

CHAPTER ONE

INTRODUCTION

1.0. Background

The issues in Mathematics education in Zambia according to Nakawa (2010, 2012) and Nonaka (2013) have indicated that students in Zambia have very low performance due to teachers' low competence and their limited views on Mathematics lessons. Nakawa (2010) has also indicated that students' low achievement is a major issue in Mathematics education. This state of affairs has not pleased the Ministry of Education, Science, Vocational, Training and Early Education. The Ministry of Education, Science, Vocational, Training and Early Education through their document Educating Our Future (1996, p.25), observed that, "the overall unsatisfactory performance in the School Certificate Examination is attributed, to a large measure to poor performance in Mathematics" Although more teachers that are qualified continue to be recruited and deployed in various schools in Eastern Province, pupil performance levels especially in Mathematics at School Certificate are still low as show in tables 5.1, 5.2, 5.3 and 5.4. The Zambian Secondary Schools have experienced a low performance in Mathematics at School Certificate level in recent years. For example in Eastern Province, at Grade 12 level in 2009, 1,860 out of 3,752 boys who sat for the Mathematics examinations failed. This represents 49.6% failure rate. Also, 1,074 out of 1,924 girls who sat for the same examinations failed, representing 55.8% failure rate. In 2006 out of 3,982 pupils who sat for Mathematics examinations 2,206 scored Grade 9, representing 55.4% failure ; in 2007, 3,859 sat for the Mathematics

examinations and 2,184 (56.6%) failed. In 2009, 5,676 sat for Mathematics examinations and 2,934 (51.7%) failed and in 2010, 7,136 pupils sat for Mathematics examinations and 4,349 (60.9%) failed. These situations pose unacceptable levels of pupils' performance (Mulendema, 2007).

In view of this deplorable situation, the Ministry of Education Science Vocational Training and Early Education and Co-operating partners have tried to reverse this trend by introducing programmes or interventions such as Zambia Mathematics and Science Teachers Education Project (ZAMSTEP) for Mathematics and Science Teachers. According to Carmody (2004), ZAMSTEP was introduced because of the shortage of skilled qualified teachers to teach Mathematics and Science in Secondary Schools. The programme was initiated in 1980 to equip the diploma holders with pedagogical knowledge so that they could confidently and effectively teach Mathematics and Science in Secondary Schools. This intervention was mainly concerned with improving the instructive skills and knowledge of the teachers. It was not concerned with improving pupils' environment of learning mathematics. The Ministry of Education admits that the poor performance in Mathematics is a real challenge. The Ministry of Education Science Vocational Training and Early Education (1996, p.54) says that "clearly, there is a situation here which requires urgent attention and major intervention by the pupils themselves and the country as a whole cannot sustain a continuation of the unsatisfactory performance in Mathematics ...". The under performance by pupils at School Certificate level has been going on for quite some time now without any tangible solution being realised by the Ministry of

Education Science Vocational Training and Early Education to reduce the trend. Pupils themselves and the Mathematics teachers are believed by the Ministry of Education Science Vocational Training and Early Education to be the ones perpetuating this situation. Therefore, to identify the root cause there is urgent need to carry out a research in the learning of Mathematics in Secondary Schools in Zambia. This problem seems not to have attracted the research attention that it deserves and little or no knowledge is known so far of its' causes.

According to Lamba and Fullerton (2000, p.1) This opinion is also supported by Paulos (1989) who says that the effects of failure in Mathematics through the years of schooling coupled with lack of numeracy skills in adult life can seriously handicap both daily living and vocational prospects in one's life. He further says that in today's world Mathematical knowledge, reasoning and skill were not less important than reading ability.

This problem of underperformance needed to be addressed or checked because it will adversely affect the Zambian society and the economic activities as there will be very few people taking up occupations which are Mathematics related. In view of this situation, the study looked at interest and attitudes in the learning of Mathematics as they are also believed to influence pupils' learning and performance or achievement in Mathematics at School Certificate level apart from other relates factors.

This opinion or belief is supported by Kalumbi (2005), who quotes Sandman (1980) who attributes the poor performance to pupils' anxiety towards Mathematics, lack of

self-esteem, enjoyment and motivation in Mathematics. The wish to try and raise the levels of Mathematics achievement led the writer to focus on identifying the nature of factors that foster as well as those that limit achievement of different groups of Secondary School pupils in selected schools in Eastern Province.

1.1 Statement of the problem

The low achievement of pupils in Mathematics at School Certificate is attributed to many factors like lack of self-esteem, belief, value and recently investigated affect or anxiety. The lack of interest and negative attitude toward learning mathematics is also assumed to influence learning and achievement in Mathematics. According to Sidhu (2002, p.133), “To arouse and maintain the student interest in Mathematics is a major problem for the teacher. He/ she should know that loss of interest is one of the principal causes of student failure.” Lack of interest by pupils should not be allowed to prevail in a class, as effective learning might not take place. This is supported by Aremu (1998) who explains that when pupils express lack of interest in the subject it affects the way they react or listen to the teacher. Mwamwenda (1996, p367) quotes Wolf and Blix (1981) who states that a “pupil’s attitude toward Mathematics serves as predictor of proof of his performance in Mathematics”. This study was therefore sought to investigate the nature and factors affecting pupils’ interest and attitudes toward learning Mathematics in Secondary Schools. These factors might contribute to the pupils’ failure to follow Mathematics lessons resulting in low achievement in Mathematics at School Certificate.

1.2 Purpose of the study

The purpose of the study is to investigate the nature of factors affecting pupils' interest and attitudes toward learning Mathematics in selected Secondary Schools in Eastern Province.

1.3 Objectives of the study.

The objectives of the study were:

1. To determine the factors that contributes to pupils developing interest or lacking interest and having positive or negative attitudes toward learning Mathematics in selected Secondary Schools in Eastern Province.
2. To determine the nature of interest pupils have towards learning Mathematics in selected Secondary Schools in Eastern Province.
3. To determine the nature of attitudes pupils have toward learning Mathematics in selected Secondary Schools in Eastern Province.

1.4 Research questions.

The study was guided by the following research questions:

1. What factors contribute to pupils having interest or lacking interest or having positive or negative attitudes toward learning Mathematics in Secondary Schools in Eastern Province?
2. What is the nature of interest that pupils show towards learning Mathematics? at Secondary Schools in Eastern Province?

3. What is the nature of attitude that pupils show towards learning Mathematics at Secondary Schools in Eastern Province?

1.5. Significance of the study

The study is vital in Mathematics education in five ways. Firstly, it could provide information to Mathematics teachers on why pupils lose interest and develop negative attitudes in learning Mathematics so that they can take steps to instil interest and positive attitudes toward learning Mathematics. Secondly, it could provide information to teacher education institutions on how to arouse interest and maintain positive attitudes of pupils which can in turn be shared with trainee teachers. Thirdly, it will provide information to the Ministry of Education, Science, Vocational, Training and Early Education about the factors affecting interests and negative attitudes in learning Mathematics so that they help formulate programmes and policies that foster interest and positive attitudes. Fourthly, the Curriculum Development Centre (CDC) might formulate and implement a syllabus and learning materials that arouse interest and positive attitudes toward learning Mathematics in the light of the results of this study. Lastly, the findings of this study will contribute to the existing Mathematics education literature and provide information for further studies.

1.6. Limitation of the study

1. The study has a minimal sample, comprising 120 pupils (i.e.30 pupils from each of the four secondary schools) and 16 Mathematics teachers from the Secondary Schools due to limited financial support.

4. Cross section method of study was used due to limitation of the study period, instead of longitudinal study method which would have been more appropriate to observe the responses for some time. Cross section method of study looks at different age groups at the same time in order to understand changes that occur during their life span. While the Longitudinal method is a “research that studies the same group of people over an extended period of time.” (Romano et al., 1994, p.44). However, despite these limitations the study was able to obtain data and had an effective conclusion.

1.7 Theoretical framework

The theoretical framework assumed that when pupils lack interest and have negative attitudes toward learning Mathematics, they will not be actively involved in the learning process and therefore no learning would be evident. The theoretical framework was guided by two theories: the motivation theory and constructivism theory. Romano et al. (1994, p.127) says motivation is “the drive to seek a goal such as food, water, and friends and so on.” In this circumstance, the drive is meant to facilitate learning mathematical concepts. This theoretical framework purports that satisfactory learning of Mathematics is unlikely to take place without sufficient motivation. This motivation is either intrinsic or extrinsic. According to Fontana (1988), intrinsic motivation involves seeking satisfaction that comes from within the individual for certain behaviour. Linking this with learning Mathematics, children’s curiosity as a motivation is a degree of interest and positive attitude which is cultivated from a learning experience. The theory investigates why some things

capture pupils' interest and pupils develop positive attitude while others do not. It may be assumed that the former has direct relevance to daily life. This enables one to cope more effectively with the task people meet. As the individual interacts with others, they may also help him or her towards self-understanding of some coherent and consistent philosophy of life. But in most of the schools learning lacks this relevance as the schools concentrate on preparation for future tasks and tasks which pupils only meet in the school. Fontana (1988) further says extrinsic motivation involves seeking a reward from outside the organism for certain behaviours. This motivation includes pupils' marks, grades, school report, tests, examinations and teacher's approval. Success in these things might help a child to develop interest and positive attitudes in the presence of teachers, peers and parents. This might assist a pupil to develop achievement motivation (need for achievement). Pupils realise that success is rewarding and build up expectations which they have to work at even more purposefully to fulfil. Some pupils, instead, experience only failure. This leads to low self-esteem or rejection of Mathematics as boring and useless, a defensive attempt to convince everyone that Mathematics is not worthy doing.

According to Mangal (2008, p.177) the law of Attitude was that, "learning is guided by a total attitude or set of the organism. The learner performs the task properly if only he developed a positive attitude towards the task." The learner might not assimilate Mathematics concepts and skills being facilitated by the teacher without interest and positive attitude. Kundu and Tutoo (2008, p.182) also say, "To secure attention among students an effort has to be made to evoke their interest in the

classroom.” The students need to construct their own understanding of each mathematical concept and skill so that the teachers’ task is not to lecture, explain or otherwise attempt to “transfer” Mathematics knowledge, but to create situations that will foster their making the necessary mental models or mental construction.

Constructivist theory is related to Brunner Instrumental Conceptualism. According to Donald, Lazarus and Lowlwana (2003,p.3) Constructivism theorists believe that “...human beings are seen as active agents in their own development and that knowledge is not passively received but actively constructed cognitively and through socialization.” The theory assumes that learning can only be evident when individuals themselves act on the knowledge or take part fully in the learning process. Therefore, it is assumed that learning cannot occur if pupils lack interest and have negative attitudes toward learning Mathematics. The pupils will not be motivated to be actively involved. Fontana (1988) says Brunner links learning to an individual who identifies and builds his or her own understanding of the stimuli. He further states that an individual interprets (or misinterprets) and transforms the knowledge in their own fashion dependent on their previous experience. Supporting this opinion Kundu and Tutoo (2008) says Piaget’s stages of cognitive development is evident that the content of the curriculum must promote activities of thinking and manipulation of learning materials in building ones understanding. In these opinions a learner is expected to generate his/her own knowledge or models. Therefore, the learner’s own effort to act on the knowledge is essential. This assumption was supported by Davies et al. (1990) who was quoted by Goose et al. (2009, p.28) who argue that

“constructivism claim that learners actively construct knowledge and personal meaning by connecting their prior knowledge with new knowledge gained from their own interaction with the world.” This effort will only be possible by arousing the interest and positive attitude through motivation as without it there will be no driving force to act on the Mathematics concepts and skills.

