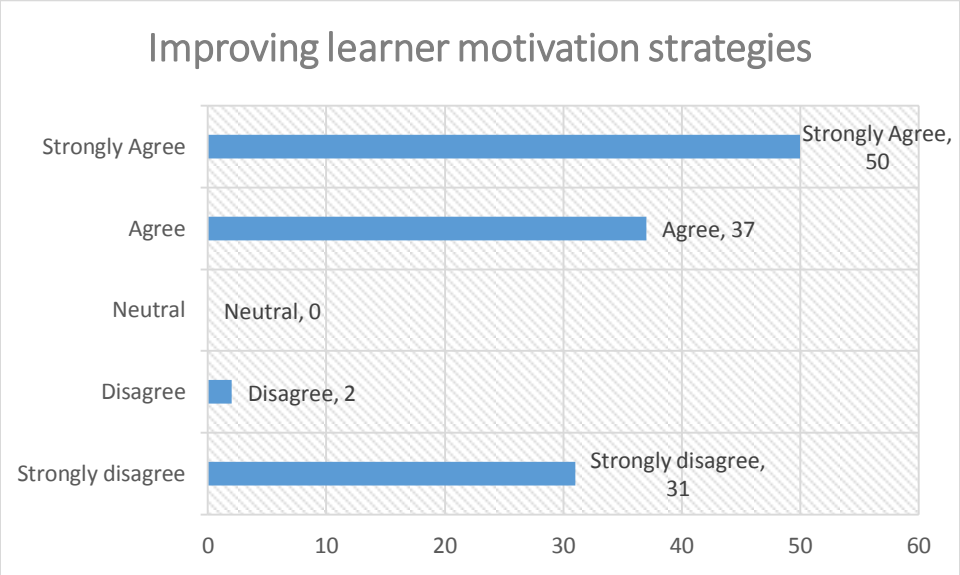

Figure 7: Improving learner motivation strategies.

Figure 7: shows that 50 participants strongly agree that improving learner motivation strategies would improve the teaching and learning of mathematics, 37 agree, 50 strongly disagree, two disagree and none were neutral on the claim. After putting these responses together, it was found that 87 agree, and 33 disagree. These findings are in support of the findings by Chirimbana (2013) which demonstrated the importance of the domains of motivational orientations, self-regulated learning strategies, and social/interpersonal abilities in facilitating academic performance. Chirimbana (2013) further reported that students who became more self-aware and

confident regarding their learning abilities, who were more motivated, who set learning goals, and who were organized in their approach to work (self- regulated learning) performed better in school.

4.3.6 Improving on learner behaviors

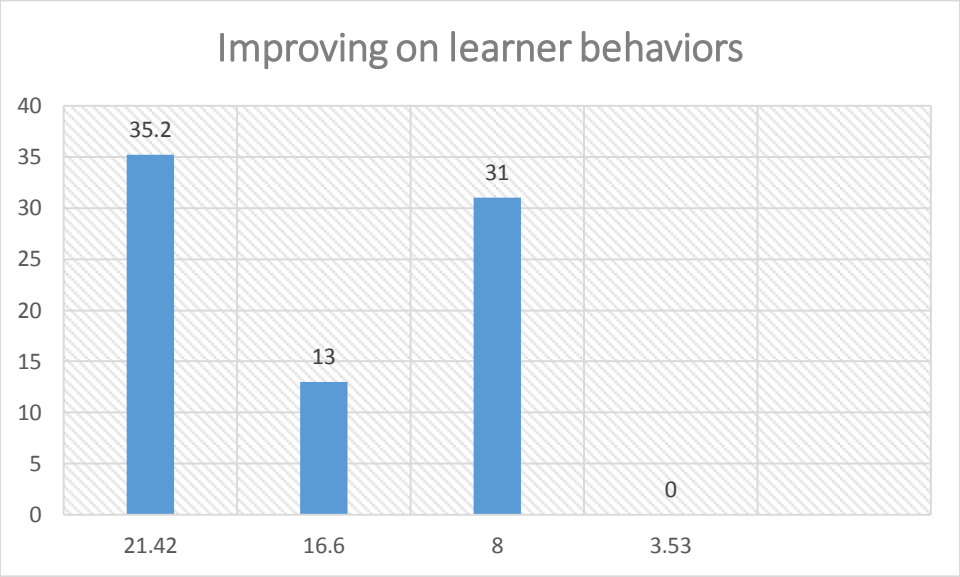

Figure 8: Improving on learner behaviours.

