

KAMPALA INTERNATIONAL UNIVERSITY

TITLE:

GENDER DISPARITY IN MATHEMATICS PERFORMANCE:

FACTS AND FACTORS

CASE STUDY:

PRIMARY SCHOOLS IN LELMOKWO ZONE, NANDI NORTH

DISTRICT-KENYA

BY

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A RESEARCH REPORT SUBMITTED TO THE FACULTY OF BUSINESS
ADMINISTRATION IN PARTIAL FULFILMENT OF THE AWARD OF A
BACHELOR OF EDUCATION DEGREE OF
KAMPALA INTERNATIONAL UNIVERSITY.

APRIL 2009

DECLARATION

I, PERIS N. KENYATTA- BED 13566/61/DF

do declare that the information given in this research report is made by myself and has never been presented by any other person, for the award of the degree of Bachelor of Education

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APPROVAL

This is to certify that **PERIS N. KENYATTA- BED 13566/61/DF**
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71%

DEDICATION

To my beloved husband Samson O. Onyancha and children Victor, Berkley, Yvonne, Sheilla, keyvan and Mukras.

ACKNOWLEDGEMENT

I would like to thank the good Lord for giving me strength and courage to compile this research report because without Him I would not be able to accomplish anything.

Special thanks go to my supervisor, Rev. Erich Kasirye who was a good mentor and advisor during the compilation of this work. To my family members and staff of Nyataro Primary school May the Good Lord reward you abundantly.

ABSTRACT

This research project report presents a survey done on factors related to gender disparity and academic performance in mathematics among primary school pupils in Lelmokwo zone, Kosirai Division, Nandi North District of Kenya. The objectives of the study were to identify the factors that cause gender disparity in mathematics performance in primary schools among the pupils. These factors included lack of role models, poor teaching methods, teachers' qualifications, inadequate teaching materials and resources, parental attitudes, teachers' attitudes, pupils' attitudes towards mathematics and the cost of education (poverty). The main purpose of this study was to determine the factors contributing to poor performance in mathematics among primary school pupils in the zone. There were twenty (20) primary schools of which four (4) of the schools were sampled by use of purposive random sampling; each was picked from four locations where the schools were found.

The researcher interviewed ten lower primary and ten upper primary teachers. This was after consulting the head teacher of the respective schools for permission to carry out the study. The researcher then observed two lower primary and two upper primary teachers and collected data from each. Performance were recorded in order to establish whether there was gender disparity and root out causes related to the respective performance in mathematics. The researcher used questionnaires in collecting data from subjects. The analysis of data was carried out with the aid of Microsoft excel. The report revealed that the poor performance in mathematics is a matter that concerns all the stakeholders of education system who include parents, teachers, pupils, education officers and the Government.

Due to tender age most pupils do not know the reasons for their poor performance in mathematics. The research revealed that the main factors contributing to poor performance were mainly based on gender disparity and included the following: lack of role models, poor teaching methods, teachers' qualifications, inadequate teaching materials and resources, parental attitudes, teachers' attitudes, pupils' attitudes towards mathematics and high cost of education (poverty). All the above contributed to poor performance in mathematics especially among girls. The results of this study can be used by all concerned to sensitize the public at large on the significance of mathematics as a subject with a view to altering their attitudes regarding mathematics. The study can also be used as a framework towards improving mathematics performance from lower primary classes to secondary levels to apply to even other subjects apart from mathematics. The study can also be used by educational government departments and teachers to project on better future performance of mathematics in schools. Suggestions and recommendations have been given which, if put in to practice can go along way in alleviating and avoiding discrepancies evident in lower and upper primary classes perpetuating gender disparity in performance.

Further research is called upon to focus on the motivators and effects of pupil's gender disparity in the performance of mathematics.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Gender disparity has existed as long as history exists. It has been experienced throughout the world in all sorts of life. Gender has a pervasive influence whether we like it or not. If we see gender as the socially constructed attributes of an individual, related to his or her sex, there is almost always gender differentiation in any given context, where one is seen as either male or female and treated as such. Gender inequalities and sexism in education we now know continued to play a significant role in the slow development of African economics. Disregard for and discrimination against 50% of the population (female) contributes to slow and poor performance in most African countries.

