LEARNERS' PERCEPTIONS OF MATHEMATICS AND THEIR ACADEMIC PERFORMANCE IN SECONDARY SCHOOLS: A CASE STUDY OF IGANGA DISTRICT IN UGANDA

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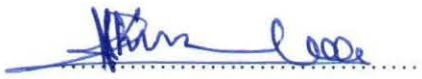
Declaration

I **KISALWE KALIMU** hereby declare that this dissertation entitled "*Learners' perception of mathematics and their academic performance in secondary schools*" is my original work, and it has not been presented to any institution in whole or part for any academic award.



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Date 22-NOV-2013

Approval

We certify that the Research work in this dissertation entitled "*Learners' perception of mathematics and their academic performance in secondary schools*" which was carried out by candidate KISALWE KALIMU has been under our supervision and is now ready for submission for examination with our approval.

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Abstract

The study examined the influence of Learners' Perception of Mathematics on their academic performance in Iganga district.

Objectives were: to identify factors which determine Learners' Perception of Mathematics in Secondary Schools; to establish how Learners' Perception of Mathematics influence their academic performance, and to suggest ways in which Learners' Perception towards Mathematics can be changed to enhance their academic performance. The study is significant to: District Administrators, Head teachers, teachers, learners and educational research.

District Education Officer, Head teachers (48), Mathematics teachers (120) and pupils of senior four and six (2570), defined the study population. Sampling was determined using Krejce and Morghan (1970) guide. Forty out of 48 secondary schools were considered during the study. The overall sample for teachers, Head teachers, and pupils was 463 (Page 18).

Stratified and simple random sampling techniques were used in the study. The research was both qualitative (Interview guides) and quantitative (Questionnaires and focus discussion guides). The researcher used a field study design and a case study. This field study design helped the student get into direct contact with respondents at different schools to fetch responses while as a case study, it saved time and resources compared if it would be carried out in Uganda as a whole.

Determinants of Learners' Perception of Mathematics were teacher-related, parent-related, students-related, and head-teacher related. Ways in which Learners' Perception of Mathematics influenced their academic performance included; students' hatred of Mathematics teachers; frustrations in examination rooms; and absenteeism due to negative Perceptions towards Mathematics.

Ways through which Learners' Perception towards Mathematics can be changed to improve on their performance entailed roles of; parents, teachers, head teachers, pupils and district administrators to overcome factors which change learners' perceptions towards Mathematics.

In conclusion, factors which determined Learners' Perception of Mathematics varied among teachers, students, school administrators, district administrators and parents. All stakeholders should: provide essential scholastic materials; improve teaching methods; equip schools with teaching and learning materials.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This Chapter presents the background of the study, statement of the problem, purpose of the Study, Objectives of the Study, Research Questions, Significance, Justification, scope and theoretical framework.

1.1 Background

The background was provided in terms of Conceptual-where the basic concepts used in the study were clearly defined both according to how they were used in the study; Historical-which traces Mathematics from its original application to date; Theoretical-explaining the most appropriate theory used to guide the study; and contextual which explains the area where this study was carried out from.

1.1.1 Historical Background

Mathematics is thought to have been founded as early as 30,000 BC and it was in form of carvings, inscriptions, and manuscripts (Allen, 1997). The earliest mathematical writings available are Plimpton 322 (Babylonian Mathematics c. 1900 BC), Rhind Mathematical Papyrus (Egyptian Mathematics c. 2000-1800 BC) and Moscow Mathematical Papyrus (Egyptian Mathematics c. 1890 BC). Babylonian Mathematics and Egyptian Mathematics relate to Pythagorean Theorem, which is the most ancient and widespread mathematical advance after basic arithmetic and geometry (Kevius, 2012).

The study of Mathematics as a subject started in the 6th century BC with Pythagoreans, who coined the term "Mathematics" to mean "subject of instruction" (Kevius, 2012). Greek Mathematics greatly refined the method of doing Mathematics through introduction of empirical reasoning and mathematical rigor in proofs, and expanding the subject matter of Mathematics (Kevius, 2012). Chinese Mathematics made early contributions to the present Mathematics through a place value system. According to Al-Karaj (2012) the Hindu-Arabic numeral system and rules for its operational use throughout the world evolved over the course of the first millennium AD in India and was transmitted to the west via Islamic Mathematics. Al-Karaj, (2012) adds that Islamic Mathematics was developed and expanded to Mathematics known to these evolutions.

In expanding Mathematics, many Greek and Arabic texts on Mathematics were converted to Latin, which led to further development of Mathematics in primitive Europe, and later to different parts of the world (Allen, 1997).

The oldest mathematical object in the world is *the Lebombo bone* found in the Lebombo Mountains of Switzerland in approximately 35,000 BC. However, research findings trace the history of the current Mathematics from Greek works of Thales of Melitus in 600 BC to 529 AD. In the ancient Greek, Thales used geometry to calculate heights of pyramids and ships from the shore, using Thales' theorem, hence Thales was spotted as the first true mathematician, and first individual to which mathematical discovery has been attributed (O'connor J. J. and Edmund F.R, 2008; Allen, 1997).

According to Allen (1997), Thales discovery of Mathematics has been manifested through various objects such as prehistoric artifacts discovered in Africa and France, dating between 35,000 and 20,000 years old, the Ishango bone, found near the headwaters of the Nile river (northeastern Congo), which reportedly shows either the earliest known demonstration of sequences of prime numbers or a six month lunar calendar. From ancient times through the middle Ages, bursts of mathematical invention were often followed by centuries of stagnation.

Research shows that Mathematics seems to be difficult to learners because it necessitates a lot of patience and persistence to understand. According to analysts, Mathematics does not come intuitively or automatically, it requires a lot of time and energy. As a problem, Mathematics has little to do with brain power but a lot of staying power is required (Fleming, 2012).

Learners therefore have divided perceptions, as some find Mathematics a simple subject to pass while others find Mathematics problematical (Brown, 2004). No matter the perception, Mathematics is inescapable because in all Ugandan academic institutions especially primary and secondary, Mathematics is compulsory and it is vital in our every day existence.

This study was carried out in Iganga district with forty eight (48) secondary schools. The research examined Learners' Perceptions of Mathematics and their academic performance in different private and public schools.

1.1.2 Theoretical Background

The Social Learning Theory (SLT) by Albert Bandura was used to guide this research. The Social Learning Theory was advanced by Albert Bandura in 1977. Bandura believed that direct reinforcement could not account for all types of learning. Bandura unfolds three concepts in the social learning theory, which determine the process of learning. First, people learn through observation, secondly, internal mental states are essential in learning, and third, the fact that something has been learnt does not mean that there is change n behavior (Kendra, 2012). This theory has been chosen as appropriate for this research because the three concepts Bandura discusses are in line with Learners' Perception. The Theory was used to establish the influence of Learners' Perception of Mathematics on their academic performance using the three concepts discussed by Bandura, i.e. Learners' Perception of Mathematics depends on their observational learning, their internal mental states towards Mathematics or an assumption that the fact of teaching Mathematics daily in a class does not mean that learners love it and are likely to perform well.

1.1.3 Contextual Background

Iganga is one of the seven districts that make up Busoga region. Before its status as a district, it was one of the areas which established secondary schools and sought government support. Among the oldest secondary schools in Iganga are: Kilibaki, Iganga secondary school and Bukoyo. Before the separation of Bugiri and Mayuge as independent districts from Iganga, Iganga had 124 secondary schools with a secondary level teaching staff of 1,449 (Iganga District Development Plan 2008/2009). Thirty percent (30%) equalling to 431 of the secondary teachers were adequately qualified. Private schools then had poor infrastructure and over 66.3% of them operated under semi-permanent grass thatched buildings and under trees (Iganga District Development Plan 2008/2009). Qualified teachers who never appreciated such conditions continuously deserted the profession (Katahoire, 2001).

Currently, Iganga district is comprised of three counties namely; Bugweri, and Kigulu (North and South) and there are nineteen (16) sub counties, one of which is the case study - Iganga town council. The district has one hundred and three (103) secondary schools (Iganga district development plan, 2009 /2010). The level of students' engagement in Mathematics is reported to be very low as most learners have developed negative Perceptions towards the subject. This is perceived as one of the major factors which have contributed to poor

academic performance especially in Uganda National Examinations at ordinary and advanced levels.

1.2 Statement of the Problem

Poor academic performance in secondary schools is one of the challenges of education in Uganda particularly in Iganga District. Iganga experiences declining students' academic performance in the Uganda Certificate of Education (U.C.E) as indicated by decreases in the statistics of those who qualify for Division 1 since 1998 to 2009, as an attribute of poor Learners' Perception of Mathematics. According to UNEB (2001), most learners believe Mathematics is for classroom practice and not worthy for much concentration; others think Mathematics is difficult; and many female students view it as a subject in which they can not perform well. Consequently, students turn their backs on Mathematics and perform poorly in exams. This study examined the influence of Learners' Perception on academic performance in Iganga district.

1.3 Purpose of the Study

The study examined the influence of Learners' Perception of Mathematics on their academic performance over these years.

1.4 Objectives of Study

The study objectives were;

1. To identify the factors which determine Learners' Perception towards Mathematics in secondary schools in Iganga district?
2. To establish ways in which Learner's perception about Mathematics influence their academic performance in Iganga district
3. To suggest ways in which Learner's perception about Mathematics can be changed to enhance their academic performance in Iganga district

1.5 Research Questions

The study answered the following questions;

1. What factors determine Learners' Perception towards Mathematics in secondary schools in Iganga district?
2. How do learners' perceptions about Mathematics influence their academic performance in Iganga district?

3. In what ways can learners' perceptions about Mathematics be changed to enhance their academic performance in Iganga district?

1.6 Significance

The study is of help to the District Administrators, for example District Education Officer, District Inspector of Schools, Head Teachers/Managers of schools, Teachers, Learners and Educational Researcher in the following ways:

It provides information about the causes for poor performance in Mathematics which can be used by district administrators to design policies which can change Learners' Perceptions towards Mathematics and enhance academic performance in Iganga district.

The study helps Head teachers to ascertain pupils' perceptions about Mathematics and liaise with district administrators to equip schools with resources that can enable students develop positive perceptions and perform well in Mathematics.

Through this study teachers are able to acknowledge Learners' Perceptions as the basic cause of poor academic performance in Iganga so that they prioritize measures that could create a positive environment through improvement in teaching methodologies, among other measures to enhance learners' academic performance.

Findings of this study are instrumental in creating a positive environment for learners develop courage and score highly in Mathematics.

1.7 Justification

This research was sought necessary following Kyafu (2008) identification that Iganga is one of the districts where learners continue to perform poorly in Mathematics. In addition, Iganga seeks to raise the academic standards and eliminate challenges faced by learners in their performance.

1.8 Scope

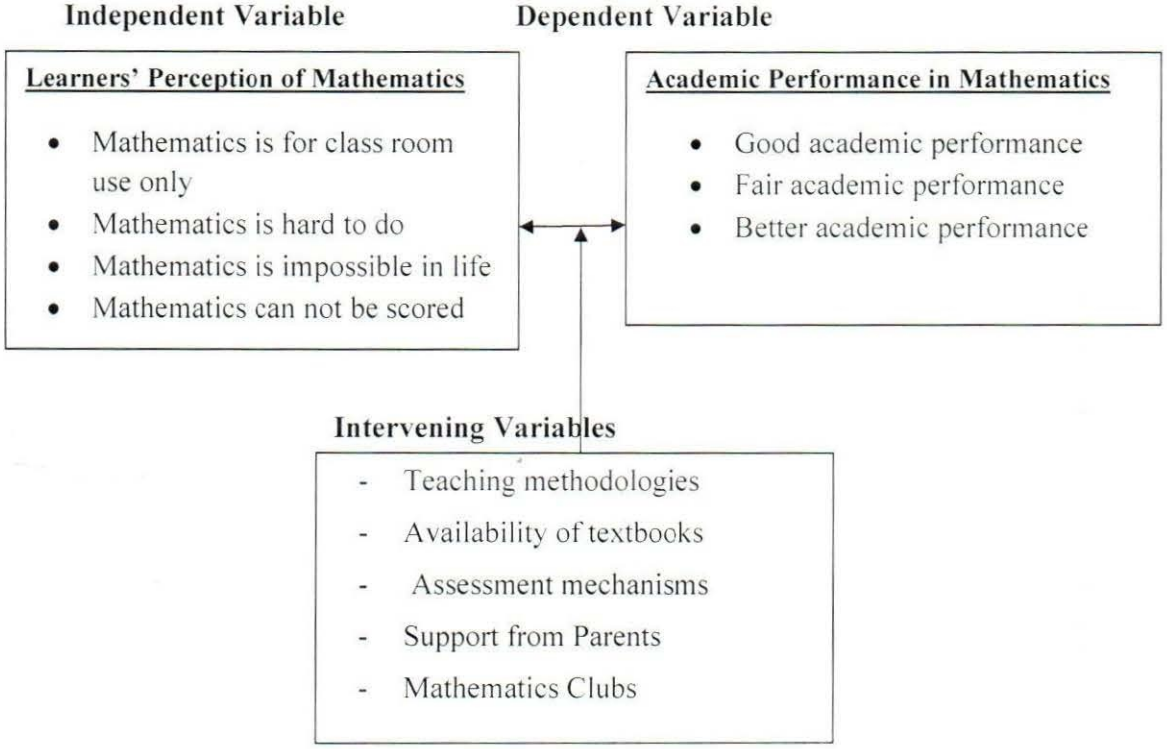
Geographical; This study was conducted in Iganga district. According to School Guide Uganda (2012), there are 48 secondary schools (30 private and 18 government-aided) in Iganga district to be targeted in the research.

Content; The study investigated about learners' perception of Mathematics and their academic performance in Iganga District. It specifically investigated factors which determine learners' perception towards Mathematics, how learners' perceptions towards Mathematics

influence their academic performance and ways in which learners' perception towards Mathematics can be can be made positive to enhance their academic performance.

Time: The study was conducted for three months, from March to April, 2012

1.10 Conceptual Framework



According to the conceptual framework, the independent variable (Learners' Perception of Mathematics) refers the opinions of learners towards Mathematics which could include; Mathematics being considered for classroom only, Mathematics as a difficult subject, Mathematics as impossibility in life, and Mathematics as a subject that can not be scored. This breakdown provides an overview on how students in various schools perceive Mathematics. In addition, the conceptual framework reveals that there are some factors which intervene between Learners' Perception of Mathematics and in turn determine the end results/academic performance. These intervening variables were given as teaching methodologies, availability of textbooks, assessment mechanisms, parents' support and existence of clubs about mathematics. The conceptual framework further reveals that Students' academic performance is graded as good, fair or better basing on whether the intervening variables are positive or negative.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

The reviewed literature in this chapter has been selected based on the research objectives/questions of the study.

2.1 Factors which Determine Learners' Perception of Mathematics

Perceptions towards Mathematics play a crucial role in the teaching and learning processes of Mathematics because it affects students' achievement. The teaching method, support of structure of the school, family and students' Perceptions towards school affect the perceptions towards Mathematics (Muhammad & Shah, 2008). The fact that Mathematics is the same subject everywhere it is taught and such conditions create a positive environment to induce students' positive perceptions, it is also possible that Learners' Perception about Mathematics are different in uninvestigated areas like Iganga district. To ascertain this, the student used Muhammad & Shah's findings to establish whether or not; Learners' Perceptions about Mathematics are determined by factors such as students' Perceptions towards the school, teaching methods, among other factors.