The figure shows that 55 participants strongly agree that improving on learner behaviors would improve on the teaching and learning of mathematics, 28 agree, 24 strongly disagree, 8 disagree, and 5 were neutral on the statement. After the responses were combined the study found out that 83 participants agree and 32 disagree. These findings are in agreement with the views of Han and Carpenter (2014) who claim that attitudes consist of cognitive, affective and behavioral reactions that individuals display towards an object or the surrounding based on their feelings or interest. On this note, Chirimbana (2014) argues that learners feeling confident in doing mathematics is linked with being successful in mathematics, which is regarded as a positive behavior. This issue is further supported by Baldirstone (2000) who indicated that when students are not

confident in doing mathematics, they may not experience success, and unsuccessful behaviour is regarded as negative feelings. This is something that all of us in the teaching profession will attest to since such students often display low self-esteem that affects class participation negatively resulting in low academic performance. This is so particularly in mathematics, a subject that needs active engagement in order to understand.

4.3.7 Overall ranking of the recommendations for improving teaching and learning in Katima Circuit

Table 6: Overall ranking of the recommendations for improving teaching and learning in Katima Circuit.

Recommendation	Agree	Disagree	Rank
Improving on parental involvement	90	25	3
Improving syllabus coverage periods	91	21	2
Changing teaching strategies	84	13	4
Improving learner motivation strategies	87	33	5
Improving on learner behaviors	83	32	6
Provision of more teaching resources	97	21	1

The table 4.8 above shows that the commonest recommendation was the provision of the teaching and learning resources (1) followed by the improvement of syllabus coverage (2), improvement on parental involvement (3), improving learner (4), motivation strategies in the teaching and learning of mathematics (4), improving teaching strategies for mathematics (5) and finally improving learners behaviors in the teaching of mathematics (6).

4.4 Summary of the chapter

This chapter presented and discussed results obtained from data from the participants in the study. The two main objectives of the study were to identify main causes of poor performance in mathematics at junior secondary schools in Katima Mulilo circuit and potential strategies that can alleviate the problem. The teachers identified six major causes of poor performance, which were, in order of importance, workload (100%), overcrowded (100%), lack of resources (100%), lack of experience (100%), negative attitudes by learners (93%) and lack of remedial classes (86%). The learners identifies six major causes of poor performance, which were, in order of importance were reported, low self-esteem and no confidence (100%), Teachers not sticking to the syllabus (100%), Remedial classes given by teachers (100%), Teachers not sticking to the syllabus (100%), lack of parents involvement in learners learning (95%) and Lack of feedback from teachers (70%). The observed results with in depth interviews shows that both the teachers and learners were in agreement in most causes of poor performance. Both the responses of teachers and learners points to four (4) main areas of concerns which are factors related to the teaching environment, factors related to the teacher, factors related to the student parents and factors related to the student. Major strategies to alleviate the problem were reported by respondents as, in order of importance, provision of teaching resources (81%), followed by Improving syllabus coverage periods (80%), improvement of parents' involvement in learners' education (78%), Changing teaching strategies (73%), learners' motivation (73%) and Improving on learner behaviors (72%).

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, a summary of the findings, conclusions and recommendations for further research deduced from the findings in relation to the factors that affect the teaching and learning of mathematics in junior secondary school in Katima Mulilo Circuit, Zambezi Region are outlined. The purpose of the study was to investigate factors that affect the teaching and learning of mathematics. The study sort to answer the following research questions:

1. What factors affect learner performance in mathematics at junior secondary school level?
2. What strategies can be used to improve the teaching and learning of mathematics in junior secondary schools in the Zambezi Region in Namibia?

The purpose of the study was to investigate the factors affecting the teaching and learning of mathematics at junior secondary school level in Katima Mulilo Circuit. The study utilized a mixed methodology through the use of the convergent parallel design through the use of a combination of the descriptive exploratory design to collect data from learners, teachers and school principals from Katima Mulilo Circuit. The study also made use of a closed ended questionnaire which was administered to 120 participants (teachers and learners) who were selected through two sampling strategies simple random on the teachers and learners and purposeful sampling on the selected schools which participated in the study. The study sort to achieve three objectives which were (1) to identify the factors affecting the teaching and learning of mathematics at junior secondary school level in Katima Mulilo Circuit (2) to find the effects of learner performance in mathematics at junior secondary school level in Katima Mulilo Circuit (3) to make recommendations on strategies that can be used to improve the teaching and learning

of mathematics at junior secondary school level in Katima Mulilo Circuit. The following section presents a summary of the main findings of the study.

5.2 Summary of the findings

This section outlines the finding of the study as mapped on the study objectives.

Research objective 1: To identify the factors affecting the teaching and learning of mathematics at junior secondary school level in Katima Mulilo Circuit.

This study revealed that misconceptions on the part of the learners are some of the factors affecting the teaching and learning of mathematics in Katima Mulilo Circuit. In addition, the study established that there is lack of adequate teaching materials and resources which also affect the teaching and learning of mathematics. The study also revealed that low teacher qualifications and low working experience in the teaching and learning of mathematics affects the success of the learners in mathematics in Katima Mulilo Circuit. Apart from that the study also found out that poor learners' discipline affects the success of learners in mathematics. In terms of availability of teaching and learning materials, learners share books. Results obtained through observations and interviews indicate that, learners in most of the schools move to other classes to borrow books in order for them to do class, assignments and home work.