Up to 1970s, considerably more boys than girls participated in education in Kenya. The Kenyan women, like her sisters in other parts of Africa, had more than her fair share of obstacles to overcome. In spite of various actions and inputs by the government as well as intervention by Non- Governmental Organization (NGOs), religious organizations and international organizations, gender disparity as taken its roots in the society. However, girls still lag behind boys at all levels of education despite the fact that the government, communities and house holds and other partners have been heavily investing in the education sector. They continued to avoid courses, which lead to career in science and technology.

Deeper forces in society that extended well beyond the boundaries of educational systems, institutions and processes caused gender inequality in mathematics. As observed in some studies (Alele – Williams, 1988, Adelman 1991: Erinosh, 1994). The basic causes of gender discrimination against women involvement in education generally, were deeply rooted in social – culturally

determined attitudes. Such factors included Patriarchy which encouraged which encouraged and perpetuated discrimination against females, sex stereotypes, division of labour in which domestic chores at home were assigned to females thus discouraging them from more active participation in mathematics causing gender disparity. This trend therefore as called for attention to find out what causes gender disparity in mathematics among primary school.

In Lelmokwo zone teaching of mathematics as been influenced by gender disparity factors leading to dismal performance, participation and achievement. Gender disparity has been caused by the following factors: Lack of role models among the girls, poor teaching methods, teachers' attitudes and qualification, pupils' self- concept and attitudes towards mathematics, inadequate teaching resources and facilities as well as parents' attitudes and poverty.

Due to the above factors the researcher found it necessary to look for ways and means of stemming out the causes of gender disparity in the zone and to improve the quality of mathematics education in the zone and the entire Nation. For instance Bernard Van Lee Foundation (1970 (BVL)) entered into agreement to upgrade the quality of Primary Education in Kenya. This foundation as contributed a lot by in-servicing teachers, training teachers on new methods of teaching, creating awareness, to the community to change their attitudes towards mathematics. Teachers have been made to ensure that learning of mathematics is holistic, integrated, stimulating and enjoyable. This could be achieved by using thematic approach where all the knowledge, skills and attitudes from all curriculum areas are developed and learnt in all integrated manner through themes.

1.2. Statement of the Problem

Gender disparity in access to education has been witnessed in primary, secondary, tertiary and university education in Kenya. The government's efforts in providing free primary Education in public schools was intended to ensure that all children acquire basic education but still enrolment rates of girls lag behind those of boys at all levels of education. The performance of mathematics in KCPE and other classes has been consistently low. Poor performance in mathematics has continued to be experienced in Lelmokwo zone when the KCPE results are released year after year by the Kenya National Examination Council.

A lot of pupils especially girls perform poorly in mathematics as compared to other subjects. This has inhibited majority of girls from being represented in mathematics, sciences and technology as they advance to higher levels of learning. Fewer girls choose mathematics and the overall performance of girls is usually poorer than that of boys, such issue has raised a lot of complaints from all stakeholders on the female poor performance in mathematics. The zone has been tailing among the three zones of Kosirai Division. There is inadequate research on this area. As a result the researcher saw it necessary to carryout the study in the area with the hope of establishing the causes which ultimately adds knowledge of the same to the academic fraternity so as to improve academic performance. The researcher is also of the view that education officers, head teachers and teachers would benefit from the knowledge of the findings.

1.3 Purpose of the Study

The purpose of this study was to find out the causes of gender disparity in the performance of mathematics among pupils of primary schools in Lelmokwo zone, Kosirai Division, Nandi North District of Kenya.