1.8. Operational definition of the terms used in the study.

1. **Attitudes** “as the relatively enduring orientations that individuals develop towards various objects and issues they encounter during their lives and which they express verbally as opinion.” Fontana(1988,p.204)
2. **Interest** is “the feeling that you have when you want to know or learn more about...” Wehmeier et al.,(2010)
3. **Teacher Centred** is applied to forms of education in which the teacher dominates the teaching and learning process by determining what is taught, how it is taught, and the sequence and pace of the teaching. Smith (2003)
4. **Child Centred Learning** is the name applied to a philosophical approach to learning that recognises the importance of matching the content and methods of children’s learning to what is known of child development and the basic needs and characteristics of children. Kraft(1994)

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0. Introduction

This chapter presents a review on interest and attitudes; a review of what learning is in terms of Mathematics; an analysis of effective learning in Mathematics; and a review of how interest and attitude influence the learning of Mathematics in Secondary Schools. It also presents a discussion of how pupils learn attitudes and a review of related studies on attitude and interest.

2.1 The Concept of Learning

A number of scholars have defined learning differently depending on their experiences with the world of knowledge. For example, Fontana (1988,p. 126), states that the behaviourists approach look at “learning in terms of connections between stimulus and response or between response and reinforcement and places great stress upon the role played by the environment, and structure the environment correctly and learning will usually follow irrespective of the particular volition of the learner.” The behaviourist approach viewed learning in terms of observable behaviour by the learner. After being exposed to a stimulus, learners were expected to have a change in behaviour (response) which would be observable to ascertain whether learning had taken place.

Fontana (1988, p.126), in this approach, the emphasis was on the learner’s mental process of how he /she interpreted and made sense of his /her

knowledge. The cognitive approach viewed an individual as not being mentally passive over the environment but an active participant in the learning activities both mentally and physically as delivered by the teacher.

According to Crow and Crow (1973, p.225) “Learning is the acquisition of habits, knowledge, and attitudes. It involves new ways of doing things, and it operates on an individual’s attempts to overcome obstacles or to adjust to new situations. It represents progressive changes in behaviour. It enables him to satisfy interests to attain a goal.” Learning here is viewed by Crow and Crow (1973) as the assimilation of new ways of thinking or cognitive processes, better ways of doing things and change in the way one relates with others. Learning in short can be summed up according to Crow and Crow (1973) as a wholesome change in an individual after undergoing an experience of resolving environmental challenges as one strives to meet his/her aspirations. Mangal (2008, p. 170) also says, “Learning is a process which brings relatively permanent changes in ones’ behaviour of a learner through experience or practice.”

Learning comes about after undergoing an experience which is usually a learning process. This learning process needs to bring about a change of behaviour that is new ways of thinking or doing things by an individual which should be permanent if one has to be labelled as a learner. In all the definitions of learning, it can be concluded that learning involves one going through an experience of the environment and the society around. This experience brings change in an individual’s cognitive levels and behaviour. An individual advances to another stage in ways of thinking, doing things, relating with others and how he/she views the world around him or her.

In a Mathematics class, a teacher will be able to observe that learning has taken place by the way pupils solve the mathematical problems. The pupils may apply general mathematics concepts to unfamiliar problem situations by understanding the meaning of the mathematical concepts. Goose et al., (2008, p.22) quotes Herbert and Carpentry (1992) who define “understanding as making connections between ideas, facts or procedures.”

2.2 What is effective learning in relation to Mathematics Education?

How can a Mathematics teacher bring about effective or meaningful learning in the Mathematics lesson? This is one of the many questions that Mathematics teachers ask themselves: According to Sidhu (2002, p.139), “Meaningful learning is ... that learning which is oriented towards good experiences and outcomes.” He went on to say, “It is constructive, productive, purposeful, and progressive in nature.” Sidhu here views Mathematics to be meaningful if the learner can appreciate Mathematics in his/her daily activities by using Mathematics to resolve challenges; applicable in most situations and appreciated in many circumstances. Therefore, the learning of Mathematics in class should explore all these avenues so that the pupils experience and develop a feeling of valuing Mathematics in all the areas of their daily activities.

Marks, Purdy and Kinney (1970, p.32) says, “The essentials of Mathematics learning process are readiness to learn and are categorized into two aspects.” One is subject matter readiness which includes the mastery of pre-requisite skills, concepts and

vocabulary. Secondly, it was motivational readiness which was the base for active pupil interest in what was to be learnt and purposeful activity in learning it. A pupil should be ready to learn the subject matter in Mathematics because of the spiral nature of the content. There are concepts or skills which a pupil needs to know prior to the new concepts during the learning process if learning will be meaningful or effective. Learning is an active process which requires the pupil to develop a positive attitude or interest to the learning process, so that the pupil can be actively involved in the activities mentally and physically. In a classroom situation, a pupil should be involved in the discussion of concepts, answering oral questions, volunteering to solve questions on the board and solving problems in the exercise book. This can only be possible if a pupil has the skills and knowledge of the concepts being taught; and when a child is psychologically ready with positive attitude and interest.

From the literature reviewed, learning can be viewed as a change in one's cognitive development and behaviour after undergoing an experience or learning process of Mathematics concepts. When pupils' way of thinking and solving Mathematical problems are advanced to the next level, it means learning has taken place. This learning should be permanent in that the cognitive models or frames are modified to accommodate current experiences. It can also be noted that learning can take place when prerequisite skills and knowledge are acquired or present. Apart from this, the learner should be emotionally ready to learn. The learners should have a positive attitude and interest in the learning process as without these no learning might take place resulting in them having low achievement or poor performance.

2.3 Interest and Learning Mathematics

The Cambridge Learners Dictionary (2003, p. 347) defined interest as a “feeling of wanting to give attention to something or discover more about it.” It further said that it was “something you enjoy doing, studying, or experiencing.” From Cambridge Learners Dictionary we understand interest as a desire or inner emotion which propels individuals to act towards something in a positive or negative way. Furthermore, as you act or get involved in the activity you appreciate or are satisfied with it.

According to Kundu and Tutoo (2008, p.189) “Interest is defined, therefore, not only in terms of the objects and activities which get attention and yield satisfaction but also in terms of the strength of the tendencies to give attention to and seek satisfaction from these competing objects of interests.” The term interest can be broken into two parts. The first part is concepts to be learnt or activities to be done need to attract interest in the learner. The other part is to ensure that they should maintain or continue to arouse this interest. This is a very important aspect in Mathematics Education on the part of the Mathematics teachers in their preparation and during the lesson, as they need to ensure that the interest is maintained throughout the learning process. On the other hand, the materials to be learnt should convince the learners that they are valuable so that they develop positive attitudes toward the subject or activities. Butler and Wren (1951, p.110), argue that, “Interests are described as motives which serve as important influences in producing both activities and attitudes that are favourable to learning.” Interests can be thought to be internal emotions in an individual which will

provoke them to take part in an activity or learning process. In a Mathematics lesson, interest can therefore be understood as a strong inner feeling which develops in an individual after receiving conviction or belief of the benefit of learning mathematics concepts. This conviction will maintain an action or energy drive to take part in a learning process.

In a classroom, pupils will pay much attention and participate fully in a lesson that is interesting. The interest in activities tends to increase the likelihood that individuals formulate goals relating to that activity and invest time and effort to achieve them. When a pupil has strong interest in Mathematics, the pupil will put in all his or her effort in learning the subject despite encountering the challenges in the learning process, a pupil will continue persisting until he/she meets the targeted goals. Some pupils when they encounter challenges the lose concentration, and the interest for the subject is lost. In the final analysis, they have low achievement. Sidhu (2002, p.133) says, "Students, as a rule, readily become interested in things which are new or exciting for which they can perceive practical values and which involve puzzles and elements of mystery." Most of the times pupils are excited to learn new things which they believe have value or are applicable to situations which will help them overcome some of the difficulties they have been encountering in the past. Sometimes it is mere show off to others that they are able to do it.

Butler and Wren (1951, p.109) argue that, "... students will work most diligently and most effectively at tasks in which they are genuinely interested." A pupil who is

interested in a given mathematics lesson will strive willingly to learn a challenging topic, will also more likely participate and will be very attentive to the concepts being delivered by the teacher. Fontana (1988, p.203) says “...Children tend to become interested in those things that help them deal with problems and difficulties in their lives because they see these as having relevance.” The Mathematics teacher has a mammoth task of ensuring that the learning materials delivered inculcate the application of the concepts in the pupils’ daily activities so that pupils can appreciate mathematics concepts.

Callahan (1966, p.301) in addition says, “A basic aspect of effective teaching involves identifying individual student’s interest and using it to achieve a high degree of motivation.” The Mathematics teacher needs to know his/her pupils well, in general, so that the needs of the pupils are well catered for. This will enable the teacher to plan a lesson which will absorb all the pupils’ interests. Callahan (1966, p.328) further say, “What interests a student will motivate him conversely what does not interest a student will not motivate him.” Mathematics teachers should at all times ensure that the lessons are interesting if pupils are to be eager to learn and assimilate the concepts being delivered to them. Kundu and Tutoo (2008, p.188) supports this opinion that, “As interests are helpful in promoting learning they are of major significance in determining learning situations. A person who is interested works harder, longer and more effectively.”

Interest is one of the most important ingredients in the learning process which builds a strong inner feeling or motion to have an appetite to learn concepts no matter how challenging the task may be. Therefore, the activation or arousing of interest in a Mathematics lesson is a vital element due to the nature of the subject and how it is viewed by the pupils. The loss of interest in Mathematics for most pupils is strongly attributed to Mathematics teachers' insensitiveness to pupils' needs. Butler and Wren (1951, p.110) agrees with this notion that "Inability to understand is likely to beget a condition of restlessness, in parents' suggestion to their children.... saying that they never liked Mathematics or they never wanted to study it or were never able to pass in it or that failure in Mathematics has been the tradition of their family." These utterances by parents most likely affected children's interest and attainment in the subject. Parents needed to be aware of the adverse effect of their comments and their responsibilities in this problem. Fontana (1988, p.203) says "... an interest in hobbies (and of course in school subjects) can come about in response to parental reinforcement, and even as a consequence of association between these hobbies and parents themselves." The parents' opinion on school subjects has an influence on the pupils' interest and behaviour in school. Pupils uphold highly their parents' views on an issue concerning them. Teachers are the drivers of the whole learning process if they fail in meeting one area of the learning process then everything fails. The teacher needs to deliver the concepts in an acceptable manner to pupils and his/her rapport with pupils should be good if learning is to be effective. The two components should ensure that pupils did not lose interest, but arouse it throughout the lesson up to the end.

Kundu and Tutoo (2008) emphasizes that teachers need to present their learning materials in an interesting and sometimes novel context. The materials should be in some way be goal directed and that the learning situation should also provide opportunity for active participation of all pupils. The atmosphere should be friendly and permissive. Interest is the most important ingredient in as far as learning is concerned. It would build a strong inner feeling or drive to grasp the concepts no matter how challenging the task might be. Arousing interest in a Mathematics lesson is a necessity due to the nature of the subject, which requires tolerance or strong resistance to challenges and failures.