Research objective 2: To identify the effects in learner performance in mathematics at junior secondary school level in Katima Mulilo Circuit

The study revealed that there are several effects of the factors affecting the teaching and learning of mathematics in Katima Mulilo Circuit. The study found out that learners in Katima Mulilo are withdrawing from mathematics and from school as a result of not achieving any successes in

mathematics. In addition, the study also found out that these factors are the leading causes of the currently faced negative emotional effects in mathematics teaching and learning. More so, the study found out that these factors are leading to decreased learner enrolments in schools in Katima Mulilo and are also contributing to some of the currently experienced psychological impacts among the learners.

Research objective 3: To suggest strategies that can be used to improve the teaching and learning of mathematics at junior secondary school level in Katima Mulilo Circuit

The study recommends that the provision of the teaching and learning resources need to be done in Katima Mulilo Circuit in order to improve the teaching and learning of Mathematics. In addition, the study also recommends that the improvement of syllabus coverage would also make an impact on improving the teaching and learning of mathematics in Katima Mulilo Circuit. Apart from that, the study also recommends that improvement of parental involvement in their children's education would also improve the teaching and learning of mathematics in Katima Mulilo Circuit. The study also recommends that improving learner motivation strategies in the teaching and learning of mathematics would improve the teaching and learning of mathematics. Finally, the study recommends that improving learners behaviors in the teaching of mathematics would ulttimately improve students' performance in mathematics.

5.3 Suggestions for Further Research

Given the findings reached, the following areas for further research are suggested:

1. There is a need to conduct further research, investigating why junior secondary school teachers rarely employ different teaching and learning activities that motivate learners to learn.

2. A tracer study will have to be conducted as a follow up procedure to the current study. Since schools are feeders to the tertiary education level, a study in tertiary institutions needs to be conducted too.

5.4 Recommendations

In light of the study findings and conclusions, the following recommendations are directed to the Ministry of Education, stakeholders, mathematics teachers, parents and education training institutions in Namibia:

- To moderate the shortage of teaching and learning materials, the government should heighten the provision of the materials to schools. In the same vein, the learner teacher ratio must apply as indicated in the education policy to avoid over crowdedness and shortage of resources. The government to hire teachers with both content knowledge and procedural knowledge to impart knowledge to learners effectively. Both teachers and learners are encouraged to cultivate a positive attitude towards the teaching and learning of mathematics for understanding.

- Mathematics teachers to embrace their work and teach for understanding regardless of the situation of over crowdedness as their sweat bring about wages on a monthly base.
- School Principals, Heads of Departments, Subject heads and parents to constantly do class visits, and check learner's workbooks regularly.
- Parents, regardless of their educational background and status of their income get involved in their children's education.

5.5 Conclusion

This study investigated the factors affecting mathematics teaching and learning at junior secondary schools in Katima circuit, Zambezi Region, Namibia. The study used a mixed methodology through the use of a survey and a descriptive exploratory research design. The study used in-depth face to face interview with 16 participants who were teachers and learners in Katima Mulilo Circuit who were selected through purposeful sampling strategy. The study also made use of a closed ended questionnaire which was administered to 120 participants (teachers and learners) who were selected through two sampling strategies simple random on the teachers and learners and purposeful sampling on the selected schools which participated in the study. The study found out that learner teacher ratio, teaching methods, teaching for examination, teachers knowledge of the subject, lack of teaching and learning resources and imbalanced distribution of educational resources were some of the factors that were found to contribute to poor teaching and learning in the Katima Mulilo Circuit.

This indicates that teaching and learning of mathematics is indeed affected by several factors in Katima Mulilo Circuit, resulting in low student performance. Some of these factors may be addressed by the government while others by other stakeholders like learners, teachers, parents and the community at large. The findings also points to need to review teacher training programmes to include robust programmes geared towards improving teacher knowledge.

REFERENCES

Adedokun, G. N., Tochukwu, H. E. & Adedeji, O.O. (2012). *Early childhood marriages and early pregnancy as a risk to motherhood. A report on the Regional Conference on Traditional practices affecting the health of women and children in Africa.* ICA.

Ader, H. H. (2016). *Advising on Research Methods.*

Ahmed, M., Ahamed, S., Waheed, A., Shoaib, M., & Khan, M. (2014). Impacts of demographics on Business students' learning. *European Journal of Business and Social Sciences, 3(8)*, 64-77.

Ali, O. H. (2013). Factors affecting students' academic performance in mathematical sciences in Tertiary institutions in Nigeria. In *Us- China education review* (pp. (A, 3 (12),905-912). A.ISSN 2161-623David Publishing. Retrieved from Us China education review: A. ISSN 2161

Andrew, R. (2015, Online 8 /22/2016). *Procedural knowledge vs conceptual knowldge in mathematics education*. Retrieved from http://learnimplementshare.com/procedural-and-conceptual-knowledge

Anyon, J. (2009). *Theory and Educational Research: toward critical social explanation.* London: Sage Publications.