The way that Mathematics is represented in the classroom and perceived by students, even when teachers believe they are presenting it in authentic and context dependent way stands to alienate many students from Mathematics (Leoville, ferlinghetti, & Pekhonen, 2002). Representation of Mathematics in classroom stated by Leoville, et al has a virtual relationship with Muhammad & Shah's findings that teaching methods determine Learners' Perception of Mathematics. Just like these findings in other areas state, the student also assumed that the cause of poor Learners' Perceptions towards Mathematics in Iganga district was related to its reflection in class. This assumption was therefore overcome through carrying out research.

Positive Perceptions towards Mathematics leads students towards success in Mathematics. Attempt to improve Perceptions towards Mathematics at lower level provides base for higher studies in Mathematics. It also causes effect in achievement of Mathematics at secondary school level (Carroll, 2011). In other words, Carroll's findings reflect that Learners' Perceptions towards Mathematics are shaped from infant stages. Carroll's findings can be linked to Muhammad and Shah, (2008) who identify that one of the determinants of scholars' perception towards Mathematics are the parents. If the parents speak positively about Mathematics, then their perception pass on to children during their primary education and it

grows in them through to higher levels of education in secondary and tertiary institutions. To this extent, no studies could tell whether Learners' Perceptions towards Mathematics in secondary relate to these conditions or not. This study was carried out to clear such uncertainties.

Girls are often discouraged from mathematical work in their primary years. They therefore dislike it in the secondary years. So they drop it at high grade levels in far greater numbers than boys. As a result, fewer women are employed in industry in post needing mathematical ability (Madelleine, Mirriam, & Weinner, 1989). These findings also reflect that perceptions towards Mathematics are developed in children positively from the infant level. However, Madelline, et al talks about how the discouragement towards mathematics develops among female scholars. This implies that there are specific factors which could have negative implications as far as female Learners' Perception towards Mathematics in Iganga district which required investigations through this research.

Costello (1991) reported that students have a common perception that doing Mathematics is consistent with a male self-image and inconsistent with a female self-image." This self image is usually caused by the peer pressure (Meece, Glienke, & Samantha, 2005). This study sought to ascertain whether or not, peer pressure is one of the determinants of Learners' Perceptions towards mathematics which could in turn have negative implications on their academic performance.

Males are more inclined towards Mathematics than females on being the male dominated domain. It is found that at secondary school level most of the girls don't actively participate in Mathematics classes due to their poor perceptions about Mathematics. Girls are negatively influenced by their sex-role stereotypes (Meece, Glienke, & Samantha, 2005). Using these findings, the student was interested in establishing the determinants of Learners' Perceptions towards mathematics in relation to gender stereotypes.

All professions requiring higher level knowledge of Mathematics are dominated by male community. Many barriers are there for the female students to have their career in Mathematics. Some times they feel pleasure in taking Mathematics but their parents consider it as a useless effort for them. Sometimes, female students show less confidence in Mathematics than their male counterparts (Arlene, 2001). Findings by Arlene would imply that basing on the language f parents about Mathematics as they try to relate it to future

career for females; girls develop poor perceptions towards Mathematics. To ascertain this, the student had to make investigations in Iganga District where a similar problem was cited with unknown determinants.

Most students in schools love Mathematics but those who dropout have different view points about Mathematics. It leads towards the fact that Mathematics is a rough and tough subject. It is the Perceptions of the student which contributes a lot towards his perception about Mathematics. It develops the adaptability and applicability in the learners (Karen, 2000). Just as Karen states it, there are some students with positive perceptions and they score highly in Mathematics. At the same time, there are others who do not have positive perceptions and these end up misfiring in final examinations. This study sought to establish why other students could not have positive perceptions towards Mathematics. It also sought to find out why really there are differences in perceptions.

The perception of prospective teachers about Mathematics is so negative that many learners cope and perceive Mathematics as a subject that can only be taught in class but of no help in day to day engagements (Akogu, 2011). According to Ball and Grass, learners get such perceptions because teachers only orient around classroom work while teaching learners Mathematics. Findings by Akogu could imply that even in Iganga district, the negative perceptions of students towards Mathematics is ignited by teachers' negative perceptions. Unaware about the determinants of students' poor perceptions towards Mathematics, the student had to carry out investigations to find out whether or not, teachers' negative perceptions towards mathematics in turn determines Learners' Perceptions towards the same in Iganga district where a similar research had not yet been carried out.

Most non-Mathematician see Mathematics as just a theoretical and complex subject, with no practical applications especially in the "real world" they do not realize that Mathematical models or ideas on which divisions are based and found in Mathematics (Asale & Adetunde, 2009). Findings accessed show that right from childhood; in nursery classes, Mathematics is one of the basic skills emphasized. This shows that it forms a foundation of any solid education. Everybody is therefore aware that Mathematics is the key to all fields of studies like Sciences, Technology, Accounting and Social Sciences, in any academic institution all over the world (Asale & Adetunde, 2009). To ascertain whether or not, the Learners'

Perception towards mathematics in Iganga district is determined by an imagination that the subject has not practical implications, this study was inevitable.

Due to the poor perception, majority of students who enroll for universities, including those who formerly performed well in Mathematics, reluctantly accept to study Mathematics as a degree course. As a result, they develop an imagination that Mathematics is only for classroom use and they get rid of it without minding how much achievement it can make in their lives (Templenton, 2009). The student could not easily tell whether such findings even apply to Iganga district or not unless this study was carried out.

Research carried out in South Africa shows that learners study Mathematics because they know it as an important subject in any field of science (Middleton & Spanias, 1999). In addition, it also serves as a filter for entry into various career paths. A review of the TIMSS study according to Hammouri (2004) reveals that the number of Mathematics learners who took it on the higher grade between 1995 and 1997, dropped to about a half of the number taking it on the higher grade between 2000 and 2004. The concern then also lays with the small number of higher grade Mathematics learners eligible for the study of science-based professions (Robinson, 2008). Using these studies from South Africa, the student was able to establish what the factors were in the context of Iganga District.

Poor perceptions of Mathematics by parents are also transmitted to scholars. In societies, there is a perception that if parents were not good at Mathematics, their children too will not be (Puscerak, 2010). Parents who were not good at Mathematics or are afraid of it are therefore often instrumental in reinforcing Perceptions that their children hold about Mathematics. Parents believe that math ability is genetic and go on to tell their children that they don't expect them to succeed in it as they, themselves, were unsuccessful (Puscerak, 2010).

Learners watch their parent's behavior and reaction to math and use this to justify their own performance (Demand Media, 2012). Parents view poor grades in Mathematics more acceptable than in other subjects. This keeps with the Perceptions of the American public that learning Mathematics is related to ability rather than effort (Lynn, 1999).

Further more, vicarious Experience also defines Learners' Perception of Mathematics; A "vicarious experience" is one in which learners learn and develop through observing

experiences and successes of others who share similar attributes as the learners themselves (Loemberg, 1988). Learners' self-efficacy Perceptions are boosted by watching others perform (model) mathematical tasks. If the learner observes someone with similar attributes as he/she succeed in an activity, it contributes to him/her creating the belief that he/she is also capable of accomplishing the task with the same degree of success (Noble, 2011).

In addition to the above, if a learner assumes a high degree of similarity with a peer, then the peer's successful experiences are absorbed by the learner, and the learners is then persuaded that this success is possible for him/her as well (Noble, 2011). Learners who are uncertain of their own capability in Mathematics are more susceptible to being influenced vicariously than those who are set in their Perceptions about their capability in Mathematics. Though learning through observing others might not be as direct and strong as learning through one's own experience, vicarious experience has a significant effect on performance. The source that is considered as the most common contributor to development of self-efficacy Perceptions is verbal persuasion (Parjas & Graham, 1999). In context of Iganga district, without this study, the student would be unable to ascertain whether the reason as to why students do not develop positive perceptions towards Mathematics results from their failure to copy from their counterparts who excel in the subject or not.

Looking at the gender of Scholars; Girls have lower expectations for themselves to succeed in Mathematics than boys. Girls believe they do not have mathematical ability and when they perform poorly in Mathematics, they attribute it to their inability (Cheng-sun, 2009). This study was necessary as the student would not tell why girls have lower expectations for Mathematics n Iganga yet it affects their academic performance.

Therefore, starting at the elementary school level, teachers need to; encourage girls to have higher expectations for themselves in math, and offer girls alternative, positive explanations of their math performance. Girls' self-esteem, confidence in their abilities, expectations for life, interest in challenging courses and rewarding careers; and pursuits in math and science affect them as they get older (Carroll, 2011).

The levels of engagement in Mathematics experienced by students during middle years of schooling (Years 5 to 8 in New South Wales) has been of some concern in Australia for a considerable period of time. The recent National Numeracy Review (Commonwealth of Australia, 2008) reported that although the levels of Mathematics achievement are quite good

when compared to international standards, there are an unacceptable number of Australian students who do not achieve appropriate levels of proficiency (Cheng-sun, 2009).
The report claims many students fail to enjoy or see the personal relevance of Mathematics and few voluntarily continue its study. Although perceptions change throughout the school years, once formed, negative perceptions towards Mathematics are difficult to change and can persist into adult life (Newstead, 1998). These findings have been reflected in research both in Australia and internationally (Anderman & Midgley, 1997; Leckey, 2000; State of Victoria Department of Education and Training, 2004; Sullivan, McDonough, & Harrison, 2004).

Engagement in Mathematics; Engagement has been defined as a deeper student relationship with classroom work, multi-faceted and operating at cognitive, affective and operative levels (Fair Go Team NSW Department of Education and Training, 2006; Fredricks, Blumenfeld, & Paris, 2004). It exists in form of behavioral, emotional and cognitive engagements (Karen, 2000). Behavioral engagement encompasses active participation and involvement in academic and social activities and leads to achievement of positive academic outcomes. Emotional engagement on the other hand includes students' reactions to school, teachers, peers and academics, influencing willingness to become involved in school work for academic performance. Cognitive engagement involves the idea of investment, recognition of the value of learning and a willingness to go beyond the minimum requirements (Wang & Halcombe, 2012). The fact that students in Iganga district are mostly not interested in Mathematics, the level of engagement was still very low. Therefore by carrying out this study, the readers and policy makers would easily establish why students develop negative perceptions so that measures are determined to enhance students' participation.

In terms of engagement in Mathematics, small engagement can be seen when students are procedurally engaged within the classroom, participating in tasks and 'doing' the Mathematics, where engagement can be seen as the view that learning Mathematics is worthwhile, valuable and useful both within and outside and beyond the classroom (Wang & Halcombe, 2012). Lack of engagement could easily be viewed as a determinant of Learners' Perceptions towards mathematics in Iganga or not, unless this study was carried out.

Some of the major factors that influence student engagement in Mathematics during the middle years are the transition to secondary schooling, peer influence, the pedagogies

employed in the Mathematics classroom and the influence of teachers. It is suggested by Sullivan, Tobias and McDonough (2006) that the students who have the most to gain from active participation, or small 'e' engagement in schooling are sometimes those who are most difficult to engage, this phenomena becoming heightened during the upper primary and lower secondary years (Wang & Halcombe, 2012). This study sought to establish if such factors also apply to the context of Iganga district or not.

2.2 Influence of Learners' Perception of Mathematics on Academic Performance

Studies by Middleton and Spanias show a positive correlation between Perceptions, positive experiences, Perceptions and achievement in Mathematics. Creating a positive learner Perceptions to Mathematics facilitates Mathematics learning (Middleton & Spanias, 1999). In other words, these studies clearly establish how various perceptions of students about Mathematics had a negative implication on their academic performance in Iganga district.

Poor Perceptions towards Mathematics has often been cited as one factor that has contributed to lower participation and success of girls in Mathematics" in academic institutions. Interest and Perceptions in the subject are the special predictors for the students' participation and success in the subject (Hamlison & Whipple, 2012). These findings lack specific explanations on how the poor perceptions towards mathematics influence students' academic performance. This gap was filled through carrying out investigations using Iganga district as a case study where a similar problem existed.

A positive Perception is viewed by many authors, for example Middleton and Spanias, Mcleod and Ortega and Renga and Dalla, as an important goal of instruction because positive Perceptions in learners facilitate learning. Positive Perceptions can be achieved when learners have mathematical experiences that they enjoy and can succeed in. It is therefore important that learners enjoy and develop a love for math (Hamlison & Whipple, 2012). Hamlison and Whippe advocate for advocate for the love of Mathematics for better score. However, they do not explore factors which could establish an environment for the love of Mathematics by students. Through careful design of research instruments, the researcher asked respondents to mention some of the ways in which positive perceptions towards Mathematics could be ignited in secondary schools, an element that was found lacking in existing research efforts.

Learners, who believe that math is important, are more likely to feel positive about it and tend to value Mathematics more than those who do not (Middleton & Spanias, 1999). Middleton

& Spanias' findings lack an explanation on how students can be made to develop a feeling that mathematics is important. This is partially why the study was important in addition to other targets.

On the negative perspective, disengagement in Mathematics leads to reducing the range of higher education courses available to students in addition to limiting their capacity to understand life experiences through a mathematical perspective (Hamlison & Whipple, 2012). According to this study, the student wanted to explore more effects of negative perceptions of mathematics towards a student besides just limiting their capacity to understand life experiences.

There are many challenges that typify the transition from childhood to adolescence including physical, cognitive, social and school changes. During this time adolescents are faced with decisions regarding their commitment to school and learning. As schools and classrooms are inherently social places, it is likely the peer group is a significant influence on adolescent achievements, Perceptions and behaviors (Ryan, 2000). Findings by Ryan do not explain specifically the effects of poor mathematics perception towards students but talks about adolescents. This is why the study was necessary.

In a study of Learners' Perceptions of how their own efforts influence achievement at Mathematics, Sullivan et al. (2006) found positive responses to school Mathematics learning opportunities were inhibited by a combination of direct and indirect pressure from peers not to try hard in school, rather than lack of confidence or lack of success. The need for adolescents to feel a sense of belonging and acceptance can often lead to conforming to peer demands which censure achievement and success at school. Sullivan et al. believe classroom culture may be a much stronger determinant of engagement than the curriculum, pedagogy or teacher experience. Sullivan et al findings were made in other areas not in Iganga and having identified that there was no research findings explaining the influence of Learners' Perceptions towards mathematics on their academic performance particularly in Iganga district, this study was sought necessary.

2.3 Ways of improving Learners' Perception of Mathematics to improve their academic Performance

As the determinants of Learners' Perception towards Mathematics was identified and the ways in which this perception influenced students' academic performance, it was necessary to establish measures of changing Learners' Perceptions towards Mathematics so as to enhance their academic performance in Iganga District. This section therefore provides some of the ways which administrators and students in various areas use to enhance students' positive perceptions towards Mathematics and in turn improve their academic performance, which could as well be applicable in Iganga District.