The researcher sought to suggest ways (strategies) in which to curb the gender disparity in access to mathematics and ways to boost positive attitudes towards mathematics among teachers, parents, pupils and the society in general

1.4 Objectives of the Study

The objectives of the present study were:

- i. To determine whether lack of role models among boys and girls caused gender disparity in mathematics.
- ii. To examine if teaching methods and learning resources caused gender disparity in mathematics.
- iii. To establish whether teachers' attitudes and qualifications contributed to gender disparity in mathematics.
- iv. To find out whether parents' attitudes and poverty caused gender disparity in mathematics.
- v. To determine whether pupils' self-concept and attitudes towards mathematics caused gender disparity.

1.5 Research Questions

Based on the objectives, the study attempted to answer the following research questions:

- i. Do lack of role models among boys and girls cause gender disparity in mathematics performance?
- ii. Do teaching methods and learning resources cause gender disparity in mathematics performance?
- iii. How do teachers' attitudes and qualification contribute to gender disparity in mathematics performance?
- iv. Do parents' attitudes and poverty cause gender disparity in mathematics performance?

1.6 Significance of the Study

The study is useful to various stakeholders in education system. It has recommendations that may help education planners to include guidance and counselling programmes in primary schools to help curb the causes of gender disparity in mathematics performance in primary schools.

The study also could help school administrators to foresee situations that could result in gender disparity leading to poor performance in mathematics mainly among the girl child and arrest them in advance. The study after diagnosing the causes offers possible solutions where applicable.

The provision of free primary education by the government highlighted on education for all children without favouring any gender and by attempting to curb the issue of school drop out. It was also hoped that the study could be used by education officials to project the transition trends to secondary school admission and to higher institutions of learning without discriminating according to gender.

The study was useful in accomplishing one of Kenya's National goals of education which aims at preparing and equipping the youth in the country with skills with which they can utilize to play effective roles in national developmental progress. It would still help them utilise their individual talents for their own welfare improvements as well as that of the entire nation. In order to meet this target of progress basics of mathematics are core elements towards enhancing such development.

The study intended to create awareness to the parents on various strategies in helping their children resolve their problems in mathematics performance in order to make them create positive attitudes towards mathematics in primary education and beyond. The study also intended to sensitize teachers, parents and the relevant government authorities to alter their attitudes towards girls' education.

1.7 Scope of the Study

Education enhances the national and individuals progress. Without it one cannot progress anywhere. Although great strides have been made in promoting good performance in all subjects in primary schools, mathematics performance has lagged behind as it is done poorly amongst the girls as compared to boys:

The study was designed to determine the causes of gender disparity in mathematics in Lelmokwo zone of which it included: lack of role models, poor teaching methods, teachers' qualifications, inadequate teaching materials and resources, parental attitudes, teachers' attitudes, pupils' attitudes towards mathematics and the cost of education (poverty).

The study was also designed in order to suggest recommendations and strategies to be used to alleviate the issue of gender disparity on pupil's performance in mathematics in lelmokwo zone and other parts of the division, the district and the entire nation.

1.8 Assumptions of the Study

This study was based on the following assumptions:

- i) The researcher assumed that there was gender disparity in access to Mathematics in the zone.
- ii) The researcher assumed that the sample selected from was a fair representation from which data is assumed to be accurate and true.
- iii) The researcher assumed that the selected sample of schools was a true representation of the other schools in the zone.
- iv) The researcher assumed that all teachers in the schools of the zone had a positive attitude towards mathematics irrespective of gender.
- v) The researcher assumed that both boys and girls of the zone performed equally well in mathematics.

vi) The researcher assumed that there was adequate teaching and learning resources and that teachers used them appropriately in mathematics lessons.

vii) The researcher assumed that pupils and parents had positive attitudes towards mathematics.

1.9 Limitations of the Study

The following limitations bound the study;

- i. The study limited itself to gender disparity in performance of mathematics among primary school pupils in Lelmokwo zone.
- ii. The whole population was not studied but four representative samples were obtained from the population for the purpose. Lack of adequate finances to extend the research beyond the zone because of cost as the researcher would have wished.
- iii. Time available for the study was also a major limitation.
- iv. It was only limited to primary schools in the zone as much time and manpower would be required to extend to high schools and colleges.