2.4 Attitude and Learning Mathematics.

The attitude of pupils towards mathematics is also one of the issues assumed to influence pupils' low achievement at school certificate. Before proceeding with the discussion on attitudes, there is a need to define it, so that it is not misunderstood or wrongly interpreted.

The Cambridge Learners Dictionary (2003, p.47) defines attitude as “how you think or feel about something and how this makes you behave.” Attitude can be said to be how you view something or react towards something. In other words, attitude is how one approaches objects or issues, either positively or negatively, depending on one's belief.

Oppenheim (1979, p.105) defines attitude as “... a state of readiness and a tendency to act or react in a certain manner when confronted with certain stimuli.” If we relate this definition to learning Mathematics, attitude is a mood or emotional state that a pupil will have to learn and respond favourably to the subject matter. Olson and Zanna (1993, p.616) say that social psychologists define attitudes “as beliefs that predispose us to act and feel in a certain way.” Attitudes can be considered to be feelings or opinions we accept from the society or what we learn by observing and interpreting, which becomes part of our philosophy of life in reacting to the events or activities.

Fontana (1988, p.204) says, “Psychologists define attitude as the relatively enduring orientations that individuals develop towards the various objects and issues they encounter during their lives and which they express verbally as opinion. After going through a certain experience, one will develop a certain reaction or feeling towards an object or subject. This is what we can call a belief or values. Beliefs and values are very important in learning as they determine the type of attitude one will adopt.

Harlen (1997, p.39) says, “Pupils’ attitudes affect the willingness of an individual to take part in a certain activity and the way in which they respond to persons, objects, or situations.” The Mathematics teacher should be alert when presenting Mathematics concepts so that the pupils do not develop negative attitudes toward the subject. Learning cannot take place if the learners have negative attitudes, as they will not be willing to take part in the learning process, since the learning of Mathematics requires active participation by the learner.

2.5 How do we learn our Attitudes?

Olson and Zanna (1993, p.616) suggests that, “we learn them directly from our experiences and we learn them from others i.e., children who are bitten by dogs often carry a negative attitudes toward dogs for the rest of their lives, in contrast the sweet crunch of chocolate chip cookies generally lead to a favourable attitudes toward them.” A pupil will develop attitudes toward Mathematics during the learning process or experience. If a pupil faces unbearable challenges or through experiences failure, he/she might develop negative attitudes toward Mathematics but where the pupil experiences outright success, he/she will develop positive attitudes toward the subject. Some pupils developed negative or positive attitudes from what they heard in the social setting or parents.

Butler and Wren (1951, p.112) in support says, “the more fully students understand Mathematics the more they want to learn about it: lack of understanding leads to continued frustration and to negative attitudes, but understanding and successful experiences contribute powerfully toward the development of self confidence, pride in accomplishment, and desirable attitudes toward the work.” The Mathematics teacher should always prepare lessons so that the materials being delivered are suitable to the level of comprehension of the class and should present coherent, logical and meaningful concepts of the subject matter. There was a strong belief that pupils develop negative attitude from primary school due to the fact that most of the teachers

who teach at that level had no interest and had negative attitudes toward Mathematics. As a result of this tendency and experience, pupils at primary level emulated their teachers in having no interest and developing negative attitudes toward Mathematics. Bishop and Nickson (1985) says pupils who undergo such mathematical experience at primary level, their achievement or lack of it with respect to the subject, and attitudes, are likely to be entrenched by the time they enter Secondary School.

Berry and Marsh (2004) quotes Kenshaft (1991), who reports that parents' support or lack of it is an important component in pupils' attitudes and participation in Mathematics instructions. The parents should be made aware of the significant role they play in moulding their children's attitudes toward Mathematics, as it is believed to affect their learning and performance. Berry and Marsh quotes Dossey (1992), who considered teachers as having to play an important role in shaping pupils' attitudes toward Mathematics. This was in the way the teachers presented the learning materials and interacted with the learners. If the learning material and relationship with the teacher made pupils uncomfortable in learning Mathematics, they would develop negative attitudes toward the subject. It was the teacher's responsibility to ensure that all pupils were willing to learn the subject.

The teacher's way of managing a class may also be one of the causes of negative attitudes toward Mathematics. If he/she is very lenient, some intelligent and mischievous pupils would take advantage of him and lag behind due to continuous inattention and non-seriousness in checking their work. But if one was very strict and

gave heavy punishments unsparingly, some of the weak minded pupils would get disheartened and discouraged as they were often punished. These would start disliking the teacher and consequently the subject. Sidhu (2002) the teacher should never forget that his/her behaviour is very important.

By forcing pupils to do the exercise or homework, some teachers believe that they will develop interest and positive attitudes toward Mathematics. A conscientious teacher who believes in pressurising children to raise a certain education level or standard will conceivably do more long term harm to the progress of particular vulnerable children than a teacher who seems less conscientious and more inclined to let children find what is sometimes described as their own level of achievement. Most of pupils will end up disliking the teacher including the subject, Mathematics. (Fontana, 1988) pupils who cannot withstand this pressure of continuous failure to understand will end up having negative attitudes toward Mathematics and worse still dislike it, resulting in low achievement. It is important that the teacher tries to monitor the reaction of his/her pupils or find a more conducive method.

Berry and Marsh (2004) quotes Dwyer (1993) that attitudes have been found in recent research to have a significant effect on performance of pupils. It is important for teachers to inculcate positive attitudes in the pupils if achievement is to be improved or realized at school certificate level. “Unless we have the right attitudes toward what we are doing our performance will probably not represent our best” (Kundu and Tutoo, 2008, p.520). From the above statements on attitudes, it is evident that pupils’

attitude toward the subject, in this case mathematics, has a positive and negative effect on their performance. If pupils have negative attitudes toward learning, mathematics chances are very high that they might underperform. It might be assumed that pupils who are higher achievers probably have positive attitudes toward Mathematics. The assessment of the nature of interest and attitude pupils have in the study might help to explain why there is underperformance in mathematics in secondary schools in Eastern Province.

2.6 Studies on Interest and Attitudes

Mulendema (2007) in his research on the perception and attitudes of pupils toward learning Mathematics in the Copper belt of Zambia found that pupils had a positive perception and attitudes toward learning mathematics; and that pupils developed negative perception and attitudes due to the way teachers presented their lessons using expository methods most of the time. The excuse given by the teachers was that they did not have enough time to cover the syllabus or to use other methods of teaching. This research did not explain how attitudes and perception affect pupils in learning Mathematics but just identified the attitudes and perception pupils had in learning Mathematics.

Kalumbi (2005) studied the attitudes of primary school teachers towards teaching Mathematics in Kabwe district, Central Province. In his findings, he argue that basic school teachers had a negative attitudes toward teaching Mathematic since most of them had not done well in the subject at Grade 12. This finding might explain why

most of the pupils come to secondary schools with negative attitudes toward learning Mathematics as they inherit it from their teachers at this level. This assumption is supported by Goose et al. (2008, p.30) who quotes Van Oers (2001) who “proposes that this process begins with the teacher’s demonstration of mathematical attitude that is a unwillingness to deal with mathematical concepts and to engage in mathematical reasoning according to the acceptable values in the community ...” Berry and Marsh (2004) quotes a number of research findings related to attitudes. The following were some studies which the quoted with different factors affecting pupils’ attitude towards learning Mathematics, these include parents (Kenshaft, 1991), teachers (Doss, 1992), gender, ethnicity, cultural background and institution approaches (Hollowell and Duch, 1991; Hang and Waxman, 1993; Koller, Baumert and Schonbel, 2001; Leder and Forgasz, Murphy and Ross, 1990). Sanchez et al. (2004) quotes a number of research studies centred on students attitude towards learning Mathematics. Motivation and attitude were reported to affect student achievement (Cote and Levine, 2000; Singh, Granville and Dika, 2002) while teachers and academic level affecting students attitude (Tymm, 2001). These studies confirm that attitude of pupils affect pupils learning in this case the learning of Mathematics. The pupils’ attitudes as indicated here are affected by many factors, which need to be known by the subject teacher so that they address these anomalies affecting their learners.

2.7 SUMMARY

The literature review established what learning was in relationship with pupils learning Mathematics. Learning has to bring a change in how to do things and interact

with other people. It further explained what effective learning is all about in Mathematics Education which should bring pupils appreciation of Mathematics in their daily life. Interest and attitude were defined and an explanation on how they relate to the learning of Mathematics were given. Finally, the literature viewed the number of studies which were undertaken earlier on interest and attitudes. These reviewed studies have investigated what factors affect pupils' attitudes towards learning Mathematics. To my knowledge, the studies have not investigated the nature of factors affecting interest and attitude towards learning Mathematics in Eastern Province. The earlier studies have not shown how factors affect the relationship between interest and attitude in learning mathematics. Furthermore, these studies might have been done in urbanised parts of Zambia and of the world; their findings may not apply to Eastern Province. This study was done in secondary schools in Eastern Province which is less urbanised than the reviewed areas.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This section describes the research design employed, target population, sample size, sampling procedure, collection and analysis of data.

3.1 Research design

The research combined both quantitative and qualitative survey designs. Kombo and Tromp (2006, p.71) quotes Ordho (2003) that the survey design "... can be used when collecting information about people's attitude, opinion, habits, or any of the variety of education or social issues." The survey design is more appropriate for this study as it is investigating interest and attitudes of pupils in learning Mathematics in selected secondary schools in Eastern Province.

Achola and Bless (1990) also say that a survey focuses on facts, belief opinions, attitudes and behaviour pertaining to the existing situation and allows for changes in the course of study. It was for this reason that the survey was used. Hussey and Hussey (1988, p.155) say focus group discussions "...are used to gather data relating to the feeling and opinion of a group of people who are involved in a common situation." The quantitative data was obtained from the questionnaire and qualitative data was obtained from the open questions of the questionnaire and Focus Group Discussions with pupils' and teachers' interview.

3.2 Target population.

The population of study was 6580 Grade 10, 11 and 12 pupils and 295 Mathematics teachers i.e. 47 secondary schools in Eastern province.

3.3 Study Sample.

The study sample comprised a population of 120 pupils and 16 mathematics teachers from the four secondary schools two in Mambwe District, one Katete District and one Chipata District. The sample for pupils had an equal number of girls and boys (i.e. 60 of each). While the sample for teachers were all males. There were no female teachers in the sampled schools. This could have been as a result of most female teachers not taking up the challenge of teaching Mathematics.

3.4 Sampling Procedure

A stratified random sampling technique was used to ensure all grades 10, 11 and 12 pupils were equally represented for each selected secondary school. Hussey and Hussey (1988) says stratified sampling assisted to overcome situations where a section of the population was under or over represented. Each identified strata of the population was taken into account by stratified random sampling. According to Best et al. (2009, p.13), “At times it is advisable to subdivide the population into smaller homogeneous groups to get more accurate representation.”

Hunt et al. (2001, p.1) says, “Stratification is the process of dividing members of the population into homogeneous\ subgroups before sampling. The strata should be mutually exclusive: every element in the population must be

assigned to only one stratum. The strata should also be collectively exhaustive: no population element can be excluded. Then simple random sampling or Systematic sampling is applied within each stratum. This often improves the representativeness of the Sample by reducing sampling error. It can produce a weighted mean that has less variability than the arithmetic mean of a simple random sample of the Population.”