Teachers must consider girls' mental and physical development and the effect of their own perceptions, and behaviors on girls' participation and performance in Mathematics. When girls mature physically, they focus more on their bodies and less on their intellectual abilities or themselves as people. As a result, their self-esteem decreases. Girls' learning style is therefore more cooperatively based and does not mesh with the independent, non-collaborative thinking encouraged in most classrooms. The notion that teachers unconsciously pay more attention to male students than to female students should be foregone (Parjas & Graham, 1999).

These findings were so helpful in that the student could use them as suggested measures in establishing an environment whereby female students who feel Mathematics as a difficult subject can develop love for it and perform highly.

Besides the above, teachers should consider girls' developmental issues as they interact with them. This could be by drawing female students' attention away from their bodies and focusing it on intellectual abilities, especially in Mathematics. In addition, teachers should pose more cooperative tasks during Mathematics instruction to support girls' learning style. Furthermore, teachers must constantly evaluate their behavior toward male and female students to insure that the attention they give students is not gender-biased (Carroll, 2011).

According to Young's (1988) findings, job satisfaction of primary school teachers in the USA is the salary one earns from it. Therefore in order to encourage teachers in primary schools to work hard and make students pass Mathematics well, there is need to give them adequate payments. Young's findings could be interpreted as measures that could help overcome the problem of poor payments of teachers which in turn create job dissatisfaction and failure to

make students pass well. Therefore, as it is applied in the USA, the student wanted to find out if creating job satisfaction for mathematics teachers could enable them make students pas the subject.

The availability and use of teaching and learning materials is another factor that can lead to better performance of pupils in Mathematics through enhancing effectiveness of a teacher's lessons (Broom 1973). The creative use of a variety of media increases the probability that the pupil would learn more, retain better what they learn and improve their performance on the skills that they are expected to develop, (Broom 1973). Young children are capable of understanding abstract ideas if they are provided with sufficient materials and concrete experiences with the phenomenon that they are to understand (Norman w. 1996). Lack of learning materials was identified as a possible cause of poor perceptions of students towards mathematics in Iganga district. Therefore, availability of these teaching materials was a good measure that would be applied to Iganga secondary schools to make students develop positive perceptions towards Mathematics.

Class sizes have also been identified as determinants of academic performance. Studies have indicated that schools with smaller class sizes perform better academically than schools with larger class sizes, (Norman w. 1996). These findings were missing out a point about Iganga district especially in establishing whether or not larger class sizes would aid improvement in Mathematic performance in Iganga district. This study was therefore necessary to ascertain that.

More to the factors above, Butler (1987 has found out that homework is a correlate of academic performance. He states that homework bears a positive relationship with learning outcomes when it is relevant to learning objectives, assigned regularly in reasonable amounts, well explained, motivational and collected, reviewed during class time and used as an occasion for feedback to students (Butler 1987). Butler's findings were not identified in Iganga district yet Iganga district also had a related problem. Therefore, the researcher's interest in this study was to identify whether homework would raise Learners' Perceptions towards Mathematics and finally enhance their academic performance in Iganga district.

In contrast to the Perceptions of Sullivan et al. (2006), Hargreaves (1994) claims the kind of learning that young people experience is ultimately shaped by what teachers do at the classroom level, how they develop, define and reinterpret the curriculum. Middleton and

Spanias (1999) believe if appropriate teaching practices are consistent over an extended period of time, children learn to enjoy and value Mathematics. Appropriate teaching practices were used as recommendations for teachers in Iganga district to help improve academic performance in Mathematics among students.

Some responses to research into effective teaching of numeracy and recent concern about engagement in Mathematics have been the formulation of teacher professional standards (Australian Association of Mathematics Teachers, 2006; NSW Institute of Teachers, 2004) and it has been recommended that the AAMT Standards of Excellence in Teaching Mathematics in Australia be utilized as a framework for the teaching of Mathematics in the national numeracy teaching standards currently in development (Commonwealth of Australia, 2008). However, AAMT studies were carried out in Australia, one of the developed countries which differ with Uganda significantly. Nevertheless, the fact that they share the problem of poor mathematics performance, its measures of improvement was applied in Iganga district.

Ainley and Fordham (1991) contributed for the excellence of school life and its relationship with other features. They investigated the student teacher relationship and concluded that student's satisfaction with school is not correlated with his academic success. This was concluded on the basis of the studies conducted on perceptions towards Mathematics. In this study, the researcher was able to use Ainey and Fordman's findings to identify whether or not, teacher-students' relationship could do much in changing Learners' Perceptions towards mathematics and improve their academic performance.

Teachers of Mathematics tried to find out relationship between Perceptions and students' performance in Mathematics during the last decade. They came to know that teaching learning process of Mathematics depends upon the positive Perceptions towards Mathematics. Serious efforts should be made to develop and gauge the positive Perceptions towards Mathematics (Muhammad & Shah, 2008). The researcher wanted to read about the relationship between teaching-learning environment and students' mathematics performance but it was missing out in the available literature just as for the rest of the objectives of this study. This knowledge was therefore used to establish measures for improving students' academic performance in mathematics.

Student's confidence is another ingredient for education of Mathematics. "Having a positive Perceptions towards Mathematics means generally enjoying working with Mathematics and

having confidence in one's own ability to do it but it does not mean that a student display this positive Perceptions towards the whole area of Mathematics all the time (Robson, 1996). The researcher expected to find such literature as one which explains that one of the ways to improvement students' academic performance in Mathematics in Iganga district was to enhance students' confidence in it but it was not the case, hence the design for this research.

Students should be encouraged and prepared for accepting the challenges of day to day life (Mathematical Sciences Education Board and National Research Council, 1989). In this same way, teachers in Iganga were expected to adopt such advises.

2.4 Summary

Conclusively, Negative students' Perceptions towards mathematics have negative implications on their academic performance in the wider world and a lot of research efforts are required to clearly establish the determinants of Learners' Perceptions towards mathematics in various areas especially in developing countries like Uganda using local case studies such as Iganga district. By doing this, Learners' Perceptions towards mathematics will be made positive and this will in turn enhance on their academic performance.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter includes; the research design, specific area of study, study population, methods of data collection, sampling and sampling techniques, ways of presenting and analyzing findings, Interpretation of findings, and ethical considerations.

3.1 Research Design

According to David J. Luck and Ronald S. Rubin, "A research design is the determination and statement of the general research approach or strategy adopted/or the particular project. It is the heart of planning (Lowhorn, 2003). Research design describes the nature of pattern the research intends to follow. It describes the plan or strategy for conducting the research.

In this study, the researcher used field research design and a case study design. Researcher used the field research design because it was easy to get into direct contact with the teachers, students, head teachers and the district administrators who had the required data on Learners' perception of Mathematics. The case study of Iganga District was used because the student was given limited time which could not be used to make investigations in Uganda as a whole. Secondly, the student had no resources to facilitate a country research, hence a choice to use Iganga District as a case study.

By using the field research design, the researcher went to different secondary schools and collected data from teachers, students and head teachers using qualitative and quantitative methods respectively. While in the field, the researcher sampled the respondents whom he interviewed and those to who questionnaires were issued.

The research involved private and public secondary schools. Qualitative and quantitative data collection methods were used in the study. The use of qualitative and quantitative methods helps to obtain reliable results, i.e. responses through quantitative methods can be backed up by those through qualitative methods.

3.2 Study Population

The Table below shows the total population of respondents in Iganga district by category

Table 1: Study Population

CATEGORY	NO OF RESPONDENTS
Mathematics teachers	120
Students (Senior Four/six)	2570
Head teachers	48
DEO	1
Total	2739

3.3 Determination of Sample Size

The sample size for teachers and students was determined using Krejce & Morgan guide for determining sample size

Table 2: Determination of sample size

Category	N	Sample size
Schools	48	40
Head teachers	48	40
Mathematics teachers	120	92
S.4 & S.6 students	2570	331

3.3.1 Sampling Techniques

3.3.1.1 Stratified sampling

This is a sampling technique which involves division of study populations into categories of similar characteristics. A stratified sample is a mini-reproduction of the population. Before sampling, the population is divided into characteristics of importance for the research, for example, by gender, social class, education level, or religion (Swindells, 2009). This approach was applied to all population categories.

Stratified sampling was used in this study as follows;

It helped to categorize the population into public and private secondary schools because the study considered both public and private secondary schools. Head teachers, mathematics teachers and students from public were identified from those of private using stratified sampling technique.

After stratifying respondents by school type, the researcher further categorized the study population into males and females. This was done to establish what female respondents could give about the problem being investigated compared to those of their male counterparts. This categorization was done to balance responses between genders/avoid being gender biased in selecting samples and reporting findings.

3.3.1.2 Simple Random Sampling

This is whereby each element in a category of study population has similar chances of being selected. This technique was used to select individual teachers and students in each stratum (Swindells, Ibid).

Simple random sampling was used after categorizing the study population in private and public, and males and females, and was basically applicable to teachers. Simple random sampling in this study meant that all females in private schools had equal chances of being included in the study as well as their counterparts in the public schools. At the same time, all males in public schools had the similar chances of being included in the study and the same applied to all males in the private schools.

The researcher used "equal chances" in this context to mean that all teachers were Mathematics teachers and therefore all could give the required data by the researcher. Following this technique, the researcher distributed tools randomly to respondents till the required sample size in each category was obtained.

3.3.1.3 Purposive sampling

This is a non-representative subset of some larger population constructed to serve a very specific need or purpose. This technique was used to select head teachers as head of schools and DEO as head of education in the district (Swindells, Ibid).

3.4 Instruments of Data Collection

3.4.1 Questionnaires

The researcher used Questionnaires in gathering data from teachers because (Francesca, n.d) states that questionnaires have advantages which include; containing demand for detailed data such as age, marital status, etc; being well organized according to the objectives, giving respondents freedom to give answers at their conveniences, and being good for large groups of people such as teachers.

3.4.2 Interview Guides

The researcher also employed interview guides to carry out investigations with head teachers and DEO. Interviews are the best approach while carrying out interviews with respondents who may not have time for questionnaires such as mangers and others in senior positions and that interviews supplement questionnaires for validity reasons (Francesca, n.d). The researcher also assumes that school managers and the education officer may not have time for questionnaires but for interviews.

3.4.3 Focus Discussion Guide

A Focus discussion guide was used to carry out investigations with students. In this attempt, students were organized into groups of ten and the researcher moderated over the discussion. This approach of data collection was used because unlike interviews and questionnaires which could be used for specific numbers of people, it is used for very many people who could neither fill questionnaires in a specified period or be interviewed such as students. Instead, the best approach would be to group them and engage them in discussions.

3.5 Validity and Reliability of Research

3.5.1 Validity

In determining the accuracy of findings, the researcher considered external and internal validity. Accordig to Tariq (1999), researchers are supposed to find out the extent to which the study being carried out is valid and reliable. This, they continue, is because some studies are not generalized. The researcher determined whether the findings can be generalized by comparing the findings by other authors in the rest of Iganga district with the situation in Iganga Municipal Council to determine external validity. Validity of research instruments was done by measuring the questions set in total against those that the supervisor approved as the correct ones. In total, the student set 27 questions but 21 were considered as the most

appropriate and valid ones. On the other hand20 questions were set in the Focus Discussion guide for students but 14 were considered as valid. The same pattern was used in constructing the questions for interview guides whereby, 21 questions had been set but 13 were confirmed as valid for the study. The confirmed questions reflected study objectives and could bring lead to collection of relevant data from various categories of respondents.

3.5.2 Reliability

The use of two research instruments among different people helped to check reliability of findings (Tariq, 1999). In this attempt, tools were designed for data collection and present them to the assigned supervisor. Reliability was done by pretesting questionnaires among respondents in surrounding schools. The researcher distributed questionnaires to ten teachers and held a discussion with two groups of ten each to test the reliability of research instruments. As a result, 8 teachers answered the questions perfectly and the researcher confirmed the reliability of questionnaires. On the other hand, students freely discussed their views with the researcher and therefore, the Focus discussion guide was found appropriate for the study.

3.6 Data Presentation and Analysis

Quantitative data was obtained using Questionnaires, which were presented and analyzed manually using frequency distribution Tables, graphs and charts to show the percentages of respondents who reacted against those who did not, about questions asked. The presentation was done numerically.

Qualitative findings were obtained using interview guides. These were presented descriptively to back-up the quantitative data. Qualitative data in chapter four is reflected in the use of quotations from the DEO or Head teachers.

3.7 Ethical Considerations

The research process was carefully carried out considering only issues in line with study objectives and problem statement. Confidentiality was highly recognized during data collection and compilation through not disclosing names of respondents and other issues as shall be instructed by respondents. In addition, respondents were allowed to give responses at their convenience.

CHAPTER FOUR: PRESENTATION AND INTERPRETATION OF RESULTS

4.0 Introduction

This chapter presents findings and their interpretations according to the specific objectives and research questions. Statistics of findings from teachers were presented using Tables, graphs, and pie-charts to show percentages of frequencies for each question asked. Findings obtained using interview guides and focus group discussion guides were integrated in the presentations following the order of research objectives. The preliminary presentation indicates findings about socio-demographic characteristics of respondents.

4.1 Findings about socio-demographic data of respondents

These include age-group, sex representation, type of school, academic qualification of teachers, subject taught and marital status, all arranged according to their order in the questionnaire.

4.1.1 Age description of respondents

Majority of the teachers (42%) were 20-29 years old. (See figure 0). This implied that most of the mathematics teachers in schools targeted were in the 20-29 age-bracket.

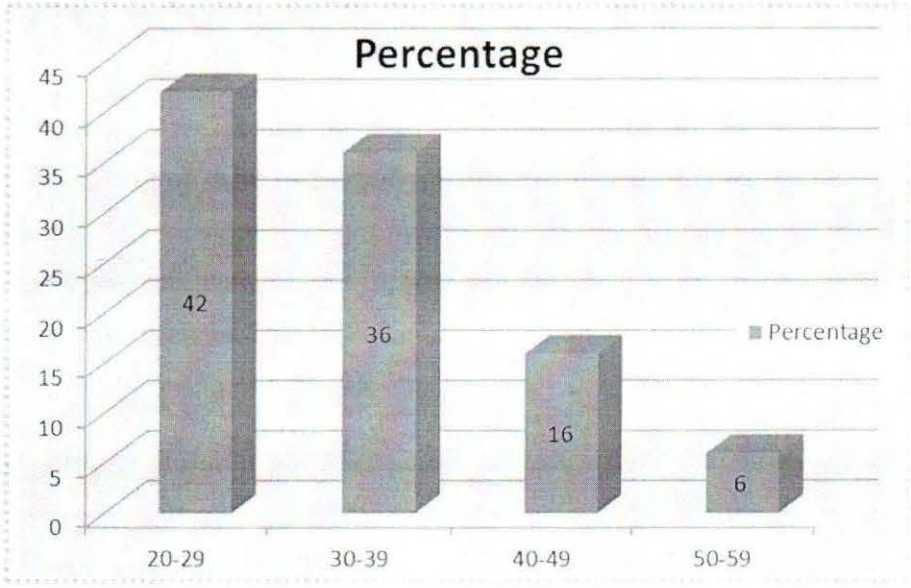


Figure 1: Age-group description of respondents

(Source: Field data)

Findings from interviews showed that only two head teachers were in the age-group of 50 to 59 years old. The rest of the Head teachers were 40 to 49 years old. The age-groups for

students was not investigated because they were engaged in focus discussions and responses were made randomly of orally. The DEO was in the age-range of 40-49 years old.