1.10. DEFINITION OF TERMS AND ABBREVIATIONS

K.C.P.E – Kenya Certificate of Primary Education

P.T.A - Parents and Teachers Association

UNICEF – United Nations International Children Education Fund

FEMSA – Female Education in Mathematics and Science in Africa

SMT - Science, Mathematics and Technology

T.S.C. - Teachers Service Commission. A body that recruit and employ teachers.

FAWE – Forum of African Women Educationalists

Pupils – Persons who are learning in formal schools either primary or secondary schools

Poverty – Lack of income unemployment and deprivation of basic needs and rights.

Factors – Conditions that bring about a result

Gender stereotype – It is a fixed impression, opinion of belief which is applied to a group of people or individual within a group

Gender disparity- The differences in performance according to sex, whether girl or boy.

Performance – The action of achievement in terms results from examination.

CHAPTER TWO LITERATURE REVIEW

2.0 Overview

This chapter (section) highlights on what other researchers have found out on the factors contributing to gender disparity in access to mathematics performance. They are presented as; lack of role models, poor teaching methods, teachers' attitudes and qualifications, teaching and learning resources, Attitudes of parents towards mathematics and Attitudes of pupils towards mathematics

2.1 Lack of Role Models

Gender disparity has been practiced for along time in many institutions. Gender has a pervasive influence whether we like it or not. Research findings have consistently shown that girls have been performing significantly poorer than boys in mathematics. This has been brought about by lack of role models among the girls. Women are consistently under represented in mathematics based institutions at the national level. For example, in 1998, female practising teachers represented 42% of the total number of teachers in primary and 35% in secondary schools. The number of women relative to men, who taught mathematics at the primary and secondary levels, the majority of female teachers were assigned to teach lower primary classes, while at upper primary classes mathematics was mostly given to male teachers. This situation tended to stereotype of female pupils against mathematics which adversely affected the performance of girls in this key subject because of no role models to relate to at this level. Female representation in mathematics and science – based subjects is generally low in access, participation and performance.

Various studies have shown that girls have obstacles in many ways to utilise their educational and intellectual capabilities (Masanja: 2004,3). Fewer girls choose mathematics and the overall performance of girls is much worse than that of the boys,

especially in mathematics. This results into very low enrolment rates in science, engineering and technology based subjects and disciplines at higher levels of learning especially those requiring mathematics skills and knowledge. Most of the managerial posts, engineers, surveyors, doctors, pilots among others are male dominated fields because they are mathematically based.

2.2 Teaching Methods

The school syllabus in Kenya is considered to be too long and gender biased. In an effort to cover the syllabus, teachers have no time to deploy teaching methods that may captivate the imagination or develop critical thinking in young people. In the case of girls, it is known that they learn mathematics best when it is related to real life situation. Inadequate equipment has led teachers to resort to teachers – centred learning approaches such as lecture methods. The students are therefore passive learners who are expected to listen and only observe. This diminishes the interest of students in the subject because the content is too abstract, and in many situations, has no relevance to their daily lives.

Gender bias has also been observed in the teaching of mathematics, teachers tend to use positive reinforcement more on boys than on girl. Teachers tend to ask boys more difficult questions than girls. They also tend to give boys more time to answer questions and more likely to openly make negative remarks about girls abilities despite this observation, research findings indicate that teachers do not think that the teaching approach has an adverse effect on girls performance in mathematics (FAMSA report No.8)

According to Piaget, there are three main methods for teaching. They are as follows: principle of genetic approach, conflict teaching and critical exploration. Principle of genetic approach requires that the method of teaching a subject should be based as far as possible, on natural ways of the development of knowledge. The

formal purpose requires genetic teaching of all subjects that admit such teaching because that is the way they have arisen or have entered the consciousness of the human.