Aremu, A. O., & Sokan. B.O.(2003). A Multi-Casual Evaluation of Academic performance of Nigerian learners: Issues and implications for National development. In *Department of Guidance of Counselling.* Ibadan: University of Ibadan.

Avong, H. (2013). Poor performance in mathematics among senior secondary school students in Kaduna state: What's to blame? JORID 11(2): Kaduna state: What's to blame?

Awoniyi, S. A., & Alege, B. A. (2007). General Education studies for prospective teacher. A publication of the Depatrment of General Education(Technical) Lafiagi.

Babbie, E. (2005). *The Practice of Social Research* (14th ed.). Boston: Cengage Learning.

Badmus, G. (2002). *Changes in contents and Teaching of school mathematics in Nigeria. In teacher's workshop.* Abuja: National Maathematics Centre.

Baker, A. M. (2007). Influence of parental education on academic of secondary school students in Kuala Terengganu. *International Journal of Academic Research in business and social sciences, Vol. 7,No. 8 ISSN: 2222-6990*.

Bank Windhoek (2013).Bank Windhoek supports mathematics education: Media Release.

Baldirstone, D. (2000). Research Framework on mathematics Teachers Behavior. *Journal of Mathematics Science and technology, 22(5)*, 134-243.

Boyle, P. & Boffeta. P.(2009). *Alcohol consumption and breast canser risk: Breast cancer Research (3).*

Baldirstone, D. (2000). Research Framework on mathematics Teachers Behavior. *Journal of Mathematics Science and technology, 22(5)*, 134-243.

Bless, C., Higson-Smith, C., & Kagee. A. (2006). Fundamentals of social research methods: An African perspective. Cape Town: Juta.

Braun, V. & Clarke. V. (2007). *Qualitative research in psychology-Using thematic analysis in psychology.* California: Sage.

Brodie, K. (2013). Using cognitive and situative perspectives to understand teacher interactions with learner errors. *Proceedings of the 29th Conference of the International Group for the Psychology of Mathematics Education*.

Burns, N. G & Grove (2004). Experimental assessment of factors affecting transfer length. *Structural Journal (Vol), Issue (6)*, 740-748.

Carpenter, S. K. (2014). Spacing and interleaving of study and practice.In V. A. Benassi, C. E Hakala (Eds.), Applying Science of learning in education: Infusing psychological Science into the curriculum (p. 131 - 141). Society for the Teaching of Psychology.

Carrell, S. E & Hoekstra, M.(2009). Extenalities in the classroom: How children exposed to to domestic violence affect everyones kids. Amer. Econ. J.: Appl. Econ. 2(1). 211- 228.

Channon, J., Smith, M., Head, H., Macrae, M., & Chasakara, A. (2003). *New General mathematics Book 3 and 4: An O level Course (3rd Ed.).* Harare: Print Originators.

Chirimbana, M. (2013). *The Effect of Setting Academic and Behavioral Goals on the Mathematics of the University Of Namibia Science Foundation Program. A Thesis Submitted In Partial Fulfilment Of The Reuirements For The Degree Of Master Of Education Of University Of Namibia.*

Chirimbana, M. (2014). *The effect of setting academic and behavioral goals on the Mathematics Performance of the Social Foundation Program Students: Un-published master's Thesis.* Windhoek: University of Namibia.

Christensen, L., Johnson, B., & Turner, H. (2012). *Educational Research.* London: SAGE publication.

Cohen, L., Manion, L., & Morrison, K. (2011). *Research Methods in education 6th edition (9thEd.).* London: Routledge Falmer.

Cohen, L., Manion, L., Morrison, K., & Wyse, D. (2010). *A guide to Teaching Practice.* UK: Taylor & Francis.

Collins, L. (2000). Science and Mathematics teaching preparation in Tanzania. *NUE journal of International Education Cooperation*, 43.

Commission, N. N. (2013). *Vision 2030 Document.* Windhoek: National Planning Commission.

Cotton, K. (1984). *Effective School Practices: A Research Synthesis. .* (Northwest regional Laboratory.

Cox, C. (2015). What makes for good research? *International Journal of Ophthalmic Practice*, 3.

Cresswell, J. (2003). *Research design: Qualitative, quantitative, and mixed methods Approaches.* Sage Publications,Inc.

Cresswell, J. (2017). *Educational research: planning, conducting and evaluating qualitative and quantitative research.* Merril: Upper Research, N.J.

Cresswell, J., Durrheim, K., & Wassen. (2010). *Mixed methods research designs. CAQD Workshop.* Germany: Margburg: University of Nebraska Lincoln.

Erickson, P., & Curl, S. (2002). *Research methodology and techniques.* New Delhi: New international (P) ltd.