4.1.2 Sex of respondents

According to the findings obtained, there were more males than female respondents as indicated in figure 0), an implication that by the time of this research, Iganga district had more male than female mathematics teachers.

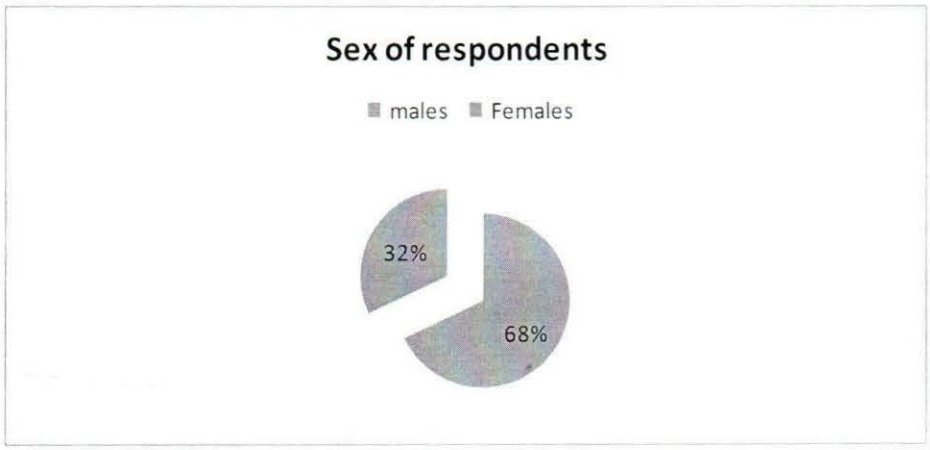


Figure 2: Sex category of respondents

(Source: Field data)

Interviews were conducted with 166 female students and 165 male students, a clear implication that there is a slightly higher enrollment of female students compared to that of their male counterparts among secondary schools in Iganga district. The DEO was a male respondent and there were 9 female head teachers in the sample population. The 31 were male head teachers. This leaves an interpretation that males have higher chances of becoming head teachers than their female counterparts.

4.1.3 Type of school

Respondents were required to state whether the types of school in which they taught was government or private. This was done to harvest different views about the research topic. According to figure 0, 60% of the schools were operated by the government and 40% were privately owned. Therefore, by the time of this research, Iganga district had more public than private secondary schools.

one Mathematics teacher, others had two while few had four Mathematics. The number of Mathematics teachers is therefore not evenly distributed among schools in Iganga district. The inadequacy in number of teachers was great especially among private secondary schools.

4.1.6 Marital status

Marital status was measured by identifying the percentage representation of married, single and other respondents. Results indicated that the highest percentage (52%) was for married teachers (figure 5 below). Findings about the marital status of head teachers reflected that all of them were married. The DEO was married too. No student was identified among the married respondents.

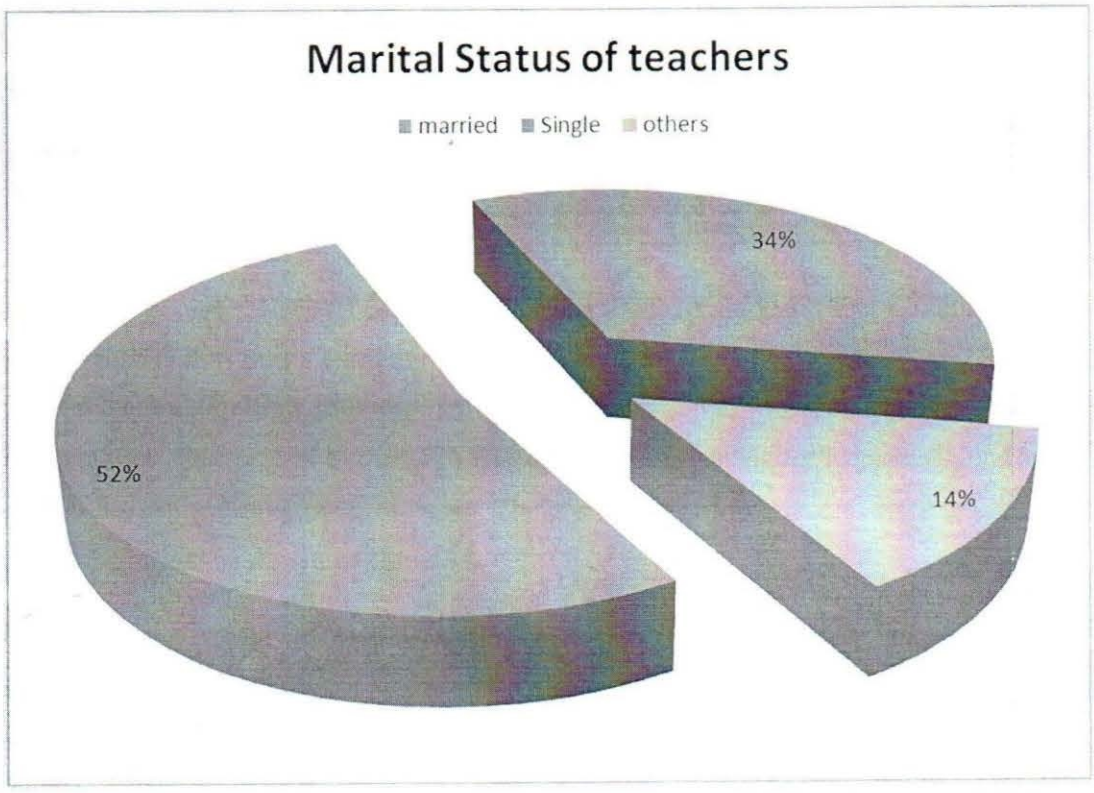


Figure 4: Marital status of respondents

(Source: Field data)

4.1.7 Classes taught per day

The largest number of teachers conducted lessons in 2 to 3 classes a day while few others conducted lessons in 4 to five classes. Teachers who conducted lessons in four or five classes

per day were mainly those of Mathematics. This was due to scarcity of teachers (primary source).

Discussions with students revealed that on average, the schools visited conduct 2 lessons per week and a maximum of 12 lessons per week. Most of the private schools conduct two or three lessons per week and few conduct four Mathematics lessons. On the other hand, most government schools conduct a minimum of four (4) lessons per week. The variation in number of lessons is related to the type of school and scarcity of Mathematics teachers. In addition, there is a variation in the number of lessons taught per week between urban and rural schools. In most urban schools, there is a minimum of six lessons taught per week. All schools which have nine and twelve lessons were identified in urban areas.

4.2 Factors that determine Learners' Perception towards Mathematics

The researcher, through tools of data collection asked respondents to mention negative and positive factors that determine Learners' Perceptions towards Mathematics. Some questions required responses in line with male students while others required responses in line with female students.

4.2.1 Reasons that make students like Mathematics

Table 4.2 shows multiple responses by teachers about factors which make students like Mathematics. Selection of frequencies was done manually using *tally approach* and later calculating the percentages accordingly. The percentages of frequencies were organized in a descending order as shown in Table 4.2.

Use of good teaching methods is a significant factor in determining Learners' Perception towards Mathematics. This is because it is ranked with the highest percentage of frequencies obtained (64%) as indicated in Table 4.2.

Teachers' responses about the use good teaching methods were supported by responses from most of the students engaged during discussions. Students mentioned that they are inspired to attend classes if teachers have good approaches to mathematical problems during lessons. According to students' responses, good teaching methods are reflected if teachers are able to use simple ways of approaching questions, using the simplest examples to understand and giving them provision to contribute while in lessons.

The aspect of teaching methods was further investigated through students' remarks about the way teachers teach. In most of their views, students used words like *excellent, wonderful, understandable, makes a student like the subject*, among many others to articulate their opinions. Positive comments about the way teachers teach were largely given by male students while most of their female counterparts gave negative comments about the way teachers teach Mathematics. The variation in comments largely depended upon the sex of students. The use of good teaching methods is therefore critical when it comes to factors that make students like Mathematics.

Career-related issues is one of the factors which make students like Mathematics, career related issues have a representation of 40% in Table 4.2. Career related issues relate to pursuing livelihoods through courses like accounting and business related courses which require Mathematics. With such optimisms, students are compelled to do Mathematics. Comebacks given by most students also showed that they like Mathematics because they want to qualify for jobs such as accounting and business administration which involve a lot of calculations.

Motivation of learners was mentioned by all categories of respondents as a factor that makes students like Mathematics. According to the distribution in Table 4.2, this factor is graded by 39% following the career related issues.

There were a number of factors that can motivate students to do Mathematics. The nature of teaching methods and homework are one of them. Remarks about the methods used by teachers showed that some students are highly inspired by the methods to love Mathematics. Questioned about the consequences of homework, most students identified that it enabled them remember a day's calculations and provides a link to lessons held the following day. In addition, students said that homework compels them to revise Mathematics. Indeed a large number of them confessed that they only revise Mathematics through homework.

Good school leadership, good teacher-student relationships

Good school leadership implies that a head teacher, deputy and other school management committee members set up an environment that is conducive for students to enjoy Mathematics. In the distribution (Table 4.2), it has a representation of 14%. Responses by head teachers, students and the DEO linked good school leadership to inspiring group discussions, carrying out continuous assessment, ensuring that teachers have enough

instructional materials, ensuring that there is a close positive relationship between the administration and students, among other factors, most of which are also given in Table 4.2.

Peer group influence meant that students could create friendship with others who like Mathematics. By making close relationships with students, students can possibly develop positive desires towards the subject. In the distribution, peer influence is rated 14% of the multiple responses given. About how their friends can assist them to like Mathematics, students' views linked to opening up Mathematics clubs, inspiring them to join discussion groups, helping them to try difficult calculations, getting grasping good comments about Mathematics in their normal conversations and linking them to Mathematics teachers for thorough discussions. More factors have been presented in the Table 4.

Table 4: Views on reasons that make students like Mathematics

No.	Reasons	Frequency	Percentage (%)
1.	Use of good teaching methods	59	64
2.	Career issues	37	40
3.	Motivation (intrinsic) of learners	36	39
4.	Making Mathematics practical in daily lives	24	26
5.	Being determined	23	25
6.	Because it is compulsory	20	22
7.	Does not have much notes to revise	18	20
8.	Existence of teaching materials	17	18
9.	Continuous assessment	16	17
10.	Traditional/genetic issues	16	17
11.	Good teacher-student relationship	15	16
12.	Peer influence	14	15
13.	Good school leadership	13	14

Source: Field data

4.2.2 Views on reasons for male students' dislike of Mathematics

This was one of the approaches used to determine factors which govern students' Perceptions towards Mathematics. Teachers gave eleven (11) factors, to explain why male students loathe Mathematics. The researcher prepared these factors in a descending order as shown in Table 5. Data analysis was done manually using tally method and displayed using a percentage frequency distribution Table.

Influence by other students that Mathematics is hard (72%) ranked the greatest among factors that make students dislike Mathematics. It was followed by Poor methods of teaching (68%) and biasness due to continual substandard sad results (66%).

In the discussions held, students were asked to mention ways in which their friends can influence them to dislike Mathematics. In response, they said that when friends fail Mathematics in successive examinations, they are disheartened to give Mathematics more concentration. In addition, if their friends are not collaborative when it comes to making calculations, students lose desires for Mathematics. Some friends speak discouraging remarks about Mathematics using words like *Mathematics is a hard subject, it is impossible for females*. Other students make fun of their colleagues who do not attain get positive results in tests and examinations.

Poor methods of teaching; This is another viewpoint to explain why male students do not like Mathematics and it is second greatest to peer-group influence by its percentage representation (68%) according to the distribution in Table 5.

Poor methods of teaching are exposed by responses obtained from discussions held with students involving male and female counterparts. Male students voiced remarks such as *poorly, speedy and difficult to understand, giving work to attempt before teaching, caning all students who fail, and* threatening students that if they do not strengthen, Mathematics is not a simple subject. Poor methods of teaching were also cited in comebacks from interviews held with head teachers. Most of the head teachers mentioned that poor teaching methods is associated with lack of suitable lesson plan, need to finish the syllabus irrespective of whether students grasp or not and a tendency of selecting only few topics to cover, leaving out others. In another viewpoint, the DEO mentioned about a custom whereby teachers, instead of focusing on the Mathematics curriculum by its order, they get past papers from other outstanding schools and start revising in the place of normal lessons. This, according to

him is a bad way of conducting lessons and puts students at risks of completely failing to get good results in examinations.

Biasness by negative results in subsequent examinations combined by lack of practice

Being a practical subject, Mathematics requires the achiever to make daily calculations of numbers. Some students attempt at least one calculation before they sleep. This is done either in discussions or on individual basis. At a rank of 66% according to the distribution in Table 4.3, biasness by negative results in examinations is one of the factors which make male students lose yearnings for Mathematics. According to responses obtained from discussions with students, it is so effortless for biased students to lure colleagues into developing loathe for Mathematics. When a student fails to perform well in Mathematics on a subsequent basis, they lose morale and try to convince others to join them. This factor is also related to lack of commitment to Mathematics reflected in negative perceptions towards Mathematics.

Some of the students just abhor Mathematics because it encompasses many calculations. Others have personal mix-ups with Mathematics teachers. In fact in a joke with some of the students, the investigator asked whether it is possible to like Mathematics in spite of having hatred for the Mathematics teacher. All students in that group stated that it is unbearable to like Mathematics yet hate the teacher. They cited that the two move together. One either hates both or adores both. "Hating one of them is a disguise to the hater" said one of the students. Therefore having personal misunderstandings with Mathematics teachers contradicts with having love for Mathematics.

Table 5: Views to explain why male students dislike Mathematics

No.	Reasons	Frequency	Percentage (%)
1.	Influence from other students that Mathematics is hard	66	72
2.	Poor methodology	63	68
3.	Biasness by negative results in exams /lack of practice	61	66
4.	Lack of commitment/negative Perceptions	61	66
5.	Involves many calculations and requires much time	60	65
6.	Personal misunderstandings with fellow students or teachers	52	57
7.	No guidance and counseling	48	52
8.	Poor background at primary/at home	47	51
9.	Parental influence	44	48
10.	Not affording instructional materials calculators, & sets	36	39
11.	Careers they believe require no Mathematics	24	26

Source: Primary data

4.2.3 Why female students dislike Mathematics

Teachers gave eleven factors that compel female students to dislike Mathematics as shown in Table 6. The chief reason for which girls dislike Mathematics is the misapprehensions that Mathematics is a subject done by male counterparts (87%). In addition, girls hate Mathematics because they think it is impassible (80%). Others show self-pity (67%) while others just do not have curiosity for Mathematics (55%). Findings identified that girls have negative perceptions towards Mathematics (45%), fear calculations (42%) and many do not receive counseling and guidance (42%).

Factors such as lack of counseling services, having negative perceptions towards the subject, influence by relatives and friends and bad teaching methods, which express why girls dislike Mathematics also feature among the factors that express why boys dislike Mathematics. This implies that to some extent, there are similarities and differences between factors that explain why girls dislike Mathematics and those which explain why boys dislike Mathematics too.