Each pupil in each grade was given a number as they appear in the register and cards were put in a box. Random sampling was then used for selecting pupils per each grade, thirty pupils were selected i.e. 5 boys and 5 girls for each grade (i.e. Grades 10, 11 and 12). Teachers were selected on purpose, that is, teachers offering Mathematics to grade(s) 10, 11 and 12. These were considered to be able to give the appropriate information required by the study. Best et al. (2009, p.19) says “Purposeful sampling allows the researcher to select those participants who will provide the richest information, those who are the most interesting, and those who manifest the characteristics of most interest to the researcher ”

Pilot Study.

A pilot study was carried out at one secondary school in Eastern Province. This involved 30 pupils and 8 teachers to ensure the questionnaires and focus group interview, validity and reliability. A pilot study was conducted “... to estimate the predictive validity of some type of questionnaires by follow up observations of respondent behaviour at the present time or at some time in future.”(Best et al, 2009)

3.6 Research Instruments.

The questionnaire was used to collect data from pupils and teachers. The study used a likert scale to collect the responses from the teachers and the pupils. The responses were in percentages and figures. There were five responses which were rated 1-5. For each view point, or statement favouring the given statement of why pupils lose interest and have negative attitude scores were given in the following way. For questionnaire or opinionaire with 14 statements, the outcomes were as follows:

$14 \times 1 = 14$ most supporting response (Lack interest or have negative attitude)

$14 \times 3 = 42$ Neutral response

$14 \times 5 = 70$ Most opposing response (Have interest and positive attitude)

Therefore, the scores of all individuals on interest and attitude were between 14 and 70. For statements supporting the view point why pupils lose interest and develop a negative attitude, the items were rated in a reverse order in the following way. Strongly agree 1, Agree 2, Uncertain 3, Disagree 4 and Strongly 5 (Best and Kahn, 2009, 331)

Where a questionnaire or opinionaire has opposing statements or items the following scores would be shown.

$14 \times 5 = 70$ most unfavourable response possible (Have interest and have positive attitude)

$14 \times 3 = 42$ A neutral response

$14 \times 1 = 14$ most favourable response (Not interest and Negative attitude)

Therefore, the scores of each individual on interest and attitude with favourable response fall less than 42. Above 42 is tending to be unfavourable to the given statement (Best et al, 2009).

A Focus Group Discussion was conducted with a group of ten pupils. For teachers, one teacher was interviewed at a time. An interview according to Romano et al. (1995, p.42) "...is a research method that involves studying people face to face and asking questions pre- prepared." Questions were asked to teachers and pupils and the responses were recorded word by word as they were given. This was to consolidate the information that was obtained from the questionnaires earlier on.

3.7 Data collection procedure

The research used two questionnaires, one for teachers and the other for pupils when collecting data. The questionnaires were administered to pupils with the help of Guidance Teachers, who were assisting in selecting pupils by allocating numbers as they appear in the register. The numbers were put in a small box by gender, and then randomly picked. The pupils were then assembled in a class. Then the instructions were read to the pupils and the purpose of the research was explained to them. The questionnaire had three parts, the first 14 questions were on interest and the second 14 were on attitude. The third had two questions with filling in the blank spaces. Teachers' questionnaires were administered through their HODs. The questionnaire for teachers had 19 questions and three questions with filling in the blanks. These were followed by 6 focus group questions for both pupils and teachers.

The researcher delivered the questionnaires, administered and collected them with the help of the Guidance Teachers who closely monitored the respondents. The teachers were given the questionnaire by their HODS. Then later after collection of the questionnaires, a focus group discussion was conducted with a group of 10 pupils. The responses were recorded verbatim. The same was done with the teachers although each teacher was interviewed separately. Responses were recorded as they were given on sheet of paper.

3.8 Analysis of Data

Data collected was analyzed in two ways. Data from the questionnaire (pupils and teachers) were analysed quantitatively and qualitatively. Qualitative data from the questionnaire (open ended questions) and focus group discussion were analysed by categorizing, describing and explaining. Quantitative data was analysed using simple statistical procedures like the mean, standard deviation, and percentages. It also involved simple diagrams like bar charts and frequency distribution tables.

3.9 Ethical concern

Permission was sought from the Provincial Education Officer and the District Education Board Secretaries for the concerned schools about this research. The Head teachers of the four high schools were also requested for permission. The aim of the study was clearly explained to both pupils and the teachers concerned. Each respondent was asked if they wanted to participate in the study or not. The informed

consent form was obtained from both teachers and pupils. The respondents were further assured to feel free to pull out of the study at any stage, as there would be no penalties.

CHAPTER FOUR

PRESENTATION OF RESULTS

4.0 Introduction

The presentation of the results was done question by question from pupils' questionnaire responses and teachers' questionnaire responses as shown in Table 4.0, 4.1 and 4.2 respectively. Responses from the Focus Group Discussions and Interviews questions were written exactly as they were .given by pupils and teachers.

4.1. Results of pupils' responses on interest in Mathematics.

The figure 4.0 shows the data collected from the questionnaire questions on the nature of pupils' interest toward learning Mathematics from all the four secondary schools.

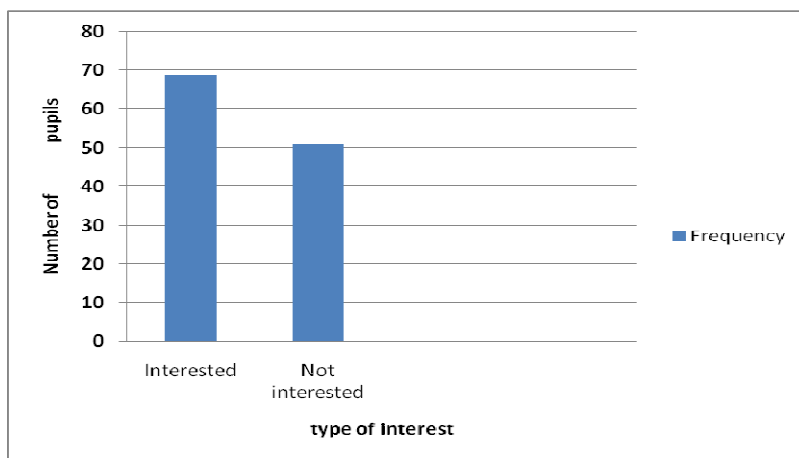


Figure 4.0 Comparison of pupils' interest in general.

There were 69 pupils with 57.5% who had 28 or less scores on the questions on interest (interested) and 51 pupils with 42.5% who had more than 28 scores on the questions on interest (not interested) for all the four selected secondary schools as shown in figure 4.0.

Table 4.0. Responses of pupils on interest in Mathematics

The table 4.0 shows the responses from the questionnaire questions on interest from all the 120 pupils. These are showing the responses obtained from each question.

S/N	STATEMENT	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
01	I like Mathematics	70(58.3%)	41(34.2%)	5(4.17%)	1(0.8%)	3(25%)
02	Mathematics is difficult to follow	34(28.3%)	52(43.3%)	14(11.7%)	15(12.5%)	5(4.17%)
03	I enjoy learning Mathematics	65(54.2%)	41(34.2%)	7(5.83%)	4(3.33%)	3(25%)
04	When it is Mathematics period, I feel like dodging or studying another subject.	65(54.2%)	35(29.2%)	7(5.83%)	7(5.83%)	6(5%)
05	I do not feel like doing the Mathematics homework most of the time	51(42.5%)	47(39.2%)	6(5%)	11(9.2%)	5(4.2 %)
06	I like practicing Mathematics with friends.	58(48.3%)	51(42.5%)	2(1.67%)	5(4.17%)	4(3.3%)
07	When I get low marks in Mathematics, i feel very bad.	84(70%)	29(24.17%)	1(0.83%)	1(0.83%)	5(4.17%)
08	I will study Mathematics in future.	42(35%)	22(18.3%)	20(16.7%)	21(17.5%)	15(12.5%)
09	I spare sometime studying Mathematics	41(34.2%)	47(39.2%)	17(14.2%)	8(6.7%)	7(5.8%)
10	I encourage my friends to learn Mathematics.	53(44.2%)	55(45.8%)	6(5%)	4(3.3%)	2(1.7%)
11	I like sharing Mathematics concepts with fellow pupils	47(39.2%)	56(46.7%)	9(7.5%)	3(5%)	2(1.7%)
12	I easily understand mathematics concepts in Mathematics lesson	33(27.5%)	47(39.2%)	15(12.5%)	18(15%)	7(5.8%)
13	I like listening to and watching Mathematics lessons on T.V and Radio.	33(27.5%)	39(32.5%)	13(10.8%)	24(20%)	11(9.2%)
14	I enjoy participating in Mathematics quizzes.	37(30.8%)	29(24.2%)	17(14.5%)	24(20%)	13(10.8%)

The responses are arranged in five options that is strongly agree, agree, uncertain, disagree and strongly agree as shown above.

The figure 4.1 shows the comparison of pupils' responses from the questionnaire questions on pupils' interest in learning Mathematics. Those who are interested and not interested in rural and urban Secondary Schools in Eastern province.

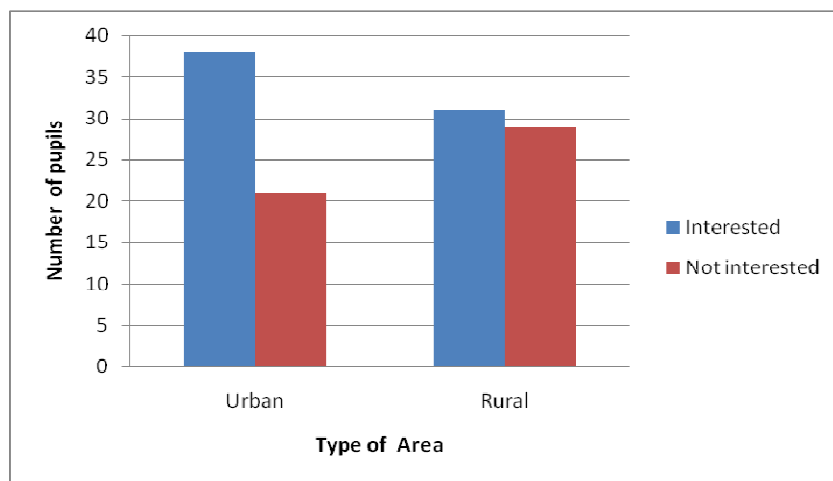


Figure 4.1. Comparison of pupils' interest in rural and urban schools

The results on interest in learning Mathematics for rural schools indicated that 31 pupils representing 51.7% had interest and 29 pupils representing 48.3% had no interest in learning Mathematics. While the urban schools indicated 38 pupils, representing 64.4% had interest and 21 pupils or 35.6% had no interest in learning Mathematics. The results show that both urban and rural pupils have interest in

learning Mathematics although the urban schools had more interest in learning Mathematics than the rural schools as shown in figure 4.1

4.2 Responses of pupils on attitude towards learning Mathematics.

The figure 4.2 shows the pupils' responses from the questionnaire questions on attitudes of pupils toward learning mathematics in the four Secondary School under the study. The figure shows those pupils with negative attitudes and positive attitudes toward learning Mathematics.