Ernest, P. (2009). *Social constructivism as a philosophy of mathematics: Radical constructivism rehabilitated.* Berlin: Deojoug'.

Even, R., & Bruckheimer, M. (2004). Univalence:a critical or non critical Characteristics of functions. *For the Learning of Mathematics*, 18(3),30-45.

Fouche, C. B., & Delport, C. S., L (2002). Writing a reasearch proposa. In De Vos A. S. Strydom, H., Fouche, C. B & Delport C. S. L. Research at the grass roots for the Social Sciences and human service proffessional: 2nd ed. Pretoria: JL Van Schaik publisher.

Gasson, S. (2004). Rigor in grounded theory in Research: An interpretive perspective in Generating theory from qualitative field studies. . In A. W. In. M.E. Whitman, *The handbook of information system research* (pp. 79-102). Hershey: PA: Idea group.

Gay, L., Mills, G., & Airasian, P. (2009). *Educational research. Compentencies for analysis And applications.* USA: Pearson Education.

Geoge, D. (2014). *Some problems encountered in the teaching of Mathematics.* Dar es Salaam.

Gitaari, E., Nyaga, G., & Reche, G. (2013, October Retreiveved 9th October, 2014 from). *Factors Contributing to Students Poor Performance in Mathematics in Public Secondary Schools in Tharaka South District, Kenya.* Retrieved from http://www.iiste.org/Journal/index.php/JEP/article/view/5281

Gomez-Chacon, I. (2003). *Accept Mathematical thinking and intercultural learning, A study on educational practice.* Spain: Madrid Complutense University.

Han, S., & Carpenter, D. (2014). Construct validation of student attitude toward science, technology, engineering and mathematics project-based learning: The case of Korean middle grade students. *Middle Grades Research Journal, 9(3)*, 27-41.

Igbal, M., & Khan, P. (2012). "Overcrowded classroom a serious problem for teachers" . . *Elixir International Journal: Elixir Edu.Tech. 49 101612- 10165*.

Ipinge, R. (2014). *Namibian counts. Stories of mathematics research in Namibia. .* Cape Town: South Africa: Digital Printing solutions.

Jacobs, M., Vakalisa, N., & Gawe, N. (2010). *Teaching-learning dynamics.* Sandton: Heinemann Publishers.

Jalbani, L. (2014). *The impact of effective teaching on the students' academic Performance and learning outcome.* Germany: Open Publishing GmbH.

Jameela, H., & Alib, H. (2016). Causes of Poor Performance in Mathematics from Teachers, Parents and Student's Perspective: . *American Science Research Journal for Engineering, Technology, and Sciences (ASRJETS) ISSN (Print) 2313-4410, ISSN (oNLINE) 2313-4402.*

Jeynes, W. (2002). Examining the effects of parental absence on the academic achievement of adolescents the challenge of controlling for family income. *Journal of Family and Economic Issues, 23(2) htttps://doi.org/10.1023/A:1015790701554*, 189-210.

Jia, Q. (2010). A Brief study on the implications of Constructivism teaching theory on classroom teaching reform in basic education. *International Education studies. Vol 3, No. 2*.

Joel, O., & Ruhan, I. (2006). Enhancing student's understanding of calculus through Writing. *International journal of mathematics 7(4)* , 100.

Joel, O., & Ruhan, I. (2006). Enhancing stuents' understanding of calculus throgh Writing. *International journal of mathematics*, 7 (4) 100.

Kandumbu, M. (2005). *Exploring education policy transformation in Namibia in terms of democratic change.* Stellenbosch.

Kapenda, H. (2007). *Learner Centred approach in mathematics class.* Khomas Rigion.Namibia.

Karigi, M., & Wario, G. (2015). Factors Contributing to poor performance in mathematics in K.C.S.E in selected public Secondary schools in Kiambaa Division of Central Province. *Strategic Journal of Business & Change management, Vol 2(58)*, 316-542.

Karue, N., & Amukowa, W. (2013, Retrieved on 10th April, 2019). *Analysis of factors that Lead to Poor Performance in Kenya Certificate of Secondary Examination in Embu District in Kenya*. Retrieved from http://www.tijoss.come/TIJOSS%2013th%20Volume/Amukowa.pdf

Kasanda, C. (2015). Provision of Mathematics Continuous Professional in Namibia. Int J Edu Sci, 8(1-ii).

Kenyan National Examination CounciKNEC) *(2004)* Government Printer.

Killen, R. (2010). *Teaching Strategies for quality Teaching and learning.* Juta & Company Ltd.

Kilpatrick, J., Swaffod, J., & Findell, B. (2001). *Adding it Up: helping children learn Mathematics.* National Acaademy of Sciences.

Kyari, G., & Ayodele, J. (2014). The socio-economic effect of early marriage in north western Nigeria:. *Mediterranean journal on social sciences. Vol 5 Number 14. ISSN 2039-2117* .

Leedy, P., & Ormrod, J. (2010). *Practical research. Planning and design.* New Jersey: Pearson education publishing as Mettril.