Table 6: Views on why female students dislike Mathematics

No.	Reasons	Frequency	Percentage (%)
1.	Misconceptions that it is a subject for men	80	87
2.	Belief that it is impassable	74	80
3.	Self pity	62	67
4.	Lack of interest in the subject	51	55
5.	Negative Perceptions towards math teachers	41	45
6.	Fear of calculations	39	42
7.	No counselors	39	42
8.	Discouragement by relatives and friends	28	30
9.	Poor methods of teaching	27	29
10.	Failure to afford instructional materials	23	25

Source: Primary data

4.2.4 Influence of teachers, parents, students and head teachers

How teachers influence learners' perceptions towards Mathematics

Teachers gave multiple views about how teachers influence learners' perceptions towards Mathematics. Some of the views showed the negative influence while others showed positive influence.

Negative influence

Teachers negatively influence learners' perceptions towards Mathematics through; using poor methods of teaching (32%), using discouraging comments which make students lose interest in the subject (16%), failure to make continuous assessments, among other factors as indicated in figure 6.

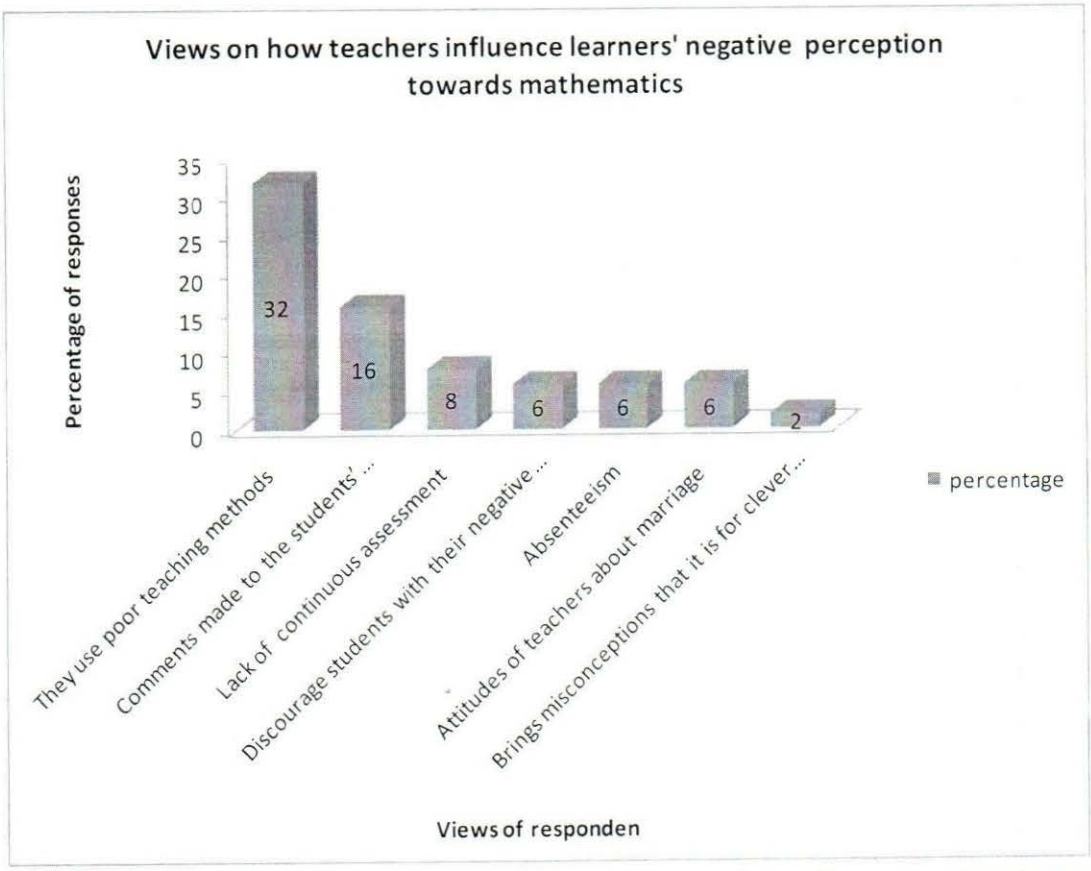


Figure 5: Graph showing how teachers influence learners' negative perception Source: Primary data)

How teachers influence learners' positive perceptions towards Mathematics

Table 7 shows ways in which teachers influence learners' positive perceptions towards Mathematics. The most significant role played by teachers to influence the positive perceptions of learners towards Mathematics is carrying out continuous assessment (84%). This is seconded by applying good methods of teaching (68%) and encouraging learners to do Mathematics (67%). Other factors mentioned include encouraging students to do work in groups (62%) and establishing good relationships with students/learners. Factors with low percentages of frequencies are organizing seminars with students, giving positive comments about Mathematics and ensuring that they complete the syllabus. These factors were identified from primary data manually by tallying responses and presenting them in a frequency Table 7.

Table 7: Views on how teachers positively influence learners' perceptions

Positive influence	Frequency	Percentage (%)
Continuous assessment	77	84
Apply good methods of teaching	63	68
Encouraging learners to do Mathematics	62	67
Encourage group work	57	62
Establish good relationship with students	44	48
Comment positively about Mathematics	34	37
Complete syllabus	23	25
Organizing seminars with students	22	24

Source: Field data

How parents influence learners' perceptions towards Mathematics

Like teachers, parents also influence the positive and negative perceptions of learners towards Mathematics. On the positive side, parents avail students with Mathematics requirements (38%), counsel their children about the need for Mathematics (22%), comment positively about Mathematics, encourage their children to carry out continuous practice of Mathematics by giving them enough time to revise, giving them a balanced diet, discouraging them from joining bad groups and paying school fees in time.

On the other hand, parents influence the negative perceptions of students towards Mathematics by their weak history about the subject (18%), not providing scholastic materials (10%), pronouncing negative comments about Mathematics (6%) and failing to make thorough follow ups to know the progress of their children in Mathematics.

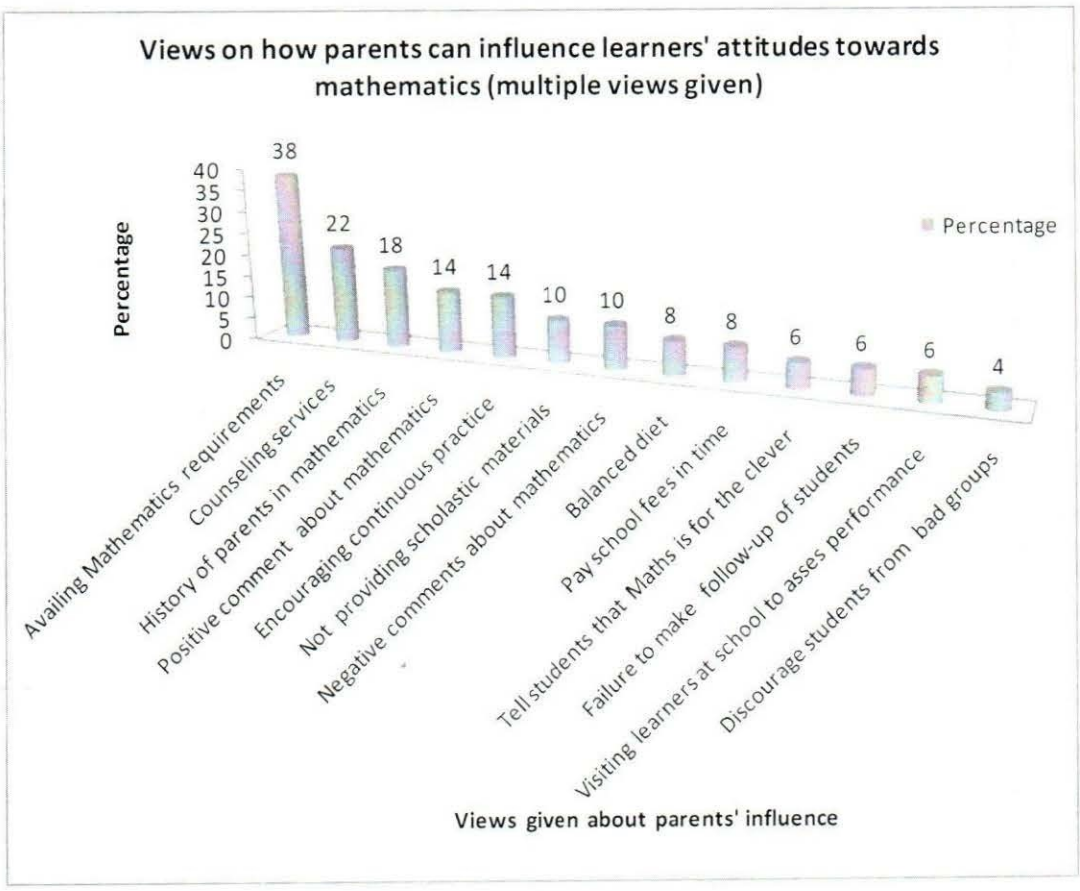


Figure 6: How parents contribute to positive Learners' Perception

(Source: Primary data)

What learners do that influences their perception towards Mathematics

Learners have a role to play in their own perceptions towards Mathematics. They either contribute to their positive or negative perceptions towards Mathematics.

Figure 7 shows some of the aspects according to teachers that explain how students contribute to their negative perceptions about Mathematics. Students think that they can not pass Mathematics (19%), they fail to revise Mathematics (18%), fail to form discussion groups (15%), and they are influenced by others through sharing negative experiences about Mathematics, among other factors. All these factors define students' negative perceptions towards Mathematics.

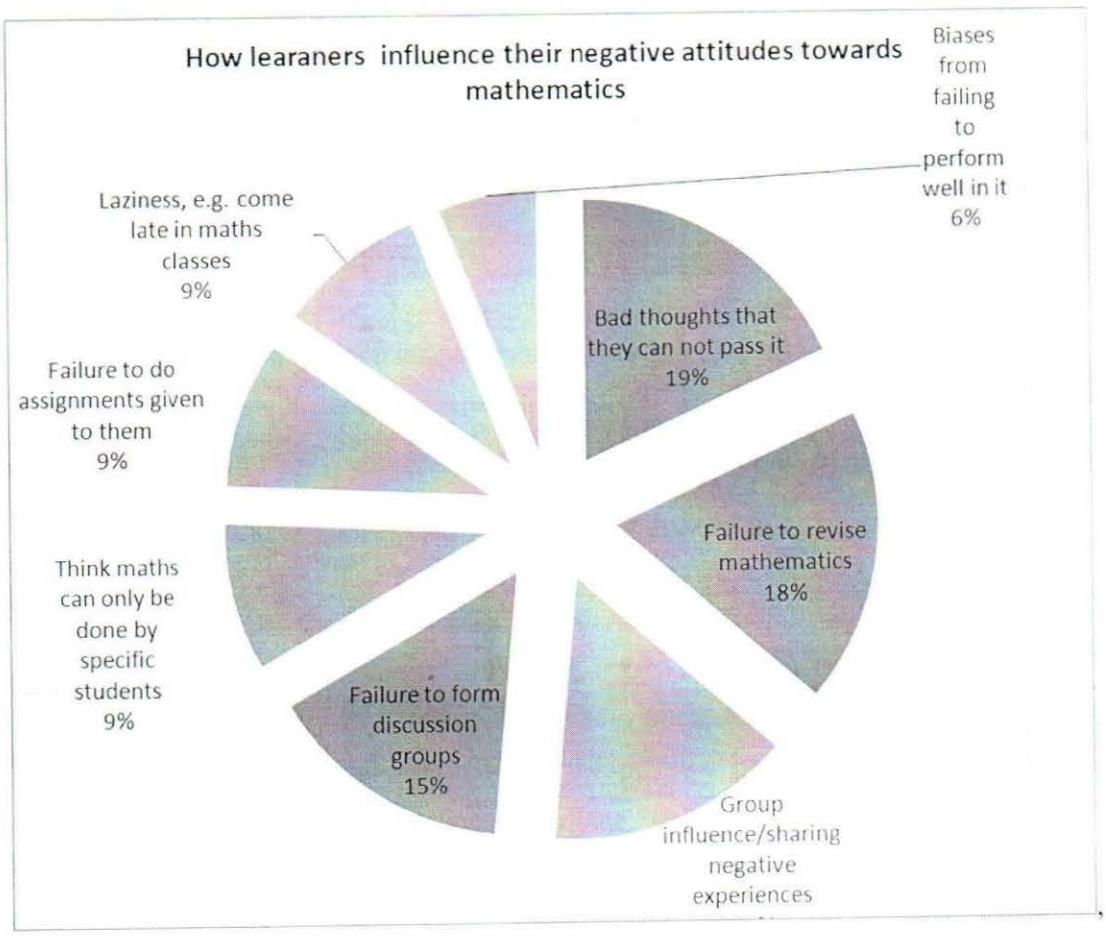


Figure 7: Views on how learners influence their negative perceptions

(Source: Field data)

On the other hand, students play a role in contributing to their positive perception of Mathematics. This is because they form discussion groups (59%), they are so inquisitive (42%), they become determined and attentive in class (42%), make self evaluation, attempt all assignments given and take them for marking, and ignore advise of other students to leave the subject (Table 8).

Table 8: How students influence their positive perceptions towards Mathematics

Influence of positive perception	Frequency	Percentage (%)
Form discussion groups	54	59
They are inquisitive	39	42
Become determined and attentive	39	42
Making self evaluation	28	30
Attempt assignments given and take for marking	25	27
Accept and appreciate the learning principles	25	27
Level of concentration	23	25
Ignore advise of other students to leave the subject	23	25
Follow other students' advise to leave the subject	15	16

Source: Field data

Influence of head teachers on learners' Perceptions towards Mathematics

In one way, head teachers contribute to the positive perceptions of learners towards Mathematics and in another, they contribute to negative Learners' Perception of Mathematics. Head teachers influence the negative perceptions of learners towards Mathematics in various ways including failure to provide teaching materials at school (42%), failing to pay experienced teachers (29%), poor motivation, among others as shown in Table 9 below.

On the other hand, head teachers influence positive perceptions of students towards Mathematics by rewarding best performing students (46%), making a close follow-up about the performance of students (41%), facilitating students for external and internal seminars and workshops (40%); availing teachers with teaching materials (27%), among other factors (Table 9).

Table 9: How head teachers influence Learners' Perception of Mathematics

Negative Influence	Frequency	Percentage (%)
Failure to provide teaching materials at school	39	42
Failure to pay teachers who are experienced	27	29
Poor motivation of Mathematics teachers	24	26
Making thorough criticisms against teachers	24	26
Not appreciating students who perform well	24	26
Using language that portrays Mathematics as a hard subject	24	26
Reluctance in making follow-ups of students' work	13	14
Positive influence	**Frequency**	**Percentage (%)**
Rewarding best performing students	42	46
Make close follow-up about the performance of students	38	41
Facilitating students for external and internal seminars	37	40
Avail textbooks and other teaching materials	25	27
Holding guidance and counseling sessions with students	23	25
Motivating Mathematics teachers with allowances	20	22
Promise bursaries to those who perform well	16	17
Recruit qualified and enough teachers	16	17
Encourage learners to do Mathematics practically	14	15

Source: Field data

4.2.5 Characteristics of female students who perform well in Mathematics

The researcher tested respondents about characteristics of female students who perform well in Mathematics and various responses were obtained successfully. Female students who perform well in Mathematics are consultative (37%), they are reserved and normally quiet in class (35%), they are not shy but bold (23%), they look social and organized (22%), among other characteristics, as shown in the Table 10 below.