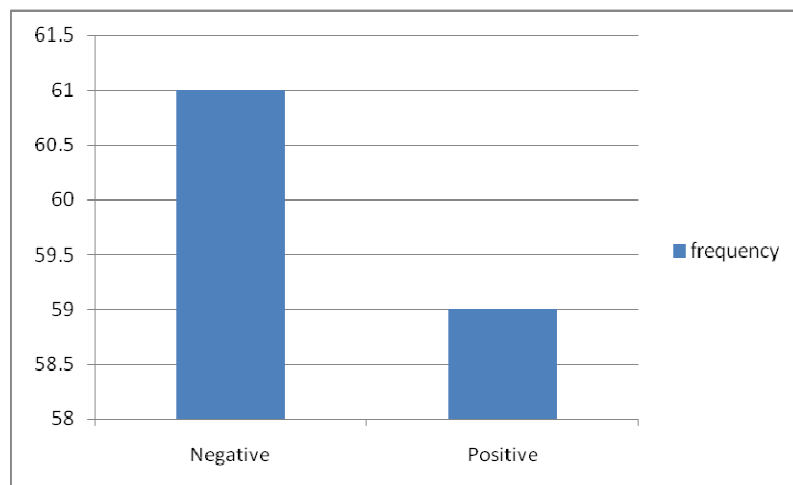


Figure 4.2 Comparison of pupils' attitudes.

The findings in figure 4.2 on attitudes show that there were 61 (50.8%) pupils who scored 28 and above indicating negative attitudes and 59 (49.2%) pupils who scored below 28 indicating positive attitudes.

The figure 4.3 shows the comparison of pupils' responses on attitudes toward learning Mathematics between rural and urban Secondary Schools showing that pupils in rural areas have few pupils with positive attitudes toward learning mathematics than urban schools. The figure shows that pupils from the rural schools have the highest number of pupils with negative attitudes toward learning mathematics than the urban schools.



Figure 4.3 Comparison of pupils' attitude in rural and urban secondary schools

The figure 4.3 show that rural schools had 24 (40%) pupils who had positive attitudes and 36 (60%) pupils who had negative attitudes toward learning Mathematics. For the urban 35 (58.3%) pupils had positive attitudes and 25 (41.7%) pupils had negative attitudes toward learning Mathematics? These differences in response of pupils' attitudes between rural and urban secondary schools may be assumed to be influenced by the area where the pupils reside.

The table 4.1 shows the responses to the questionnaire questions investigating pupils' attitudes toward learning Mathematics. The table has the figures showing what pupils score which were further translated into percentage.

Table 4.1 Responses of pupils on attitudes questions from the Questionnaire.

S/N	STATEMENT	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
14	I passed Mathematics at Grade 9	58(48.3%)	31(25.8%)	1(0.83%)	19(15.8%)	11(9.2%)
15	The Mathematics teacher is unfriendly	73(60.8%)	33(27.5%)	1(0.83%)	12(10%)	1(0.83%)
16	Mathematics should not be compulsory	60(50%)	19(15.8%)	6(5%)	15(12.5%)	20(16.7%)
17	Given a choice between going for sports or working at Mathematics project I would choose to do Mathematics	49(40.8%)	50(41.7%)	8(6.7%)	11(9.2%)	2(1.7%)
18	Mathematics is a difficult subject to understand.	40(33.3%)	42(35%)	13(10.8%)	15(12.5%)	10(8.3%)
19	If a question is written on the board, I can volunteer to solve it.	32(26.7%)	61(50.8%)	10(8.3%)	14(11.7%)	3(2.5%)
20	I always request for Mathematics textbooks during my free time.	37(30.8%)	43(35.8%)	11(9.2%)	19(15.8%)	10(8.33%)
21	My parents consider Mathematics as a least important subject	53(44.2%)	19(15.8%)	7(5.83%)	15(12.5%)	41(34.2%)
22	Mathematics demands a lot of my time for study.	28(23.3%)	41(34.2%)	5(4.2%)	25(20.9%)	1(0.83%)
23	Mathematics is one of the subjects I would like to pass at Grade 12.	90(75%)	25(20.8%)	1(0.83%)	3(2.5%)	1(0.83%)
24	I do not like any activity involving Mathematics	58(48.3%)	36(30%)	7(5.8%)	12(10%)	7(5.8%)
25	I do not value Mathematics in my academic life.	64(53.3%)	35(29.2%)	11(9.2%)	6(5%)	4(8.33%)
26	Mathematics should only be for the few intelligent pupils	83(69.2%)	25(20.8%)	3(2.5%)	3(2.5%)	6(5%)
27	Some topics should be removed from the syllabus.	43(35.8%)	23(19.2%)	14(11.7%)	20(16.7%)	20(16.7%)

The response from the question Mathematics teacher is unfriendly show that the teachers are still unfriendly. While the question my parents consider Mathematics as a least important subject. Shows that parents influenced pupils attitude toward learning Mathematics. The 99 pupils indicated that they do not value Mathematics in their academic life. This shows how pupils have strong negative attitudes toward the subject.

4.3 Pupils responses from Focus Group Discussion.

This section presents the discussion findings conducted with 6 groups of 10 pupils in each of the four Secondary Schools on what they felt made pupils lack or have interest in learning Mathematics. It also presents what they thought made them have positive or negative attitudes toward learning Mathematics.

QUESTION 1.*What do you think makes pupils lack interest and develop negative attitudes toward Mathematics?*

Common Responses:

“Pupils lose interest and develop negative attitudes toward Mathematics because of our Mathematics teacher who is very fast, harsh, not willing to answer questions.”

“The school has no textbooks for practising on our own”.

“Our school has no Mathematics club to seek help.”

“Mathematics club is only for these who are good in Mathematics.”

“How do I become interested in mathematics if i cannot understand?”

QUESTION2 *Do you enjoy learning Mathematics?*

Common Responses:

“The teacher is harsh and not willing to answer question we ask.”

“When we ask he says these are simple use your brain...”

“I am unable to follow what the teacher is teaching.”

“The teacher comes late and is often absent therefore I fail to connect what I learnt before and now as I forget...”

QUESTION 3 *Which topic(s) don't you like learning in Mathematics and why?*

Common Response:

“I do not like Earth Geometry, Probability, Transformation and Trigonometry. The topics are difficult and I am unable to understand or follow, the teacher equally struggles to explain them.”

QUESTION 4 *What can be done so that pupils have interest and develop positive attitudes toward Mathematics?*

Common Responses:

“Government should send degree holders teachers in schools.”

“Government to send many text books for pupils.”

“They should remove difficult topics in Mathematics.”

QUESTION 5 *Who influences your interest and attitudes toward Mathematics?*

Common Responses:

“My parents influence my interest and attitudes toward Mathematics as they encourage/ discourage me that Mathematics is not/ important.”

4.4 Mean and Standard Deviation of the interest and attitudes for all the four Secondary Schools.

The total population of 120 pupils had the mean interest of 27.3 and standard deviation of 8.22. The mean score for interest showed that pupils had a weak interest in Mathematics though there was a large variation between these scores as shown by the large standard deviation. The mean attitude score was also 26.8 and standard deviation was 7.7. The mean score on attitudes indicated that pupils had positive attitudes toward Mathematics but weak scores had large variations.

4.5 Responses from the teachers’ questionnaire.

The questionnaire was designed to investigate how teachers taught and interacted with pupils in their Mathematics lessons. The results from the teacher questionnaires are shown in a frequency Table 4.2 below. These were the cumulative responses from teachers’ questionnaire. The responses between 38 to 95 points indicated poor method of teaching and poor interaction with pupils; 19 to 38 points indicated good classroom management and good rapport with pupils during lessons. In general, as shown, in Table 4.2 below, teachers in the four secondary schools had their responses between 38 and 95 showing poor management of classrooms and poor rapport with pupils

during lessons. This might be what was contributing to pupils losing interest and developing negative attitudes toward mathematics.

Table 4.2 Cumulative teachers' responses.

The table shows the total scores the 16 teachers obtained from their questionnaire of the 4 secondary schools with the mean and standard deviation.

SCHOOL	TR1	TR2	TR3	TR4	MEAN	S.D
A	40	56	45	49	47.5	6.8
B	48	52	50	53	50.8	5.0
C	50	53	49	48	50.0	4.8
D	66	50	56	4	54.5	6.6

TR- Represent a Teacher

The mean for individual schools showed that their responses ranged between 47 and 55, and standard deviation from 5 to 7 as shown in Table 4.2 above. The responses were graded as indicated on the likert scale with five choices. The responses were from 16 teachers. The responses were designed to investigate the teachers' interaction with pupils and the pedagogical skills used.

Table 4.3 Teachers responses to the questionnaire questions

The table 4.3 shows the teachers' responses from the 19 questionnaire questions on aspects of teaching and pupils' interest and attitudes toward learning Mathematics. The

teachers' responses from the questionnaire questions had five options that is strongly agree, agree, uncertain, disagree and strongly disagree .The responses were obtained using the likerts scale with the figures being translated into percentages for easy

S/N	QUESTIONS	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
01	Pupils develop negative attitude in learning Mathematics due to the way it is taught at high schools	4(35.3%)	7(58.3%)	0(0%)	1(8.33%)	0(0%)
02	I provide remedial work to backwards pupils	3(25%)	5(41.7%)	1(8.33%)	1(8.33%)	2 (16.8%)
03	Most of my teaching method is teacher exposition	3(25%)	7(58.3%)	1(8.33%)	1(8.33%)	0(0%)
04	Pupils lack interest in Mathematics due to most of it being abstract and not easy to follow.	2(16.7%)	2(16.7%)	1(8.3%)	6(50 %)	1(8.3%)
05	There are some topics in Mathematics which are difficult to teach	1(8.33%)	6(50%)	1(8.3%)	3(25%)	1(8.3%)
06	Mathematics should not be compulsory	10(83.3%)	1(8.3%)	0(0%)	0(0%)	1(8.3%)
07	I always go through the exercise and home work with pupils.	4(33.3%)	6(50%)	0(0%)	0(0%)	2(16.7%)
08	I punish pupils who fail a test or home work	2(16.7%)	2(16.7%)	2(16.7%)	5(41.7%)	1(8.3%)
09	We have an active Mathematics club in school	1(8.3%)	5(41.7%)	2(16.7%)	2(16.7%)	2(16.7%)
10	I enjoy teaching Mathematics in all the Grades (i.e. 10,11& 12)	8(66.7%)	3(25%)	0(0%)	0(0%)	1(8.3%)
11	Pupils lack of interest and negative attitude toward Mathematics is due to parents	0(0%)	1(8.3%)	6(50%)	4(33.3%)	1(8.3%)
12	Pupils lack of interest and negative attitude toward mathematics is due to Mathematics teachers	0(0%)	2(16.7%)	5(41.7%)	5(41.7%)	0(0%)
13	Pupil's lack of interest and negative attitude toward Mathematics are the main cause of poor performance at school certificate.	7(58.3%)	4(33.3%)	0(0%)	0(0%)	1(8.3%)
14	Pupils lack interest and develop negative attitude toward Mathematics from basic schools.	4(33.3%)	5(41.7%)	2(16.7%)	1(8.3%)	0(0%)
15	I do not punish pupils who dodge my lessons.	7(58.3%)	5(41.7%)	0(0%)	0(0%)	0(0%)
16	The pass% in Mathematics is low compared to other subjects in this school.	4(33.3%)	5(41.7%)	0(0%)	3(25%)	0(0%)
17	Pupils fail Mathematics due to lack of textbooks	1(35.3%)	7(58.3%)	0(0%)	1(8.3%)	0(0%)
18	Pupils find Mathematics difficult at high school due to poor background from basic schools	5(41.7%)	7(58.3%)	0(0%)	0(0%)	0(0%)
19	I try to improve the interest and attitude of my pupils i teach?	6(50%)	5(41.7%)	1(8.3%)	0(0%)	0(0%)

comparison.