Lucy-Mare, L. (2014). Behavior problems in Post-Institutionalized Romanian adopted: Explanatory parameters in the adaptive home, 14,.

Maree, K. (2010). *First Steps in Research.* Pretoria: Van Schaik.

Maree, K. (2012). *First Steps in Research.* Pretoria: Van Schaik.

Maree, K. (2013). *First Steps in Research.* Pretoria: Van Schaik Publishers.

Mateya, M., Utete, C., & Ilukena, A. (2013). *Factors that cause poor performance in mathematics at National School Secondary Certificate level compared to Junior Secondary Certificate level in four selected schools in the two Kavango Educational regions.* University of Namibia.

Mayer, R. (2002). Roles versus meaningful learning. . In *Theory into Practice, 41 (4),* (pp. 226-232).

Mayya, S., Rao, A., & Ramnarayana, K. (2004). Learning approaches, Learning difficulties and Academic performance of undergraduate students of physiotherapy. The inernet International Conference on Mathematics and Science education. *Journal of Physics: Conf. Series 895(2017) 012030*.

Mbugua, Z., Kibet, K., & Nkonke, G. (2012). *Factors Contributing to Students' Poor Performance in Mathematics at Kenya Certificate of Secondary Education in Kenya:*. Retrieved from A Case of Baringo County, Kenya.: http://www.aijcrnet.com/journals/Vol _2_No_6_June_2012/11.pdf

Mensah, J., Okyere, M., & Kuranchie. (2013). Student attitude towards mathematics and Performance: Does the teacher attitude matter? *Journal of education and practice, Vol. 4. No. 3,2013*.

Michael, I. (2015). *Factors leading to poor performance in mathematics subject in Kibaha secondary schools: a dissertation submitted in partial fulfilment of the requirements for the degree of*

master of education in administration, planning and policy studies (med. Apps). (med. Apps) of the Open University of Tanzania 2015.

Milaturrahmah, N., Mardiyana, M., & Pramudya, I. (2017). Mathematics learning process with Science, technology, engineering, Mathematics (STEM) Approach in Indonesia.International Conference on Mathematics and Science education. *Journal of Physics: Conf. Series 895(2017) 012030.*

Miranda, H., Nakashole, S., & Chirimbana, M. (2013). *How the Namibian mathematics syllabus compare with those of other SADC countries. Annual mathematics Congress(2-7).* Swakopmund: University of Namibia .

Mlozi, M., Kaguo, F., & Nyamba, S. (2013). Factors influencing students' academic performance in community and government built secondary schools in Tanzania. Acase of Mbeya Municipality. *International Journal of Science and Technology 2 (2)*, 174-186.

Mohamed, L., & Waheed, H. (2011). Secondary students' attitude towards mathematics in selected school of Maldives. *International Journal of Humanities and Social Scince 1(15)*, 277-281.

Mugo, F. (2017, February 12). *Social research methods. Retrieved September 12, 2017*. Retrieved from http:www.socialresearchmethods.net/tutorial/Mugo/htm.

Mwandingi, H. (2019). Challenges faced by learners in informal boarding schools. *Tanzania Journal of Education Development, 2(3)* , 76-89.

Namibia. Ministry of Basic Education, A. C. (2016). *The National Curriculum for Basic Education.* Okahadja: NIED.

National Institute for Educational Development, N. (1998). *The Basic Education Diploma-Based Curriculum. Okahaadja: Namibia: The Ministry of Higher Education Vocational Education, Science and Technology Education and Ministry of Basic Education and Culture.*

Namibian National Planning Commission. (2013). *Vision 2030 Document.* Windhoek: National Planning Commission.

Namibian National Planning Commission. (2016). National Development Plan 5(NDP5). Windhoek: National Planning Commission.

Nigel, P., & William, G. (2015). Economic aand Social analysis. *Marketing intelligence & Panning, 7(5/6),* , 5-7.

Nur, M. (2010). *Factors that influence secondary school students' performance in Mathematics in Banadir Region.* Somalia.

Ojimba, D. P. (2012, October Retreived on 19th October, 2014). *Strategies for Teaching and Sustaining Mathematics as an Indispensable Tool for Technological Development in Nigeria.* Retrieved from

http://www.mcser.org/images/stories/MJSSSpecialissue%202012%20Special%20Issue%20vol1203%20no%2015/Daso%20Peter%20Ojimbaa.pdf.

Ojonubah, J. (2015). Impacts and solutions of overcrowded mathematics class on Students' achievement in school:. *Journal of resourcesful and distinction. Vol 11 Number 1. ISSN 2276-9684.*

Ojose, B. (2015). Mathematics literacy: Are we able to put the mathematics we learn into Everyday use? *Journal of Mathematics Education. Vol: 1,*, 89-100.