Table 10: Characteristics of female students who perform well in Mathematics

Characteristic	Frequency	Percentage (%)
They are consultative	34	37
They are reserved and quiet in class	32	35
They are bold	21	23
Are social and organized	20	22
Are focused	20	22
They love their subject and teachers	19	21
Have a high level of understanding	17	18
They make personal revisions	17	18
Attend school regularly	16	17
Well disciplined	15	16
Many come from a humble background	14	15
Are in most cases shabby	14	15
Do not have grown-up hair	13	14

Source: Field data

4.2.6 Characteristics of male students who perform well in Mathematics

As demanded in 4.2.6, teachers were asked to mention characteristics of male students who perform well in Mathematics and multiple responses were obtained. Male students who perform well in Mathematics love discussion groups (32%), and like their female counterparts, they are consultative/inquisitive (22%), and social (20%). Looking at the characteristics of the male students and female students, there is a difference observed. On the males' side, a reflection of differences is in factors such as the desire to be competitive, considering Mathematics more of a priority than other subjects, not being fond of girl-boy love relationships, among other differences. Females also have different characteristics which include being bold, being shabby, coming from humble families, among other factors.

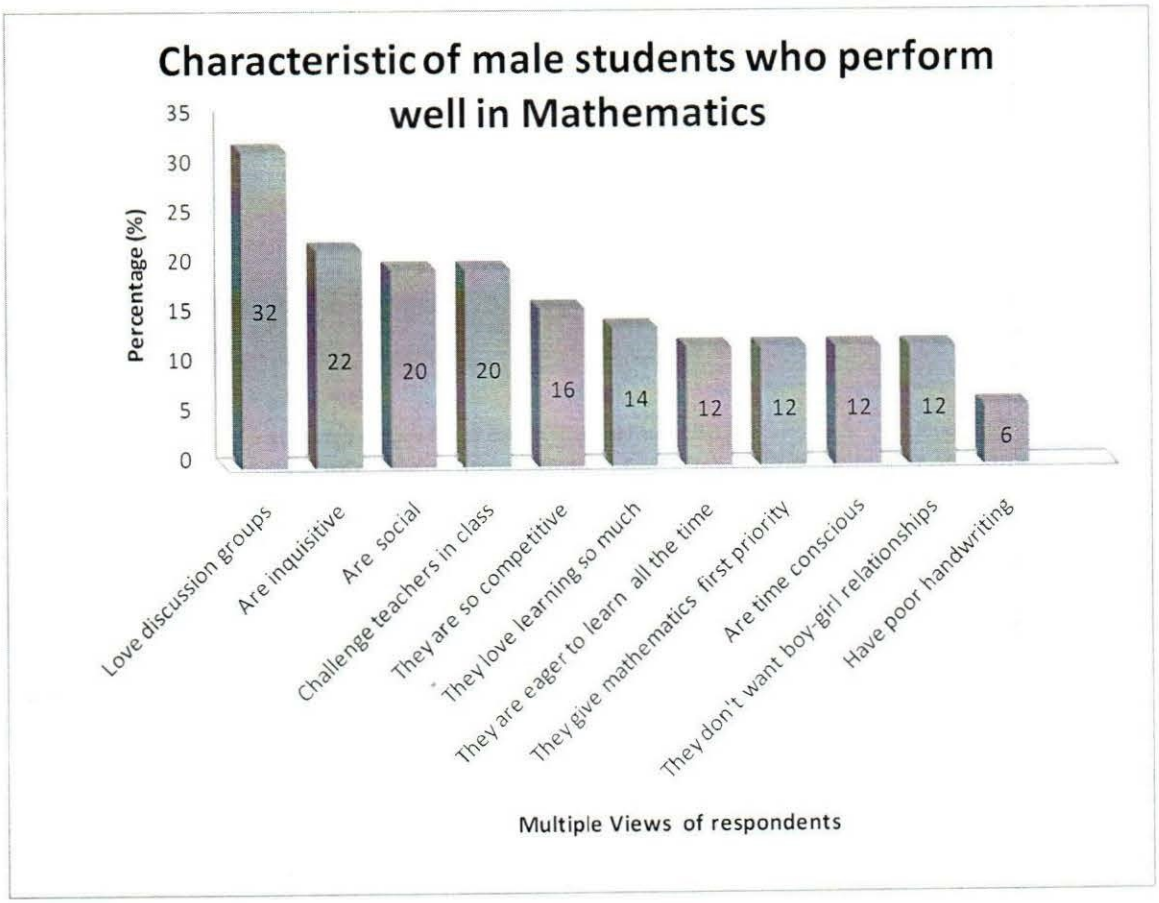


Figure 8: Characteristics of female students who perform well in Mathematics (Field data)

4.3 Ways in which learners perceive Mathematics

Views about performance of male students in Mathematics in various examinations

Teachers in different schools mentioned that male students perform well in UNEB examinations but their performance in periodic tests and examinations is relatively poor. In some schools, male students' performance in Mathematics was identified to be moderate while in others, it was generally poor both in UNEB and in periodic tests.

Views about the performance of female students in Mathematics in various examinations

Teachers gave multiple comments about the performance of female students in the preceding examinations to the research project. They stated that female students, like their male counterparts perform poorly in periodic tests and examinations. However, female students

normally perform poorer than the male counterparts when it comes to UNEB. In some schools, teachers stated that girls perform below average when given examinations.

Do some students who like Mathematics fail to perform well in tests and exams?

In a structured question, teachers were required to give their views on whether or not, some students who show greater interest in Mathematics during lessons end up performing poorly in examinations. Most of the teachers (76%) agreed, some disagreed while others remained neutral as indicated in figure 10 below.

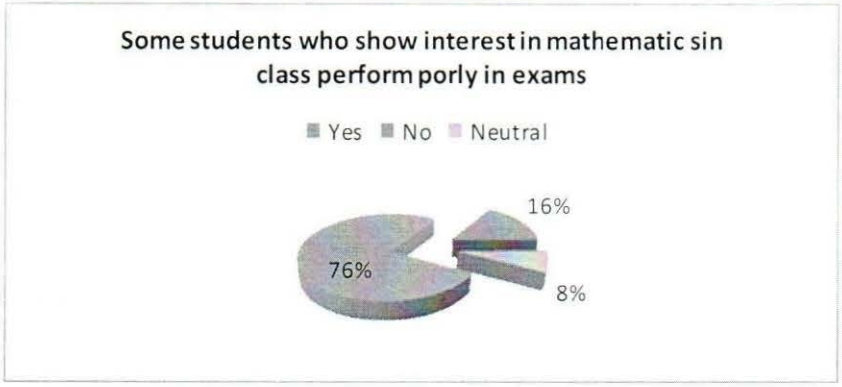


Figure 9: Do students who show interest in Mathematics during class perform poorly in examinations

(Field data)

Reasons given to explain why students who show interest in class end up performing poorly in examinations

Sometimes, the failure was related to the change in type of examinations set whereby UNEB set hard examinations for students. These examinations at times are either not in line with what teachers have already taught or the language used

At times, it was as a result of panicking in examinations making them fear to attempt even the simpler questions. According to responses by some teachers, students could even panic upon seeing a strange color of an examination paper, which in turn disorganizes their subsequent positive thinking towards the questions set.

Some times, students showed interest only when in class but did not practice calculations after class. They thence forgot basic calculations ending up into failure to perform well in examinations

Some students were disabled or have other problems which affect their psychological performance during examinations

Many students become over confident about the subject during examinations and end up being frustrated either by time or by failure to choose on questions they can do perfectly.

Some students fail to manage time by over concentrating on particular questions and not completing many important questions.

Sometimes, it is as a result of inadequate preparations.

At times, ambition makes them think they know everything and later fail to choose among the many what to do.

Many students in that category do not want to make discussions during revision yet Mathematics is practical.

Misinterpretations of questions may also lead to failure. This is related to over anxiety and ambition

They always want to focus on final examinations and put little attention on foundational tests/exams

Many students do not want to look at past examination papers yet there are many possibilities of setting questions from topic covered some years ago.

In many cases, such students pay little attention to Mathematics when it comes to revision. For they think Mathematics can not be revised and end up being misfired.

Sometimes it is teachers' fault for not completing the syllabus. Sometimes, teachers choose few topics to teach and over concentrate on those ones, leaving most of the information that can be relevant to students in final examinations. Especially if the syllabus was not completed

It at times happens in topics that they never understood well and yet there are no other familiar questions

Lack of Mathematics materials such as sets, calculators may lead to failure because many questions are practically attempted by drawing or making calculations using mathematical sets and calculators/log books respectively.

Reasons to justify why students who show interest in Mathematics during classes also perform well in examinations

They take time to look for questions during discussions and become well prepared

They pay much attention whenever in class and take time to consult teachers in case of uncertainty.

They like teachers making consultation easy whenever need arises

Questions are normally familiar to them because they make regular discussions

They ensure handing in heir books for marking and make corrections immediately with close consultations of teachers. They are always confident when they enter examination rooms

Why some male and female students who do not show interest in class rooms end up performing well in the final examinations

In many cases, students may fail to show interests in Mathematics during classroom but surprisingly perform well in examinations. Teachers gave a set of multiple reasons to justify this as indicated in the figure 11 below. The major justification is that such students do not want to share ideas with others (18%), many become very serious at examination hour (14%) while others decide to join discussion groups when about to do exams (10%).

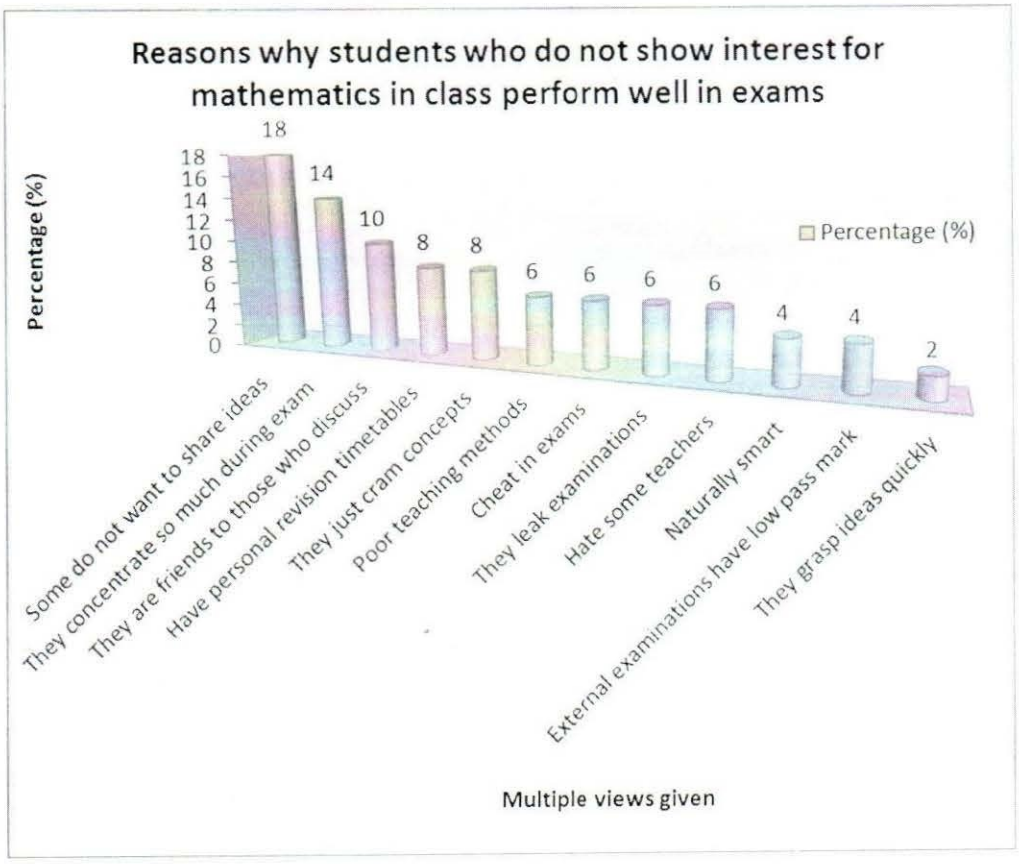


Figure 10: Reasons to explain why students who do not show interest in class perform well in exams

(Field data)

4.4 How to change learners' perceptions

To obtain responses on ways of improving Learners' Perception towards Mathematics, teachers were required to state the role of parents, teachers, students, head teachers and District Education Officer in this respect, and they gave multiple responses about each stakeholder as represented in the distributions following.

4.4.1 Ways in which teachers can help improve Learners' Perceptions

Teachers can improve Learners' Perception towards Mathematics by carrying out continuous assessment (44%), counseling and guiding students about Mathematics whenever necessary (34%), encouraging students to form clubs/discussion groups (32%) and guiding students on how to approach questions, among other ways, as illustrated in figure 12 below.

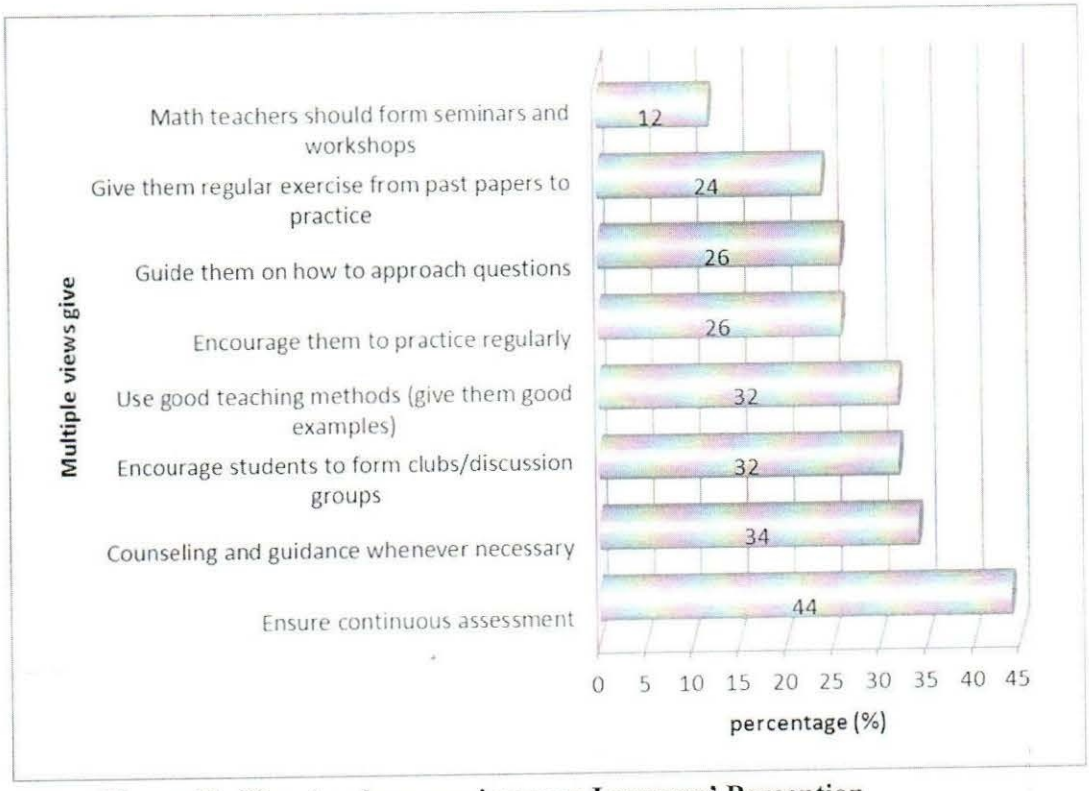


Figure 11: How teachers can improve Learners' Perception

(Field data)

4.4.2 Ways in which Parents can help improve Learners' Perception

Teachers gave multiple views about ways in which parents can help improve Learners' Perception towards Mathematics as shown in Table 11. There were common responses in four factors-rewarding children, who perform well, and counseling, each with 42% on one hand, and telling children about successful people who have excelled because of Mathematics as well as reducing parent teacher gaps, each with 30% representation, on the other hand. However, the highest percentage of responses (77%) stated that buying scholastic materials for children is a great role of parents in improving children's perception towards Mathematics.