Conflict teaching also called diagnostic teaching is used within some of the lessons and was viewed as a catalyst for many of the social constructive activities taking place within the classroom. The teachers pose questions that send the pupils in to confusion, causing even the most confident and intelligent of pupils to doubt their methods, reasoning and justification. When done correctly this can create great mathematical discussions and highlight many important misconceptions pupils may have. This teaching strategy helps to bring out the underlying misconceptions pupils have within mathematics and help build on eradicating these through allowing the pupils to debate themselves interactively as a class.

Critical exploration is a method of questioning students that can be used by teachers to help lead students into productive disequilibrium. According to Piaget, the concept of disequilibrium is an imbalance between assimilation and accommodation. Piaget said that disequilibrium occurs when an experience or thought is inconsistent with what the child's schemata would predict at the moment; Piaget therefore uses critical and abstract means of teaching mathematics.

Pupils acquire mathematical skills and concepts at an early age and primary school teachers should build on and continue developing these skills and concepts through appropriate activities and materials interesting to pupils in order to lay a firm foundation in the performance of mathematics and to cultivate future interest in subject. The activities involved should be practical and glare linked to real life experiences in order to make mathematics meaningful.

The objectives of primary school mathematics curriculum are to develop interest in and positive attitude towards mathematics, early mathematical concepts and skills,

ability to think and reason logically. The materials to use for teaching have to originate from the local environment. The methods of assessing the set objectives are also given in the curriculum.

2. 3 Teachers' Attitudes and Qualifications

Teachers' bias has also a lot in the mathematics access, participation and performance. Both male and female teachers have negative attitudes towards girls' abilities to perform well in mathematics and sciences. Teachers assumed that girls were better suited to do arts and language subjects than boys, or that boys were better able to do mathematics and sciences than girls. Teachers often unconsciously used gender to manage pupils in their classes. Among the reasons given by the teachers for gender differences in performances in mathematics included girls' fear of the subject, lower determination and intelligence in girls than in boys. The teachers report that girls do not ask questions and often cannot solve problems on their own. They believed that girls suffer from an inferiority complex when it comes to academic achievement and are therefore incapable of excelling.

Bali (1997) found that the majority of teachers believed that boys would join the Universities to train as doctors, engineers and architects, tailors and secretaries. This has been proved false, for example the medicine classes at the university, of Nairobi, usually has more girls than boys. This appears to be due to the clarity that the girls have regarding the usefulness of medicine in life. This is what enhances their motivation to do the science subjects needed for this highly competitive course and perform well in science. Teachers attitudes regarding girls ability are critical factors since teachers often advise or force students to enrol for those subjects they feel the students is likely to succeed in (FEMSA report No.7)

Gender stereotyped attitudes about what subjects are appropriate and proper for female and males led to the channelling of girls and boys in to specific and often

limited fields of study. This denies girls and women access to a wide choice of science base field as they are concentrated in arts – based subjects starting all the way in middle primary classes to the university. Teachers gave more attention to boys, asking them questioning and disciplining them. Boys and girls are still not always treated equally.

In lower primary classes girls, often do as well as or better than boys. As they get older girls often have poorer attendance and may drop out of school early. In upper primary classes (6-8) girls examination results in mathematics are usually lower than boys. Girl's poor performance in mathematics has been reported in other studies (Eshiwani, 1982). Gender differentiation has also been reported as evidenced in other research whereby teachers differential talk to boys and girls, ((swann and Graddol, (1988) and French and French (1984)). Teachers' differential treatment to girls and boys also showed gender disparity. Teachers were harsh on boys and very gentle with girls. This form of treatment was underpinned by society's cultural beliefs that boys should not be "softened". They are expected to be tough, active and brave while girls are often treated as "soft". Teachers' treatment of boys and girls in their classrooms reaffirmed gender bias in accordance with cultural norms which define masculinity and femininity, (Kitetu, 1998).