Omwenga, L. (2014). Factors contributing to dismisal performance in mathematics among secondary school girls in Nyambira County, Kenya. *Journal of education and practice. Vol 5 (5)*.

Peat, J., Mellis, C., Williams, K., & Xuan, W. (2002). (2014). Health Science Research: A handbook of qualitative methods. London, UK: SAGE.

Peters, B. (2016). Realistic Mathematics Education and Professional Development: A Case Study of the Experiences of Primary School Mathematics Teachers in Namibia. *Dissertation presented for the degree of DOCTOR OF PHYLOSOPHY IN EDUCATION, In the Department of Curriculum Studies Faculty of Education University of Stellenbosch*.

Pia, K. (2015). Barriers in teaching learning process of mathematics aat Secondary level: A quest for Quality improvement. *American Journal of Educational Research, Vol. 3 No. 7*, 822-831.

Pin, K. (2015). Barriers in teaching and learning process of mathematics in secondary level: A Quest for quality improvement. *American journal of educational research, Vol: 3(7).*

Republic of Kenya (2004). The Kenyan National Examination Council. Nairobi. Government Printer.

Robson, C. (2010). *Real world resaerch: .* Australia: Blackwell publishing, Oxford.

Sa'ad, T., Adamu, U., & Sanding, A. (2014). The causes of poor performance in Mathematics among public Senior Secondary school students in Azare, Metropolis of Bauchistate Nigeria. *DOI: 10.9710/7388-04633 240. Iosrjournals.org*.

Schunk, D. H. (2012). *Learning theories: An Educational perspective. .* Boston: Pearson Education, Inc.

Shah, J., & Inamullah, H. M. (2012). The impact of overcrowded classroom on the academic Performance of the students at secondary level:. *International Journal of research in Commence and management. Vol 2 Issue 6*.

Shulman, L. (1987). Knowledge and teaching: Foundations of new reform. *Harvard Educational Review,57,*, 1-22.

Spaull. (2011). Learner preschool exposure and achievement in South Africa,. *Policy briefs, 4, SACMEQ*.

Stigler, J. W., & Hiebert, J. (2004). Improving Mathematics Teaching:. *February 2004 | Volume 61 | Number 5.*

Trochim, W. (2015). *The Research Methods Knowledge Base, 2 nd Edition. .* California:: Sage.

Tshabalala, T., & Ncube, A. C. (2012, Retrieved on 19th October, 2014 19th). *Causes of Poor Performance of Ordinary Level Pupils In Mathematics in Rural Secondary Schools in Nkayi District: Learner's Attritions.* . Retrieved from from http://novaexplore.com/NJMBS/wp-content/uploads/sites/4/2014/02/N.JMBS_4-14.pdf

Wang, L., Li, X., & N, Z. (2004). Socio-economic status and mathematics achievement in China.Mathematics Education. *Journal on SES in China. Vol: 46(7).*, 1051-1060.

Whyte, J., & Anthony, G. (2012). Maths Anxiety: Fear factor in the mathematical classroom. *New Zealand journal of teachers work. Vol, 9. Issue,1,*, 6-15.

Woolley-Wilson, J. (2013). *21st Century mathematics skills: A critical component to success. l.*

Zakariya, Y., & Vamidele, E. F. (2015). Investigation into the Causes of poor Academic Performance in Mathematics among Nigerian Undergraduate Students. *World Journal of Science and Humanities, 2015, Vol. 1 No 1*, 1-5.

Zan, R., & Di Martino, P. (2005). *The role of affect in the research on the affect: The case of Attitude. In M.A. Mariotti (Ed.), Proceeding ofthe Third conference of the European Society for research in Mathematics (CD) , .* Italy: PISA.

APPENDIX A: PARTICIPANTS' QUESTIONNAIRE (TEACHERS AND LEARNERS)

SECTION A: BIOGRAPHICAL INFORMATION OF THE PARTICIPANTS

Please respond by putting a √ or × in the appropriate box.

1. How old are you?

Age group	Option
<18	1
19-31	2
32-50	3
Above 50	5

2. What is your gender?

Gender	Option
Male	1
Female	2

3. What is your responsibility?

Learner	1
Mathematics teacher	2
Principal	3
HOD	4

4. Which school do you belong to?

School	
A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	8
I	9
J	10

SECTION B: STRATEGIES CAN BE USED TO IMPROVE THE TEACHING AND LEARNING OF MATHEMATICS IN JUNIOR SECONDARY SCHOOLS IN THE ZAMBEZI REGION IN NAMIBIA

Please respond by putting a √ or × in the appropriate box.