4.6 Do pupils who fail Mathematics at grade 9 improve?

The responses by teachers from an open questionnaire question on whether pupils who failed Mathematics at Grade 9 improved were distributed and the responses were as follows; 7 indicated that they did not improve, while 5 indicated that they improved. The responses from the Mathematics teachers' questionnaire were not adequate to give a conclusive statement on whether the pupils improve or not therefore, there is need for an independent research to be carried out.

4.7 Teachers' responses from focus group interviews.

The interview questions were categorised in three groups:

QUESTION 1 *What do you think makes pupils lack interest and develop negative attitudes toward Mathematics?*

Common Responses:

“The pupils lack interest and develop negative attitudes toward Mathematics because of failing to seek clarification from the teacher and peers when they are faced with challenges.”

QUESTION 2 *What method do you mostly use in teaching Mathematics and why?*

Common Responses:

“The method I mostly use is the teacher exposition method as it makes me cover enough work in the period. If I use teacher centred method the children we have will delay me. When you ask them, a question they will be quiet no response for some time, therefore the lesson would not be complete. The coverage of the syllabus will be impossible.

QUESTION 3 *Do you enjoy teaching all the topics in Mathematics? If no, which one do you find boring?*

Common Responses:

“I enjoy teaching most of the topics but some are abit challenging as we did not learn them at school and college (Earth Geometry).”

“We lack textbooks for reference to explain most of these topics.”

QUESTION 4 *Do you offer remedial to backwards pupils?*

Common Responses:

“We do not offer remedial lessons because they are a lot of activities we are involved in, like CPD and other co-curriculum activities.”

“Pupils themselves fail to come for consultation when we are free.”

QUESTION 5 *How can you help pupils who have no interest or develop negative attitudes toward Mathematics?*

Common Responses:

“Pupils can be helped to understand concepts they do not understand. This is by offering extra lessons. You can also help by offering remedial work and praising them if they are signs of improvement.”

QUESTION 6 *What do you think makes pupils to under achieve in Mathematics?***Common Responses:**

“Pupils under achieve because of lack of interest and negative attitudes toward the subject.

4.8 SUMMARY

The chapter presents the results from the questionnaire questions on pupils’ responses on interest and attitudes toward learning Mathematics. The results were first combined, and then separated, in rural and urban Secondary Schools. This was meant to compare the nature of pupils’ interest and attitude in rural and urban Secondary Schools. Focus group discussion and interview were also presented in interest and attitudes of pupils toward learning Mathematics. Mean and standard deviation of pupils’ interest and attitudes for all the four Secondary Schools was shown. Teachers’ questionnaire questions responses were also presented showing how teachers taught and interacted with pupils in their Mathematics lessons.

CHAPTER 5

DISCUSSION OF FINDINGS

5.1.0. Introduction.

The chapter discusses pupils' responses to the nature of pupils' interest and attitudes towards learning mathematics and Focus group discussion. It then discusses the responses of the teachers on interest and attitude of the pupils and Focus Group Interview. Finally discussion on the factors affecting pupils' interest and attitude towards learning Mathematics.

5.1.1. The pupils' interest in learning Mathematics.

The combined results of the pupils' questionnaire on interest towards learning Mathematics from the four Secondary Schools showed that the pupils had interest. A comparison of rural and urban Secondary Schools show that pupils from urban Secondary Schools have more pupils with interest in learning Mathematics than those with no interest. While the rural Secondary Schools on the other hand have more pupils with no interest than those with interest. This may indicate that they are certain contributing factors which may prompt such a situation in rural schools. The schools in rural areas may lack facilities or activities which may arose interest in Mathematical concepts. The teachers' responses from the questionnaire show that pupils had no interest. The pupils may have had interest in learning Mathematics as they indicated but this may have been altered due to the challenges they faced in understand the

Mathematics concepts and their poor performance in Mathematics. The teachers may have shown that pupils had no interest in learning Mathematics by the way they responded to them during Mathematics lessons and their poor performance, which may be due to failure to understand the concepts and skills being delivered in a lesson. The pupils' lack of interest could have been avoided if the Mathematics teachers assisted the pupils to understand the mathematics concepts or help them develop mathematical reasoning and logic.

5.1.2. The Mean and Standard Deviation of the Pupils' responses on Interest in Mathematics.

The mean of the pupils' responses on interest in Mathematics showed that pupils had interest but was rather weak. Butler and Wren (1951, p.109) say "... students will work most diligently and most effectively at tasks in which they are genuinely interested." A pupil who is interested in a given lesson will strive willingly, will also more likely participate and will be very attentive to all the concepts being delivered by the teacher. The pupils' interest in Mathematics was weak therefore; it may have affect the learning of the subject. This may in turn have also affect pupil's performance in Mathematics. The standard deviation was 8.22 showing that there was a large difference between the pupils' scores. This difference may be assumed to have been as a result of a multi-social and multi-economic background of the selected pupils and selected schools that are urban and rural schools. Kelly and Kanyika (2000) in their study of children observed that children who went through pre-school performed significantly higher on Mathematics achievement test than their friends in control group. This could be assumed that lack of this profession in rural areas could

affect the pupil's interest and attitude bringing up this difference. The 29 pupils of rural schools lack interest and 38 pupils in urban areas were interested in Mathematics.

5.1.3. Pupils' Focus Group Discussion on interest in learning Mathematics.

The Focus Group Discussions also showed that pupils had interest in learning Mathematics. The interest was only affected by the way teachers conducted themselves in Mathematics lessons. Pupils mentioned instances where a teacher was very fast and refused to answer their questions. Sometimes a teacher rebuked pupils who gave wrong answers especially the girls. The pupils gave the following statements "The teacher is harsh and not willing to answer questions we ask." and "When we ask he says these are simple use your brain..." Teachers support could have been one of the factors that affected pupils' motivation to learn. Security is described by the teachers' behaviour indicated by open communication and a sense that children needed support and help to be felt fulfilled (Pianta and Mumetz, 1991). Teachers had a direct effect on pupils' motivation to learn (Khanus, Dukmak and Ehoweris, 2008). It indicates that most of the activities of the teacher which were done in the classroom had effects (negative effect or positive effect). Pupils were therefore discouraged and lost interest with teachers' activities. Howson (1975, p.45) advised that "the training of teachers of Mathematics at all levels is subjected therefore to two strong pressures that is; must alter the Mathematical knowledge with which it equips intending teachers and it must show them the new insight into how children learn Mathematics and how such learning can be introduced." The teachers of Mathematics needed to change their approach to the subject to help the pupil considering the nature

of the subject which was challenging and required a lot of Mathematical reasoning and logic.

5.1.4. The Teachers' Focus Group Interview on pupils' interest in learning Mathematics.

During the teachers interviews it was found that 108 pupils in the secondary schools had interest in learning Mathematics except that they were said to be lazy to ask for assistance when faced with challenges and failures. It was further established that it was only the 12 who failed to hand in or write Mathematics exercises, homework and tests that had shown to have had no interest. These 12 pupils were believed to have lost interest due to their perpetual failure to grasp mathematical concepts and the teachers' failure to help them. Their lack of interest was alleged to be worsened if they did not consult friends or teachers or no remedial lesson came their way. Some teachers felt this lack of interest was influenced by pupils' parents and other subject teachers' comments about Mathematics as being a difficult subject. These comments convinced pupils that Mathematics is a difficult subject to learn and not important. The teachers in the focus group interview revealed that pupils had interest but lost it due to failure to understand Mathematics concepts. The teachers should endeavour to clarify, simplify or make pupils understand the concepts being delivered so that pupils can maintain their interest towards Mathematics. The teacher needs to convince pupils to learn Mathematics by arousing interest and initiating positive attitudes to the learners.

5.2.0 The pupils' attitudes towards the learning of Mathematics.

An analysis of the pupils' responses to the nature of attitudes toward learning Mathematics showed that they had negative attitudes. The negative attitudes were more prominent in rural secondary schools than in urban secondary schools. It can be argued that the differences might be due to social - economical status. Scholars like (Epstein, 1987) have showed that parents with higher socio-economic status are more involved in their children's education than parents of lower socio-economic status. This greater involvement results in development of positive attitudes of children towards learning including Mathematics. It is believed that low socio-economic status negatively influenced pupils' attitude, in part, because it prevents students from accessing various educational materials and resources, and creates a distressing atmosphere at home (possible disruptions in parenting or an increased likelihood in family conflicts) (Majoribank, 1996).

Rummel (1976) says attitude and interest are somehow related to each other in that one is considered to stimulate the other. Interest, it is believed to be an inner emotional feeling that propels pupils' attitudes which is expressed in their behaviour or action. Since the pupils have less interest in learning Mathematics, they may pay little or no attention to the learning of Mathematics. Rummel (1976) further considers interest as the strength of attitude.

Finally, he said that interest has a strong motivating influence of initiating activities towards the realization of goals and thus the gratification of the needs or wishes. The

pupils had less or no interest as observed from their overall responses, it was not surprising that they developed a negative attitude as interest plays a major role in determining a person's attitude as elaborated by Rummel. The results suggest that pupils had negative attitudes towards learning mathematics due to their weak interest as shown by the mean interest.

5.2.1. The Mean and Standard Deviation of Pupils' responses on attitudes.

The pupils' questionnaire scores scale was designed in such a way that the pupils whose scores were between 14 and 42 showed pupils who had positive attitudes, while those with scores from 42 to 70 showed pupils who had negative attitudes. The combined results of the four schools showed that the mean attitude score was 26.8. The interpretation of these results is that pupils had negative attitudes toward learning Mathematics as their scores were closer to the middle (28 the middle score) of the scale instead of the top (14). If the pupils had positive attitudes, their mean scores of attitudes would have been closer to 14 (the top score).

This was again assumed to have been one of the reasons why pupils' achievement was unsatisfactory in Mathematics at School certificate. The negative attitudes towards learning Mathematics could have been perpetuated by the teachers who were not effectively facilitating the learning of Mathematics and meeting the needs of pupils in the Secondary Schools. Van oer (2009) quoted by Goose et al. (2008, p.30) concurred with that assumption when he said "this process begins with the teachers demonstration of a Mathematical attitudes that is willingness to deal with

mathematical concepts and to engage in mathematical reasoning according to the accepted values in the community and consequently from the teachers mathematical expectations about the learners activity.” The teachers were unable to portray these attitudes to the pupils, instead were not committed to the learners of ensuring that the pupils had grasped the concepts and to assist the slow learners.

The other thing the teachers needed to ensure was to make Mathematics relevant to social and economic activities in the area where pupils reside or learn. Goose et al. (2008, p.16) quoted Cunningham (2006) the director of the Australian Council for Education Research (ACER) who said that the current challenges for Mathematics teaching was that the Mathematics curriculum needed to be more relevant because many secondary students felt alienated from Mathematics classrooms. This could be one of the reasons why the pupils lacked the interest and developed negative attitudes toward learning Mathematics, as they could not visualise any relevance of mathematics in their area where they reside and situation in life.