Poppers (1972) in his research concluded that teachers had to avail learning activities, which provide between new experiences for pupils and the opportunity to talk about this experience. Majority of the teachers in primary schools and especially at Lelmokwo Zone are farmers, due to inflation and thus the salaries given to them by government cannot sustain their families. A survey carried out in 2005 found out that over 80% of the teachers all over the country do not enjoy their profession. Most of them complained about poor salaries, over crowding of classes due to free primary Education, lack of teaching materials, lack of cooperation between parents and

teachers, over age pupils who are slow learners and finally lack of proper administration.

Government ban on canning in the year 2000 has brought more problems to teachers all over the country. This has resulted in many pupils not putting more effort to participate in mathematics or even finish their homework because of lack of canning thus demoralising the teachers. Miller (2001) argued that through using computer for listening to and watching stories could be part of students reading centre rotations and reading assignment. More studies shows that teachers tend to answer boys more often than girls in math and pay more attention to girls in non-science classes, thereby sending messages about gender capacities.

In a study by Alao and Adeleke(200), investigating the prevalence of mathphobia girls was found to exhibited more metehophobies than boys and consequently were likely to record lower performance than boys in mathematical activities. Mathematics is more or less regarded either wrong or rightly as a subject in male domain. There is therefore the tendency to believe that males will do better. Fennema and Sherman, (1978) also reasoned along this line when they reported that the differential performance observed as a result of gender difference in mathematics is possibly attributable exhaustively to the community in which the students live.

Due to under staffing in most parts of the country, more untrained teachers have been employed by the P.T.A. As they lack professional ethics and training skills as the regular T.S.C teachers, they have not been able to teach and guide the pupils in mathematics in a proper way. Male teachers practised gender bias as they did not encouraged the girls to like mathematics as they did encourage boys. This has been brought about by cultural beliefs that girls best place is in the home. A teacher's qualification is of great importance to the promotion of prerequisite knowledge of pupils to a higher level.

Richard (1974) pointed out that trained teachers were active and sometimes helped pupils to be more creative by identifying and observing their wide range of interest and encourages creativity. According to (Readers Digest 2002, May, Pg 24 – 26) mathematics should be taught by a professional who has a clear understanding of the subject and the theories of mathematics. This will enable the teachers to explain and teach from the parameters that can be easily understood by the learners as compared to the formulas given in the books which most of the teachers use in primary school. CESA and UNICEF (1994) indicated that some districts in Kenya had much higher proportions of professional untrained teachers

2.4 Teaching and Learning Resources

Pupils' learning achievement and development were promoted by extensive use of learning and playing resources. Child in an unstipulated environment was likely to be slow in talking, walking and generally retarded in development which further complicates the overall performance and understanding of mathematics (Sharma, P. and Ghona L 1980).

Donenue Colleta (1992), said that, a conducive environment stipulates childhood period. Hunt (1961) argued that an enriched environment could make a great difference in the rate and level of intellectual development in early childhood. This also received support from Guchuru (1995) who lamented that the development of pupils attitude and interest to education and especially, mathematics and curriculum implementation should be commenced by his mothers to stimulate child's cognitive froths research done by CESA (1990 – 1995) showed that parents could not afford text books and other materials due to high inflation and poverty in the African countries. The Kenya Institute of Education has no more attention to the publication of mathematical books in the market, as most of the primary mathematical books used to have been there since the inception of the 8.4.4 system of education in 1986. The

writers of the 8.4.4 curriculum and especially in the primary section did not consider the best way to introduce the system as most of the syllabus were very shallow and thus leads to less understanding of a particular topic

Well equipped laboratories are essential as they enhance the teaching and learning of mathematics however, most schools do not have adequate facilities and equipment for the effective teaching of mathematics. Teachers strive to improvise experimental equipment and learning materials wherever possible. However, this has proved to be difficult for most schools. Where equipment is available both male and female students view them as male dominate and so students and teachers expect boys to work with the equipment while girls watch or have no interest at all. This leads to poor female performance in mathematics and science based subjects. There is also lower representation of female at post secondary technical and science educational institutions (FEMSA report no. 2)

Furthermore, to stimulate mental growth, children need a lot of teaching and learning materials. Teaching/learning materials facilitate learning and make it real as noted by Maria Montessori. Bishop (1985) stated that "If there is to be change and improvement in education, then there must be adequate resources". According to Jacinta and Regina(1981:26), it has been observed that the use of materials amuses the children's interests, develop concentration, confidence and cooperation. Children also are known to succeed when they work collaboratively. Dovine and Bunnete (1990) materials motivates the learners, enhances teaching and learning process and creates discipline in class.