	Recommendations	Strongly Disagree	Disagree	Uncert-ain	Agre e	Strongly Agree
		1	2	3	4	5
1	Improving on parental involvement					
2	Improving syllabus coverage periods					
3	Changing teaching strategies					
4	Improving learner motivation strategies					
5	Improving on learner behaviors					
6	Provision of more teaching resources					

Recommendations to mitigate on the factors contribute to poor performance in

Mathematics

APPENDIX B: INTERVIEW PROTOCOL (TEACHERS AND LEARNERS)

1. What are your experiences of teaching and learning in terms of:
   (a) Individual attention
   (b) Feedback on assignments
   (c) Assessments done
   (d) Resource availability
   (e) Teaching methods used by the teacher.
   (c) Remedial teaching
   (d) The effect of overcrowded classes
2. Describe your level of understanding of mathematics concepts:

3. Give specific suggestions for improving quality of your learning/teaching experiences you highlighted in item 1.To what extent do you think this problem is affecting learner performance in mathematics in Katima Mulilo Circuit?

APPENDIX C: LETTER TO THE MINISTRY OF EDUCATION

Box 2209

Ngweze

Katima Mulilo

18 June 2018

The Education Director

Ministry of Education

Katima Mulilo

Zambezi Region

Dear Sir

RE: PERMISION TO CONDUCT RESEACH IN KATIMA MULILO CIRCUIT SCHOOLS.

I am a Masters student, pursuing masters in Mathematics Education at the University of Botswana. Part of my study is to complete a dissertation by conducting research in mathematics. My research topic aims to explore factors affecting mathematics teaching and learning at junior secondary schools in Katima Mulilo Circuit, Zambezi Region. This study will thus, motivate teachers to give much attention to the subject matter that should be imparted, teach for conceptual understanding by relating mathematics to real life situations. In doing so, learners will realize mathematics as a powerful tool which is useful in all if not to some of the life experiences.

The results of this study may serve as a guiding tool for educational planners, mathematics teachers, parents including all stakeholders. The findings of this study may also be used by researchers intending to do research in this area as a starting point for other intending. The following tools will be used to collect data from the HODs, teachers and learners: Interviews, Questionnaires and class observations.

I intend to visit the following schools: Caprivi Senior Secondary School, Kizito College, Ngweze Senior Secondary School, Katima Combined School, Mavuluma Combined School, Mavuluma Junior Secondary School, Mafuta Combined School, Tobias Hainyeko Project School, Liselo Combined School, Imukusi Combined School, Lisikili Combined, Kasheshe Combined School.

The anticipated visit to school will be from 25 June 2018 – 13 July 2018. I will appreciate if favorable considerations are made at your earliest convenience.

Yours Sincerely

.....

Karen N. Mubonenwa

APPENDIX D: LETTER FROM THE MINSTRY

REPUBLIC OF NAMIBIA
ZAMBEZI REGIONAL COUNCIL
DIRECTORATE: EDUCATION, ARTS AND CULTURE

Tel: +26466261931
Fax: +26466253187
Enquiries: Adrenah K Mukela

Ngoma Road
Govt Building
Our Ref: -

Private Bag 5006
KatimaMulilo, Namibia
Date: 20 June 2018

PO Box 2209
Katima Mulilo
Namibia

Attention: Ms Karen N Mubonenwa

RE: PERMISSION TO CONDUCT RESEACH IN KATIMA MULILO CIRCUIT SCHOOLS: YOURSELF

1. Your letter dated 18 June 2018 in the context above is hereby acknowledged.

2. Permission is granted to you to conduct research in schools within Katima Mulilo Circuit as per your programme, however, you are advised to ensure that your presence in those schools you intend to visit does not disrupt the normal teaching and learning at such schools.

3. Kindly communicate your proposed program to the school management so that it does not interrupt the school set program.

4. The Ministry of Education, Arts and Culture would like to request you to share your findings with the Directorate.

NB! By a copy of this notice the Inspector of Education is notified of your presence such schools.

Thank you,

MINISTRY OF EDUCATION ARTS & CULTURE
Zambezi Regional Directorate
2018 -06- 20
Office of the Director
Private Bag 5006 . Katima Mulilo

MR JOSEPH J KAWANA
ACTING REGIONAL DIRECTOR: EDUCATION, ARTS AND CULTURE

APPENDIX E: CONCENT LETTER

Box 2209

NGWEZE

Katima Mulilo

Dear Respondent

RE: CONCENT LETTER

You are being asked to participate in a study: Factors affecting Mathematics teaching and learning for conceptual understanding at Junior Secondary School in Katima Circuit, Zambezi Region. Your participation may help to explore factors that are fact Mathematics teaching and learning for conceptual understanding in Katima Mulilo Circuit, Zambezi Region.

If you are agree to participate you will be required to complete two activities, firstly you will be asked to complete a twenty (20) minutes questionnaire secondly, you will be interviewed. Although all studies may have some amount of risk, the risk potential of this study is minimal. All activities are normal processes and all procedures will be anonymous. No cost will ensured as a result of participation.

AUTHOURISAZION : I have read the above and understand the nature of this study and agreed to participate in the study understand that I may refuse to participate, or I may withdraw from the study at any time without pre-judgement.

Participate signature: ..... Date: .....

Researcher Signature: ..... Date: .....