Kundu and Tutoo (2008) said interest was a feeling side of attention or the affective accompaniment of attention. A pupil will pay attention when he/she is interested in the subject or activity. Therefore, the lack of it might develop into the lack of attention. Kundu and Tutoo (2008) further said that interest is an objective sphere which emphasises the motor behaviour of an individual which is attitude of an individual. Attitude is the one which makes an individual to act or behave in a particular way.

Di Martino and Zain (2002) said that a positive attitude and interest toward learning Mathematics reflected a positive emotional disposition in relation to the subject and, in a similar way, a negative attitude or lack of interest toward learning Mathematics relates to a negative emotional disposition. It is for this reason that positive attitudes and interest of learning Mathematics are desirable since they may influence ones' willingness to learn and also the benefits one can derive from Mathematics instructions despite the challenges they may face in solving Mathematical problems.

5.2.2. Pupils' Focus group discussion responses on their attitudes toward learning Mathematics.

In the Focus group discussions pupils showed positive attitudes towards learning Mathematics. A number of them pledged to study Mathematics in future but were discouraged by lack of assistance to learn Mathematics from the Mathematics teachers. Pupils indicated that they enjoyed learning Mathematics as it helped them solve problems in other subjects where calculations are involved like Geography, Physics and Chemistry. The pupils felt that if they were taught by graduate teachers they would have no problems in assimilating Mathematics concepts as their current teachers failed to explain clearly certain concepts as they felt they had less mathematical knowledge. The 10 (85.8%) of the pupils indicated that they would like to get good results in Mathematics at all costs as higher institutions demanded for good Mathematics results. The discussion with pupils revealed that pupils had positive attitudes toward learning Mathematics but were let down by the Mathematics teachers' failures to explain and interact competently to meet their needs.

5.2.3. The teacher's Focus group interview findings on pupils' attitudes toward learning Mathematics.

The interview established that pupils had positive attitudes toward learning Mathematics, just like interest, they developed negative attitudes due to failure to follow Mathematics lessons due to Mathematics teachers' poor methods and rapport. Ngala (2005) complained that in most African countries several Secondary Schools lacked well qualified Mathematics teachers, often teachers who never trained as Secondary Teachers were forced to teach Mathematics at this higher level. The lack of adequate content in Mathematics might force teachers to be unfriendly in Mathematics lessons triggering negative attitudes. When pupils' efforts to overcome challenges in Mathematics were unsuccessful then pupils developed a negative attitudes toward learning Mathematics; teachers felt that at times there was need to provide an opportunity for success and help pupils who lag behind to cultivate positive attitudes toward learning Mathematics. The teachers blamed each other for failure to cultivate the positive attitudes into pupils in the way they conducted their lessons and behaved in the Mathematics lessons. Some teachers enjoyed seeing pupils struggling to learn Mathematics concepts which contributed to some of the pupils developing negative attitudes toward learning Mathematics.

5.3.0. Teachers' views on pupils' attitudes toward Mathematics.

The teachers in their responses showed that pupils had negative attitudes toward learning of Mathematics. The teachers' responses showed that the Secondary School

pupils had negative attitudes toward learning Mathematics. The pupils did not pay attention and were not willing to do any exercises and tests. The teacher questionnaire was meant to investigate how teachers conducted their lessons and to obtain teachers' views on why pupils developed negative attitudes toward the learning of Mathematics. The 11 (93.6%) teachers indicated that pupils' negative attitudes were the cause of low achievement. The 11 (93.6%) of the teachers indicated that pupils develop negative attitude due to the way Mathematics was taught in Secondary Schools and the 10 (83.3%) teachers used expository methods to teach Mathematics. The teacher responses for the four Secondary Schools were between 38 and 95 which showed poor management of the classrooms and poor rapport with pupils during lessons. These teachers' responses are evident that teachers had poor classroom management in terms of teaching and pupils' interaction, which might have contributed to pupils' lack of interest and negative attitudes toward learning Mathematics. This was supported by Opolot-okurut (2010) that teachers should pay attention to their classroom environment and change them. The teachers need to assess their classes to ensure they are conducive for learning and change them to motivate the learning process. Meece, et al.(2006) added saying considerable evidence suggest that elementary and secondary students show the most positive motivation and learning pattern when their school (classroom) setting emphasise mastery, understanding, and improving skills and knowledge.

5.4.0. Factors affecting pupils' interest and attitude towards learning

Mathematics.

A number of factors affecting pupils' interest and attitudes were identified by scholars such as (Kenshaft, 1991) and (Doss, 1992). This research has identified five factors. These are the Mathematics teachers, the parents, lack of Mathematics textbooks, poor background from primary school and the environment where a pupil resides.

Nicolaido and Philippou (2003) showed that negative attitudes and lack of interest were the result of frequent failure or problems when dealing with Mathematics tasks and these negative attitudes and lack of interest may become relatively permanent. According to these authors, when children first go to school usually, they have interest and positive attitudes towards Mathematics. However, as they progress, their interest and attitudes become less and eventually become negative at Secondary School. These sentiments show that teachers influence the pupils' interest and attitudes in the way they deliver their Mathematics lessons.

The study established that Mathematics teachers contribute to pupils' losing interest and developing a negative attitude. The methods they use left the majority of pupils not understanding Mathematics concepts. During the Focus group discussion, pupils stated that, their teachers used expository methods of teaching. During this time, they were not allowed to ask questions but just listened to the teacher. Later on, they were given an exercise to do. The majority of teachers agreed to having used teacher expository methods alleging that the syllabus was too long to be covered using other methods. These results showed that most of the teachers used this method making it difficult for pupils to follow the Mathematics lessons. The failure to follow the lessons

meant pupils therefore lost interest and developing negative attitudes. When pupils lack interest and have negative attitudes toward learning Mathematics might they may have low achievement or poor performance in the subject.

Aunola et al., (2006) has shown that teachers' goal may influence child motivation (interest) and attitudes not only through their instructional practices and the tasks they propose to students but also through the messages, they send out about learning in general. These are seen as self determinate and students feel competent; intrinsic motivation can increase and this may also promote positive attitudes toward Mathematics. A teacher who is supportive to students, who shapes students expectations about learning in a positive way, who sets meaningful tasks which are somewhat, but not excessively challenging and promotes cooperative learning environment will probably stimulate intrinsic motivation in their students and as a corollary may contribute to the development of more positive attitudes toward learning Mathematics.

Bransford et al. (2000) said that teachers not only need knowledge of a particular subject matter but also need to have pedagogical knowledge and knowledge of their students. Teachers' competency in these areas is closely linked to students' thinking, understanding and learning in Mathematics education. There is no doubt that student achievement in Mathematics education requires teachers to have a firm understanding of the subject domain and the epistemology that guides mathematics education as well as an equally meticulous understanding of different kinds of instructional activities

that promote student achievement. Competent Mathematics teachers provide a roadmap to guide pupils to an organised understanding of Mathematical concepts, to reflective learning, to critical thinking, and ultimately to mathematical achievement.

In the focus group teacher interview, teachers attributed pupils' lack of interest to their failing to seek clarification from teachers and their peers on concepts which seemed challenging in Mathematics. They disagreed with pupils that they refused to answer questions asked by pupils in class during Mathematics lessons. The other issue brought in was the issue of negative comments, Mathematics teachers levelled against pupils who seemed not to do well, especially the girls. According to Nicolaidou and Philippou (2003), there are a number of factors which can explain why interest and attitudes towards learning become more negative with the school pupils, such as the pressure to perform well over demanding tasks, uninteresting lessons and less than positive attitudes on the part of the teachers.

The responses from the teachers and pupils had shown that parents influenced the pupils' interest and attitudes toward learning Mathematics. The pupils and teachers agreed that parents influenced the pupils' interest and attitudes toward learning Mathematics. Sidhu (2002) said comments which parents utter unknowingly about Mathematics resulted in pupils losing interest and developing negative attitudes toward learning Mathematics. Parents who have had no interest and had negative attitudes toward Mathematics during their school days may influence their children's interest and attitudes toward learning Mathematics. Goose et al., (2008) quoted Ewing

(2004) and Horne (1998) who said adults developed negative attitudes toward Mathematics due to their past school experience which they may use to influence their children to lose interest and develop a negative attitude towards learning Mathematics.

The lack of essential learning materials like textbooks for reference and practice is one of the factors noted to affect pupils' interest and attitudes toward learning Mathematics. The Teachers suggested that pupils might develop interest and positive attitudes if they have textbooks for reference and practicing. Lack of books might bring discomfort and results in loss of interest and negative attitudes toward learning Mathematics. In the focus group discussion, pupils also emphasised the need to have textbooks especially where they were lacking. Pupils even suggested that teachers should produce pamphlets with past examinations papers with solutions for their practice.

The environment where a pupil resides was also a factor as it was observed by the differences in interest and attitude between rural and urban secondary schools. The rural secondary school pupils showed lack of interest and negative attitudes toward learning Mathematics. Pupils in urban areas showed interest and positive attitude. Studies have shown that parents with a high socio-economic status are more involved in their children's education than parents of the lower socio-economic status. This greater involvement results in the development of positive attitudes and interest by children towards learning Mathematics in school and enhancement of academic achievement (Epstein, 1987).

The pupils' poor background from primary school was identified in the study to affect their interest and attitudes towards learning Mathematics in secondary school. Pupils from basic school need to be assisted to have the arithmetic ability or mathematical reasoning including skills such as manipulating Mathematical knowledge and concepts in ways that transform their meaning and implication. This could allow the pupils to interpret, analyse, synthesize, generalize, or hypothesize the facts and ideas of Mathematics. Pupils at this level should have developed the arithmetic ability or Mathematical reasoning so that they are able to solve complex problems, discover new meaning and understand then arrive at logical conclusions. For pupils to learn Mathematics they need to have interest and a positive attitude. The presence of these two will motivate the pupils, as Mathematics requires reasoning, making interpretations, and solving problems, Mathematical issues and concepts. The challenges of Mathematics learning for today's education are that it requires disciplined study, concentration and motivation. To meet these challenges learners must be focused and motivated to progress. This requires pupils having interest and positive attitude. The teachers' main instructional task in class is to create a learning environment where pupils can be engaged in Mathematical thinking activities and see Mathematics as something requiring exploration, conjecture, representation, generalization, verification and reflection (Carr, 1996). Mathematics learning requires a deep understanding of mathematical concepts, the ability to make connection between them, and to produce effective solutions to ill structured domains. There is no perfectly well structured, planned or prescribed system that lets pupils think and act

mathematically. This can be done if and only if pupils themselves play their assigned role in their learning process.

5.50. SUMMARY.

The chapter discussed the findings on pupils' interest in learning Mathematics, their mean and standard deviation scores in interest. Focus Group Discussions and Interviews on interest in learning Mathematics. The findings of pupils' attitudes toward learning Mathematics including their mean and standard deviation. Focus group discussion and interview. Finally the chapter discussed the findings on the nature of factors affecting pupils' interest and attitude towards learning Mathematics, these included mathematics teachers, the parents, lack of Mathematics text books, poor background from primary schools and the pupils' environment.

CHAPTER 6

SUMMARY, CONCLUSION AND RECOMMENDATIONS.

6.0. Introduction.

This chapter presents the summary, conclusions and recommendations of salient points emanating from the study's findings.

6.1. SUMMARY

The main purpose of this study was to assess the nature of factors affecting pupils' interest and attitude towards learning Mathematics in secondary schools in Eastern Province. The study was guided by the following questions; What factors contribute to pupils having interest and attitudes toward learning mathematics in Secondary Schools in Eastern Province; What is the nature of interest that pupils show towards learning Mathematics at Secondary Schools in Eastern Province; and What is the nature of attitudes that pupils show towards learning mathematics at Secondary School in Eastern Province.