Table 11: How Parents can improve Learners' Perception

Multiple views about parents	Frequency	Percentage (%)
Buying scholastic materials	71	77
Pay school fees in time	63	68
Encourage them to revise hard	52	56
Give them enough revision time	41	45
Reward children who perform well	39	42
Counseling	39	42
Tell them about successful people as roll-models	28	30
Reduce parent teacher gap	28	30
Provide a balanced diet to children	27	29

(Field data)

4.4.3 Ways in which students can improve their Learners' Perception

Students could improve their perception towards Mathematics in multiple ways as in Table 10.There is a great relationship between forming focus discussion groups and improvement in Learners' Perception of Mathematics. This was because just like in other responses above; it has the highest percentage distribution (85%), compared to all other factors. This is seconded by the attempt to consult Mathematics teachers about areas of uncertainty whenever necessary (72%). Other ways in which students can improve their perception towards Mathematics include making regular revision because Mathematics is a practical subject that can not be crammed, avoiding bad groups that normally talk ill about Mathematics (61%), Attending classes regularly and in time (61%), attending seminars and workshops whether internal or external, being active in class, attempting all exercises given and taking them for marking and generally having positive perceptions towards Mathematics (Table 12).

Table 12: Ways in which students can improve their perceptions

Multiple views about students	Frequency	Percentage (%)
Form groups discussions	78	85
Consult Mathematics teachers	66	72
Regular revision	56	61
Avoid peer influence	56	61
Attend classes regularly and in time	43	47
Attend seminars, workshops and clubs	32	35
Be active in class	21	23
Attempt all exercises given and take for marking	21	23
Have positive perceptions	20	22

Field data

4.4.4 Ways in which Head teachers can help improve Learners' Perceptions

There were various ways in which head teachers can improve Learners' Perception towards Mathematics. Most of them center on being able to create an enabling environment for the change in perceptions. Among the views given, rewarding students and teachers who excel (36%) is one significant way in which head teachers can improve Learners' Perception towards Mathematics. Other significant views mentioned include recruiting qualified and experienced teachers of Mathematics (30%), acquiring relevant instructional materials (28%), and organizing for internal and external seminars (26%), among many other factors (Figure 13). These responses were analyzed manually and presented into a chart.

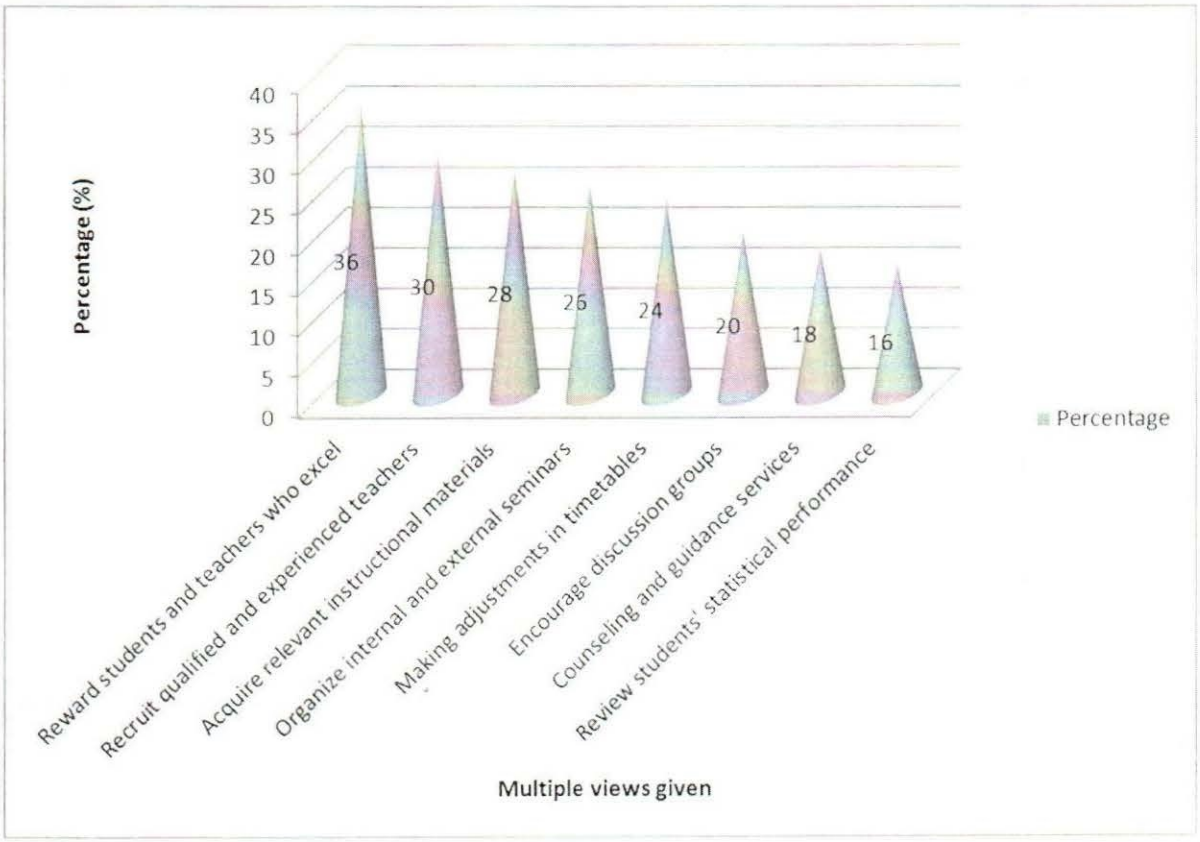


Figure 12: Views on how head teachers can improve Learners' Perception

(Field data)

4.4.5 Ways in which the DEO can improve the Learners' Perception

Teachers gave multiple responses on how the DEO can improve Learners' Perception towards Mathematics in Iganga district. Among the great roles that the DEO has to play is ensuring regular inspection of schools (24%), followed by posting qualified Mathematics teachers to schools evenly (14%). Apart from organizing internal and external workshops (12%), teachers also stated that the DEO has a role to lobby instructional materials from the ministry of Education and Sports, among other factors as indicated in Table 13.

Table 13: How the DEO can improve Learners' Perception

Response	Frequency	Percentage (%)
Regular inspection of schools	22	24
Post qualified Mathematics teachers to schools evenly	13	14
Workshops and seminars-external and internal	11	12
Lobby instructional materials from MoES	8	9
Publishing performance patterns for schools	8	9
Conduct career guidance	7	8

4.4.6 Other ways that can improve Learners' Perceptions

Teachers gave more ways through which Learners' Perception towards Mathematics can be improved as stated below

Teachers must carry out regular revision with learners. This can help reduce the gap between teachers and students which affects their abilities to make consultations.

Schools have to organize and give rewards to students and teachers who perform well as an incentive for them to maintain the habit

Head teachers are advised to organize parties for all students who perform well to motivate others to follow suit

Head teachers in collaboration with DEO should organize regional, national and international workshops with teachers and pupils respectively to share about teaching methods and how to improve on Mathematics performance in schools

Schools need to introduce programs to coach students during holidays (however, even if possible, this is prohibited by the Ministry of Education and Sports-a dialogue is required here in case this agitation can solve the problem in question).

Parents and teachers are advised to relate students to successful individuals who passed well and have good jobs

It is also very necessary to counsel students about the relevancy of Mathematics

Students are urged to carry out research about Mathematics extensively in past papers of successful schools and consult them through exchange programs

Teachers, head teachers and all other stakeholders are advised to attend to problems of individual students to ensure improvement in performance

Providing students who are in discussion groups with question banks so that they can revise following order of topics from ancient times to avoid being biased with forgetfulness in examinations.

Teachers have to accept and join students' discussion groups to monitor the achievement periodically.

Students need to accept that Mathematics is a life reality and without it, the future is dark. The have to embrace it and develop positive perceptions towards it.

Initiate programs of joint examinations so that students get exposed to various ways of setting examinations and learn various approaches to questions. This can be done by teachers in union with their head of school.

Establish strong friendly relationship between teachers and pupils so that they find it easy to make consultations. Teachers are advised to be close to pupils and follow them up individually to see their progress.

Students and their teachers ought to initiate programs which enable them have daily revision programs to get used to Mathematics calculations.

Parents are advised to be so close to Mathematics teachers so that they can monitor the academic performance of their children.

CHAPTER FIVE: DISCUSION, CONCLUSIONS, RECOMMENDATIONS AND GAPS FOR FURTHER RESEARCH

5.0 Introduction

This chapter includes discussions of findings in line with research questions/objectives, the conclusions, recommendations and gaps that have been cited for further searches.

5.1 Socio-demographic Construction of respondents

The research encompassed four sets of respondents; students, head teachers, teachers, and the DEO of Iganga. The investigator probed for numerous interests including marriage category, years of work practice, category of school, education level, gender composition, age structure, among other concerns. Reactions given about questions asked varied according to these socio-demographic constructions. Other responses varied with age, some varied with school category, others differed according to gender composition, and quite a number of them varied with the subject taught as reviewed in the following sections.

5.2 Discussion of findings according to study questions

The investigator used Bandura's Social Learning Theory (SLT) to have a direction in the discussions. The results of the findings were suitable in line with the theory. The three concepts: *people learn through observation, internal mental states are essential in learning,* and *the fact that something has been learned does not mean that there is a change in behavior,* unfolded in the theory are applicable in the findings.

5.2.1 What factors determine Learners' Perceptions towards Mathematics?

The researcher basically discussed teacher related, parent related and student related determinants of students' perception towards mathematics.

Teacher related determinants

The investigator identified that some factors are teacher related. Carrying out continuous assessment is one of those ways teachers can influence Learners' Perception towards Mathematics. Continuous assessment enables a teacher to supervise the achievement levels of learners on individual bases. It encompasses giving continual exercises/homework to measure levels of perception for individual students and making follow-up to ensure that all students have submitted in their books for correcting. Consequently, a teacher has to attend to all weaknesses of students till positive results are obtained. Another way is to use good methods

of teaching, encouraging learners to join group discussions, working hard to ensure that they complete a syllabus, and organizing seminars with students with in and out of the school to compare different ways of approaching Mathematics problems (Table 4.5).

Teachers can negatively influence Learners' Perceptions towards Mathematics by; using poor methods of teaching, using bad remarks such as "Mathematics is not for ladies, it is for gents" failure to carry out continuous assessment. At times, teachers themselves have negative perceptions towards Mathematics and students follow suit. Akogu (2011), states that students can only develop positive perceptions towards mathematics if their teachers also have positive perceptions towards the same. Akogu acknowledges that if teachers who speak negatively about Mathematics while teaching students do a lot to discourage students from liking mathematics.

On the side of female students, teachers form love relationships with them. As a result a student can not have enough time to concentrate because she spends most of the time in love affairs with the male teacher. Some teachers rash to complete the syllabus but do not care whether or not, students have grasped the past topics (see figure 6). In other cases, teachers who complete the syllabus spare very limited time to revise the past work with students. Teachers do not also provide students with question banks so that they have a guided discussion. Cases of late coming and dodging of lessons among teachers were also reported by students and head teachers. This was new knowledge introduced in the research field. In the related literature accessed, authors do not talk about creation of love relationships between students and teachers, rushing to complete syllabuses and sparing little time to revise, and cases of late coming among teachers and students.

The issue of teaching methods is also of great concern for teachers as determinants of students' perceptions towards mathematics. Nature of teaching methods was identified as a major factor which determines Learners' perceptions towards Mathematics. As Muhammad and Shah (2008) state, the use of good teaching methods is instrumental in determining Learners' Perceptions towards Mathematics in Iganga secondary schools. Students described teaching methods as the ability of teachers to explore simple ways of managing mathematical problems. Students further acknowledged that good teaching methods incorporate the use of straightforward examples to illustrate a mathematical problem.

Students' remarks about the methodologies of teachers in Mathematics classes trigger lots of interpretations about their perceptions of Mathematics. They aired out comments such as

the teacher is boring, he teaches to himself, he is self centered, he uses the hardest terms while explaining words, giving work to attempt before normal lessons, the teacher is so speedy, the teacher canes a lot etc.

At some point, responses varied between males and females from the same classes. In other cases, variations in responses tallied with variations in classes. These remarks clearly reflect leoville, Ferlinghetti and Pekhonen (2002)'s findings that if Mathematics is wrongly represented in classroom by teachers, it is very likely to find some students diverting their minds from it. Going by majority remarks, teachers in Iganga district are called upon to design the best ways in which students can develop positive perceptions towards Mathematics while in classes.

The issue of teaching methodology was also a concern for the DEO and head teachers. The DEO emphasized that teachers in various schools have insupportable customs of reviewing past papers instead of dealing with normal syllabus. In other schools, according to the DEO, teachers use bad language such as "Mathematics is for only those who tighten, it is a shock to the weak ones". Therefore poor teaching methods negatively influence learners' academic perceptions of Mathematics while good teaching methods compel learners to learn Mathematics.

Parent related determinants

Teachers, students, head teachers and DEO reacted to requirements about the influence of parents on Learners' Perceptions towards Mathematics. Parents are bound by the duty to provide scholastic materials such as mathematical sets, uniforms, calculators and logarithm books to students. In addition, parents have a role to counsel children about the need for Mathematics so that it cannot be considered as a subjected for classroom use only but as one that is encompassed in day to day running of activities. Further, parents determine Learners' Perception towards Mathematics through the remarks they make about the subject.

Some parents have a poor history about Mathematics, i.e. they failed to perform well in Mathematics and do not see the value to influencing their children to work hard and attain better grades in Mathematics. In agreement with this, Puscerat (2010) also states that the behaviors of parents who were not good at mathematics are transmitted to their children. All they say is that *we already failed and so you will.* They tell their children that Mathematics is

for the clever ones. Some parents do not even make follow-ups to establish achievement levels of their children in Mathematics, and many others do not see it necessary to discourage their children from joining bad groups which influence them against doing Mathematics.