The study combined both quantitative and qualitative survey design. The sample comprised of 120 pupils and 16 teachers from the four Secondary Schools. Two were rural and two were urban Secondary Schools. Stratified random sampling was used to select pupils, 60 pupils comprising boys and girls from each school's Grades 10, 11 and 12 were selected. The pupils and teachers responded to the questionnaires on

interest and attitude, Focus group discussions and Focus group interviews. The questionnaires used likerts scale to collect responses.

The results from the study showed that pupils in secondary schools of Eastern Province had interest though weak, looking at the scores, they obtained and had negative attitude towards learning mathematics. The pupils from rural secondary schools were less interested in learning mathematics that is, compared to the urban pupils. The study identified five factors affecting secondary school pupils learning Mathematics in Eastern Province. The following were identified namely: the Mathematics Teachers, the parents, lack of text books, poor background from primary school and the environment where a pupil resides. The study also established that the Mathematics teachers were contributing to pupils' lose of interest and development of negative attitudes.

6.2. Conclusion.

The research findings have established that pupils have interest and positive attitude as they come to Secondary School. They only lose interest and develop a negative attitude due to the way some Mathematics teachers deliver their lessons; using teacher centred methods (Expository methods) and not assisting pupils who lag behind or are faced with challenges. Pupils' nature of interest and attitudes toward learning Mathematics has been stated to be weak despite the pupils' responses showing that pupils have interest and negative attitudes toward learning Mathematics. This is noted from their mean scores of interest and attitude which are close to the middle score

which is on the boundary between strong and weak interest. This weak interest is assumed to have contributed to pupils developing negative attitudes toward learning Mathematics. The factors which were found from the pupils' and teachers' responses to have changed the nature of pupils interest and attitude towards learning Mathematics were due to Mathematics teachers' pedagogical styles and rapport with pupils; the influence from parents; the lack of Mathematics textbooks for reference and research; the poor background of some pupils and the area where a pupil resides.

6.3. Recommendations.

The following recommendations were made to the Ministry of Education
Science Vocational Training and Early Education:

- 6.3.1. The Ministry should encourage the Teacher Education Institutions to encourage student teachers in the use of pupil centred methodology in most of their teaching time to arouse interest and positive attitude in the learning of Mathematics.
- 6.3.2. The Ministry through Curriculum Development Centre (C.D.C) should develop Mathematics textbooks which will incorporate practical application of Mathematics concepts to arouse pupils' interest and positive attitude towards learning Mathematics.
- 6.3.3. The Ministry should improve staffing of qualified Mathematics teachers at Grade 9 level in Mathematics to curb the pupils' poor background in grade 9 at this level and provide an opportunity for in-service activities in school for lower qualified staff teaching Grade 10, 11 and 12.

6.3.4. The Ministry should change the policy on selection at Grade 10 by making Mathematics as one of the passing subjects to arouse interest and development of positive attitude towards the subject.

6.3.5. The Ministry should supply adequate Mathematics textbooks to Secondary Schools.

6.4. Suggestions for future research

Research should be carried out in Mathematics education in areas such as:

6.3.1. How interest and attitude affect performance in government Secondary schools.

6.3.2 .Find out whether the textbooks in use at Secondary School arouse the interest and attitudes of learners and teachers.

6.3.3. How teachers could cultivate and maintain interest and attitude in learning Mathematics in Secondary Schools.

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APPENDIX 1

Matula Day Secondary School

P.O BOX 119

MFUWE

Dear Respondent,

RE: THE QUESTIONNAIRE CONTENT

This questionnaire is only for research purposes only. You are therefore requested to respond according to your own feelings or judgment. The research findings will help improve the teaching and learning Mathematics in Zambian High Schools.

Your co-operation will greatly be appreciated

Yours faithfully

MTONGA. D.S (MR

Cell No: +260-977945243

QUESTIONNAIRE FOR PUPILS

NAME:.....GRADE:.....SEX:.....SCHOOL:.....

INSTRUCTION: Tick (☐) the appropriate response which is appealing to you. You are kindly requested to be very honest in answering the questionnaire so that it reflects the true picture of yourself not somebody else. The responses here are for the research purpose only therefore be open and objective.

INTEREST IN MATHEMATICS

S/N	ACTIVITY	Strong Agree	Agree	Uncertain	Disagree	Strong Disagree
01	I like Mathematics					
02	Mathematics is difficult to follow					
03	I enjoy learning Mathematics					
04	When it is Mathematics period, I feel like dodging or studying another subject.					
05	I do not feel like doing the Mathematics homework most of the time					
07	When I get low marks in Mathematics, I feel very bad.					
08	I will study Mathematics in future.					
09	I spare sometime studying Mathematics					
10	I encourage my friends learning mathematics.					
11	I like sharing mathematics concepts with fellow pupils					
12	I easily understand mathematics concepts in mathematics lesson					
13	I like listening and watching to mathematics lessons on T.V and Radio.					
14	I enjoy participating in mathematics quizzes					

ATTITUDE IN MATHEMATICS

S/N	ACTIVITY	Strong agree	Agree	Uncertain	Disagree	Strong disagree
15	I passed mathematics at Grade 9					
16	The mathematics teacher is unfriendly					
17	Mathematics should not be compulsory					
18	Given a choice between going for sports or working at mathematics project I would choose to do mathematics					
19	Mathematics is a difficult subject to understand.					
20	If a question is written on the board, i can volunteer to solve it.					
21	I always request for mathematics textbooks during my free time.					
22	My parents consider mathematics as a least important subject					
23	Mathematics demands a lot of my time for study.					
24	Mathematics is one of the subjects i would like to pass at Grade 12.					
25	I do not like any activity involving mathematics					
26	I do not value mathematics in my academic life.					
27	Mathematics should only be for the few intelligent pupils					
28	Some topics should be removed from the syllabus.					

PLEASE CONTINUE

29. What should the Ministry of Education do to improve results in mathematics at?

your School?

.....

.....

30. Is there anything that makes you dislike mathematics? YES/NO

If the answer above is yes what is it?

.....

.....

THE END

THANKS FOR ACCEPTING TO ANSWER THE QUESTIONNAIRE

APPENDIX II

QUESTIONNAIRE FOR TEACHERS

SCHOOL:.....POSITION:.....

DATE:.....QUALIFICATION:.....

INSTRUCTIONS: Tick (☐) the appropriate response appealing to you. All the responses are for research purpose.

S/N	ACTIVITY	Strong agree	Agree	Uncertain	Disagree	Strong disagree
01	Pupils develop negative attitude in learning Mathematics due to the way it is taught at high schools					
02	I provide remedial work to backwards pupils					
03	Most of my teaching method is teacher exposition					
04	Pupils lack interest in Mathematics due to most of it being abstract and not easy to follow.					
05	There are some topics in mathematics which are difficult to teach					
06	Mathematics should not be compulsory					
07	I always go through the exercise and home work with pupils.					
08	I punish pupils who fail a test or home work					
09	We have an active Mathematics club in school					
10	I enjoy teaching Mathematic in all the Grades (i.e. 10,11& 12)					
11	Pupils lack of interest and negative attitude toward Mathematics is due to parents					
12	Pupils lack of interest and negative attitude toward Mathematics is due to mathematics teachers					
13	Pupil's lack of interest and negative attitude toward Mathematics are the main cause of poor performance at school certificate.					
14	Pupils lack of interest and develop negative attitude toward Mathematics from basic schools.					
15	I do not punish pupils who dodge my lessons.					
16	The pass% in Mathematics is low compared to other subjects in this school.					
17	Pupils fail Mathematics due to lack of textbooks					
18	Pupils find Mathematics difficult at high school due to poor background from basic schools					
19	Have you tried to improve the interest and attitude of your pupils you teach?					

PLEASE CONTINUE.

20. What can be done to improve the results in your school?

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21. What makes pupils in your school lose interest and develop negative attitude in
Mathematics?

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22. Do pupils who fail mathematics at Grade 9 improve in the high school?

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**THE END THANKS FOR ACCEPTING TO ANSWER THE
QUESTIONNAIRE**

APPENDIX III

FOCUS GROUP INTERVIEW SCHEME (FGI)

TEACHERS

1. What do you think makes pupils lack interest and develop negative attitude towards mathematics?
2. What method do you mostly use in teaching Mathematics and why?
3. Do you enjoy teaching all topics in mathematics? If no, which one do you find boring?
4. Do you offer remedial to backwards pupils? If no give a reason.
5. How can you help pupils who have no interest or develop negative attitude towards mathematics?
6. What do you think makes pupils under achieve in mathematics?

PUPILS

1. What do you think makes pupils lack interest and develop negative attitude towards Mathematics?
2. Do you enjoy learning mathematics?
3. Which topic(s) don't you like learning in mathematics and why
4. What can be done so that pupils have interest and develop positive?
Attitude towards Mathematics?
5. Who influences your interest and attitude towards mathematics?

Table 4.4 CUMMULATIVE PUPILS RESPONSE TO QUESTIONNAIRES FROM FOUR SCHOOLS

A	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	I	23	23	35	49	38	35	26	21	26	31	22	40	21	40	24	36	46	36	32	36	34	37	42	28	51	32	32	32	33	28
	A	37	19	27	40	27	32	23	23	29	29	25	38	20	18	35	31	49	42	36	31	31	36	35	25	47	36	36	33	43	40
B	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	I	14	23	29	23	30	24	38	34	19	27	34	24	35	31	27	20	20	15	21	21	35	39	30	30	17	35	22	26	23	22
	A	18	24	31	31	28	24	34	25	27	28	26	24	27	35	27	20	24	21	18	22	20	32	25	31	34	36	31	31	23	23
C	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	I	22	18	17	28	18	20	27	18	15	27	38	27	33	30	21	35	18	18	27	21	22	38	19	18	30	25	20	29	29	22
	A	35	26	29	21	14	30	26	19	17	31	39	45	27	34	36	36	23	21	34	16	22	29	17	16	34	36	22	34	31	20
D	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	I	26	29	16	27	31	24	25	25	16	31	53	27	29	14	47	20	18	19	20	17	26	42	21	31	26	25	36	26	24	30
	A	26	27	20	19	32	32	20	21	30	19	40	27	32	18	44	37	21	28	19	26	20	43	39	38	22	29	29	28	25	19

I-Interest responses

A-Attitude responses

P- Pupil Identity Numbers

A, B, C and D (schools)

Table 5.1 2006 Grade 12 examinations results for Eastern Province

GRADES	1	2	3	4	5	6	7	8	9	TOTAL
FREQ	153	97	319	128	158	396	231	294	2206	3982

Table 5.2 2007 Grade 12 examinations results for eastern province

GRADES	1	2	3	4	5	6	7	8	9	TOTAL
FREQ	126	120	297	119	158	424	189	242	2184	3859

Table 5.3 2009 Grade 12 examinations results for eastern province

GRADES	1	2	3	4	5	6	7	8	9	TOTAL
FREQ	215	209	445	243	207	552	341	360	2934	5676

Table 5.4 2010 Grade 12 examinations results for eastern province

GRADES	1	2	3	4	5	6	7	8	9	TOTAL
FREQ	193	162	348	173	176	501	240	361	2581	7393