According to Arlene (2001) though some students would love to do mathematics, their parents discourage them by wrongly advising them not to do it but concentrate on other subjects. Worse of it all, demand Media (2012) identifies learners watch their parents' behavior about mathematics and use it to justify their own performance. Demand media adds that parents view poor grades in mathematics more acceptable than in other subjects. This has escalated the poor perceptions of students towards mathematics in Iganga district.

Student related determinants

In this regard female and male learners have diverse factors that influence their perceptions towards Mathematics. The general factors related to their punctuality in classes whereby some come while others are prompt. The perceptions of students towards assignments given also influence their perception of Mathematics. Some attempt all assignments while others fail to do assignments. Others do assignments and fail to hand in while others do assignments, hand in and do the required corrections instantly.

Group influence is also common to both and determines their perceptions towards Mathematics as explained above. The nature of performance in successive examinations also determines Learners' Perceptions towards Mathematics. In addition lack of counselors about the need for Mathematics is also a problem. Other students are orphans and cannot afford to buy instructional materials such as logarithm books, mathematical sets, and graph books, among other requirements (Table 4.4, figure 8 and Table 4.6). These findings are related to what Loemberg (1988) calls the vicarious experience. In the vicarious experience, Loemberg states that learners are able to adopt and develop through observing others succeed. This means that learners can motivate each other to like mathematics. However, as Noble (2011) states it clearly, learners can easily learn from peers in that if their close friends perform well, they will also pull up their socks to achieve the same. On the other hand, if a learner's friend performs poorly, they will be enticed to pay no attention to mathematics. Therefore, learners in Iganga secondary schools develop positive or negative perceptions towards mathematics basing on their friends' performance.

Some factors were identified among female students but not among the male counterparts. These are; the general Perceptions of girls towards Mathematics, the kind of relationships between they hold with male teachers. Some female students just have self-pity and consequently fail to attempt mathematical problems. Other female students have a feeling that Mathematics can only be managed by male students (Table 4.4, figure 8 and Table 4.6).

Literature identified more girls with negative perceptions towards mathematics than boys. This according to Meece, Glienke & Samantha (2005), female students' perception is that Mathematics can only be managed by their male counterparts and therefore they become reluctant to do it. In the same way, Costello (1991) states that female students have a common perception that mathematics is a male self-image and it is inconsistent with female self-image-this female students develop poor perceptions towards mathematics.

To further confirm that mathematics is largely done by males, Arlene (2001) also states that all professions requiring skills of mathematics such as engineering, accounting, among others are dominated by men. Therefore, female students in Iganga must change this perception because mathematics can be managed by all sexes.

Career related issues also determine students' perception towards mathematics in Iganga district. According to the findings obtained, some students like Mathematics because they desire to pursue courses like accounting which involve a lot of mathematical experience. This compels them to have a positive opinion towards the subject. On the contrary, some students assume that Mathematics cannot be important to them in future because the courses they want to pursue are not slanted towards Mathematics. Arlene (2001) acknowledges that all professions requiring higher level of mathematics are dominated by men. This gives an implication that it is more likely to find more ladies than males who dislike mathematics due to lack of a foresight for possible courses requiring application of mathematics skills. Therefore it is important to ensure that all students regardless of their sex composition equally see the value of mathematics.

5.2.2 How do the poor perceptions of learners towards Mathematics?

According to the viewpoints by all categories of respondents, poor perception of learners towards Mathematics influences their academic performance in the following ways;

Hamlison and Whipple (2012) identify that negative perceptions towards mathematics makes limits students' ability to understand real life experiences. Students with poor perceptions towards Mathematics in Iganga district develop dislike for Mathematics teachers. As a result they hate Mathematics too. In a discussion, students mentioned that when one hates a Mathematics teacher, they hate the subject too. With such discontentment, students stop attending Mathematics lessons. Those who attend classes do it irregularly and end up failing to master basic topics. During examinations, they fail to choose on a number the can do perfectly. In 4.1.7, students in similar classes were not aware of the number of lessons taught per week. Others mentioned six, some said one while others said two. This is an indication that some students dodge lessons and finally perform poorly.

If students dislike Mathematics, they give excuses like "Mathematics is for boys, girls can not achieve positive results in Mathematics". Some say Mathematics contains many calculations. Others just say Mathematics is very hard to do. With such misconceptions, students end up luring others with similar Perceptions to avoid discussion groups, hate Mathematics teachers and finally do not grasp anything at all.

Owing to loss of interest in Mathematics, students do not attempt assignments on regular bases. Sometimes, they calculate numbers but at other times, they dodge assignments. In addition, such students cheer the revision of other subjects more than Mathematics. Indeed, in examinations, many of the students who loathe Mathematics achieve high marks in other subjects but get few marks in Mathematics.

The effects of poor Learners' Perception of Mathematics on their academic performance were also reflected in the comments of teachers and head teachers about Mathematics academic performance in successive examinations. Responses unfolded that most students perform well in UNEB but perform poorly in periodic tests.

Surprisingly, some students who show desires for Mathematics in classrooms end up failing to achieve positive results in final examinations. On the other side, there are some students who do not show desires for Mathematics in classrooms but perform well during final examinations.

Bandura acknowledges that direct reinforcement does not account for all types of learning. Some students may be directly reinforced with all sorts of requirements such as mathematical sets, calculators, graph books and others as required but finally fail to perform well. On the other hand, some students may not have all the required mathematical materials but if given chance they excel.

In general, all literature reviewed point to the effect that positive perceptions towards mathematics result into better performance and better use of mathematics in daily lives while negative perceptions lead to hatred of mathematics and results into poor performance among students in Iganga district.

5.2.3 How can Learners' Perception towards Mathematics be changed?

This can be ensured through checking the teacher-related, parent related and student related factors which negatively determine Learners' Perception towards Mathematics.

A advocated by Norman (1996) and Broom (1973), Parents in Iganga district should give their children mathematical equipment such as mathematical sets, calculators, rulers, logarithm books among other requirements. Parents are also encouraged to pay school fees in time so that students do not face problems of being sent out of class. In most cases, without such requirements, students rarely settle down for commitment.

Young (1988) advocates for motivation of teachers to raise academic performance in Mathematics among students and so by adopting this, schools in Iganga district have to organize and give rewards to students and teachers who perform well as an incentive for them to maintain the habit and raise the interest of students towards mathematics. This was viewed as a basic role of Head teachers in collaboration with DEO who should organize regional, national and international workshops with teachers and pupils respectively to share about teaching methods and how to improve on Mathematics performance in schools

In addition to uplifting the morale of students towards mathematics, schools in Iganga district need to introduce programs to coach students during holidays (however, even if possible, this is prohibited by the Ministry of Education and Sports-a dialogue is required here in case this agitation can solve the problem in question).

It is also a role of students to carry out research about Mathematics extensively in past papers of successful schools and consult them through exchange programs. However, this can be

done easily when the parents and school administrators provide incentives for this through Providing students who are in discussion groups with question banks so that they can revise following order of topics from ancient times to avoid being biased with forgetfulness in examinations, teachers have to accept and join students' discussion groups to monitor the achievement periodically to enable students form discussion groups and get exposed to various ways of solving Mathematics problems, initiate programs of joint examinations so that students get exposed to various ways of setting examinations and learn various approaches to questions as stated by Broom (1973) and Sullivan (2006).

It would be vital for teachers to carry out continuous assessment in order to assess the capacity of students' understanding on individual bases. In addition, teachers have to get close to students while in discussion groups so that they provide simplest ways of solving Mathematics problems. Since mathematics is a practical subject, it requires students and teachers to always make thorough calculations. In addition, students and their teachers ought to initiate programs which enable them have daily revision programs to get used to Mathematics calculations.

Parents are advised to be so close to Mathematics teachers so that they can monitor the academic performance of their children. Besides that, Parents are obliged to usually pay school fees in time and also provide students with necessary scholastic materials such as mathematical sets, calculators, logarithm books, among other requirements. This enables students to concentrate without being sent away for such requirements.

5.3 Conclusions

The research was carried out successfully and the gaps identified were filled using responses obtained. The determinants of Learners' Perception towards Mathematics were identified to be teacher related, head teacher related, student related and parent related.

The ways in which poor perception of Mathematics influences students' Mathematics performance basically involved the identification that students who hate Mathematics end up hating the teacher of Mathematics too. In addition, such students face frustrations when in examination rooms. Many fail to attend classes regularly and many others do not want to join discussion groups.

Among the ways in which Learners' Perception towards Mathematics can be enhanced, the investigator identified that there was need for parents, students, teachers, head teachers and DEO to ensure that hindrances to factors such as regular school attendance, provision of mathematical requirements to students and forming discussion groups are eliminated to create an enabling environment for students to have positive perceptions towards Mathematics.

5.4 Recommendations

The investigator recommends the following

Continual heart of making discussion groups as the only way to revise Mathematics using approaches from different students

Forming seminars and workshops between students with in and out, and between teaches with in and out. As a result teachers will continue digesting various ways of simplifying Mathematics calculations. At the same time, students will be mastering skills in approaching Mathematics problems.

All stakeholders are required to play their part-parents by providing essential scholastic materials, teachers playing their part as required, and school managers should also play their parts in establishing an enabling environment for students to develop positive perception towards Mathematics.

Students who excel in Mathematics are recommended to join the teaching profession to check on inadequacy of Mathematics teachers.

5.5 Gaps for further research

More investigations have been cited as required in the following areas;

The extent to which teaching methods has contributed to poor learners' performance in Mathematics

Comparison of the causes of poor Mathematics performance between girls and boys

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APPENDIX 1: Determination of Sample size from a given population

"N" is the population size

"S" is the sample size

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	190	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	341
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	198	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	385

APPENDIX 1: QUESTIONNAIRES FOR TEACHERS

Name: Kisalwe kalimu

I am doing an academic research on "Learners' Perceptions of Mathematics and their academic Performance in Uganda" using a case study of Iganga District, to meet one of the basic requirements for an award of a master degree in *Education Policy, Planning and Management*, of Kyambogo University. I humbly seek your responses in line with the following questions to enable me compile the report.

Indicate one figure of the right option in the empty box in the last column, as indicated in the following example

No.	Question	Options to choose from	Response
1	Do you have children at home?	Yes (1) No (2)	1
2	Crime Prevention Mechanism	Love (1) Hatred (2) Counseling (3) Others (4)	4

SECTION A

Background Information

No	Question	Options to choose from	Response
1.	Which is Your Age-group	20-29 (1) 30-39 (2) 40-49 (3) 50-59 (4)	
2.	Sex description	Male (1) Female (2)	
3.	Type of School	Private (1) Government (2)	
4.	Academic	Diploma (1) Degree (2) Certificate (3) Master Degree (4) Others (5)	

5.	Marital Status	Married (1) Single (2)	

6. What is the name of your Sub County? .....

7. How many classes do you teach a day?.....

Section B

This section seeks responses about determinants of Learners' Perception of Mathematics

8. Give three reasons that make some students like Mathematics

i. .....

ii. .....

iii. .....

9. Why do some male students dislike Mathematics (Give at least three reasons)

i. .....

ii. .....

iii. .....

iv. .....

10. What makes some female students not to like Mathematics?

i. .....

ii. .....

iii. .....

iv. .....

11. Give two ways in which each of the following influences Learners' Perception of Mathematics

A. Parents

i. .....

ii. .....

B. Teachers

i. .....

ii. .....

C. Students

i. .....

ii. .....

D. Head teachers

i. .....

ii. .....

12. What are some of the characteristics of female students who perform well in Mathematics?

i. .....

ii. .....

iii. .....

iv. .....

13. Give at least three characteristics of male students who perform well in Mathematics

i. .....

ii. .....

iii. .....

iv. .....

Section C

14. Give your views about the performance of male students in Mathematics in various exams (Periodic tests, term exams, and UNEB)

i. .....

ii. .....

iii. .....

15. What is your view about the performance of female students in the previous examinations?

i. .....

ii. .....

iii. .....

16. Do you think some students who show great love for Mathematics fail to perform well in tests, and examinations? .....

17. Give three reasons to support your answer in (14 above)

i. .....

ii. .....

iii. .....

18. Why do some male students who do not show interest in Mathematics during class work end up performing well in examinations? (give two reasons)

i. .....

ii. .....

19. Why don't some female students show interest in Mathematics?

i. .....

ii. .....

Section D

Ways of improving Learners' Perception of Mathematics in order to improve on academic performance

20. How can the following help to make Learners' Perceptions towards Mathematics positive Give at least two ways

A. Teachers

i. .....

ii. .....

iii. .....

iv. .....

B. Parents

i. .....

ii. .....

iii. .....

iv. .....

C. Head teachers

i. .....

ii. .....

iii. .....

iv. .....

D. District Education Officer (DEO)

i. .....

ii. .....

iii. .....

iv. .....

E. Students

i. .....

ii. .....

iii. .....

iv. .....

21. Suggest other ways that you believe can help to make Learners' Perceptions positive towards Mathematics and in turn improve their academic performance?

i. .....

ii. .....

iii. .....

iv. .....

.....Thank you Very Much for your time.....

Appendix 2: Focus Discussion Guide for Students

1. What do you understand by the term "Mathematics"?
2. How many Mathematics lessons do you attend per week?
3. What are your comments about the way teachers teach Mathematics?
4. Do you love doing Mathematics homework after lessons?
5. Why do you think homework is good?
6. Why would you think homework is not good?
7. What reasons can you give to explain why some students do not perform well in Mathematics?
8. What things can the following do to discourage students from performing well in Mathematics?

A. Parents

B. Teachers

C. Head teachers

9. How can your friends influence you to love or hate Mathematics?
10. What things do students who perform well Mathematics do?
11. Mention some of the things which students who do not perform well in Mathematics do
12. What advice would you give to students who do not perform well in Mathematics?
13. What problems are faced by students who do not love Mathematics?
14. Give ways in which perceptions of students towards Mathematics can be made positive

Appendix 3: Interview Guide for Head teachers

1. Name of school
2. Type of school
3. Job experience
4. How many Mathematics teachers do you have?
   A. Male teachers .....
   B. Female teachers .....
5. Comment about the general performance of students in Mathematics for the last two years
   A. General performance of female students
   B. General performance of male students
6. Why do you think some Male learners like but others dislike Mathematics
7. Why do some female students have dislike for Mathematics
8. What is the Student-teacher ratio in your school?
9. Are the teaching and learning materials in relation to Mathematics adequately available?
10. What are some of those materials in (8) above?
11. How do you think parents influence Learners' Perception towards Mathematics?
    A. Male learners
    B. Female learners
12. How are teachers responsible when female learners pass or fail to perform well in Mathematics?
13. Give ways in which Learners' Perception towards Mathematics can be made positive in order to improve on their academic performance.

Appendix 4: Interview Guide for the DEO

1. How many secondary schools are in Iganga
2. What are the obstacles to better academic performance of students in secondary schools?
   A. Male students
   B. Female students
3. Why do you think some students perform well in Mathematics while others do not?
   Male students
   Female students
4. What is your comment about the general students' performance in Mathematics for the period you've been a DEO?
   A. Performance of male students
   B. Performance of female students
5. What measures can Mathematics teachers take to enable students pass Mathematics?
6. What can you, as DEO do to ensure that students perform well in Mathematics?
7. What other ways can you suggest to help improve students' performance in Mathematics?