Woodfolks (1990:58) Ndukhukire (1996) observed that children interest with learning materials and teachers through doing, learning is made real with the guidance of the teacher. The learner gets actively involved as a participant but not as passive listener learning by doing achievement but also their intellectual capacity. With

availability of such teaching resources, the learners of mathematics would catch easily and view it interesting to pursue to higher levels.

2.5 Pupils Self – concept and attitudes Towards Mathematics

Research revealed that more learning took place when there was interaction amongst learners Russel (1982). He found out that pupil learning of concepts was always accelerated when they were able to discuss the task before them. Piaget (1977) revealed that pupils performing tasks and talking about them revealed the awareness typically develops when something gives us pause of thought and when we stop to consider the possibility of acting before us. Mathematics as a subject requires discussion and proper understanding which many of the students did not understand. The relationship between the learners and teachers has never been good for a very long time and especially mathematics teachers.

Most learners have grown in the academic ladder with a perspective that mathematics is a very hard subject to grasp the contents or even make an effort to do so. Studies have shown that females have more negative attitudes towards mathematics. Wasanga (1997) reported that the majority of girls perceived science subjects to be useful to boys. For girls' usefulness was directly related to domestic purposes, while usefulness for boys was more a function of future career development. This shows the negative effects of perceived gender roles. In the country several seminars have been held across to enhance the change of attitude towards mathematics as a subject in both primary and secondary level, nothing has not been done to incorporate the pupils and students who carry the major aspect of the mentality that mathematics is a hard subject. Despite vigorous campaigns by a team of lecturers from Moi and Maseno Universities to enlighten and motivate both boys and girls to work to perform in their education especially mathematics based subjects (2009), still the pupils performed poorly in mathematics in Lelmokwo Zone. Those

who scored lowest grades were girl child. Misconceptions about gender appropriate careers also adversely affects girls participation and performance in mathematics. Studies show that girls perceive engineering professions as only appropriate for boys and not girls, (Muganda, 1997).

Mathematics teachers do not encourage perceived relevance based approach when teaching girls. Other that affect participation and performance are negative self – confidence. Self – image is a major determinant of the choice s that people make. Bali (1997) found that girls had a low self – image relative to boys. In addition, girls were more self – critical and lacked self- confidence, which would undoubtedly diminish the choice and performance of mathematics. In addition, low self-esteem hinders girls from asking questions and attempting to solve problems on their own.

Moreover, students who had positive perceptions or attitudes towards mathematics showed better achievement in both mathematics and science (Kiamesh, 1997). According to Schreiber (2000), those, who had positive attitudes towards mathematics, had a better performance in this subject. The student's attitudes towards an academic subject is a crucial factor in learning and achievements in that subject. Whether a student views herself or himself as a strong or weak person in a specific subject may be an important factor in her or his academic achievement. Stodalsky at al (1991) mentioned that students develop ideas, feelings and attitudes about a school subjects over time and from a variety of sources.

Many studies have examined students' thinking about school and their attitude towards mathematics (Vanavan, white, Yuen and Teper, 1977), cited Papanstasiou (2000) Institution in school settings provides one important and regularly experienced context in which ideas and perceptions about subject matters as well as other cognitive and affective outcomes can be shaped. Lyton, (2000) refers to the

environmental effects that influence the child's development. These environmental effects may come from peer groups and social pressures. In addition to home background and attitudes towards the subject friends and maternal pressure for learning mathematics Martin et al, 2000 are among the factors that construct students' attitudes towards and beliefs about mathematics, (Kulm; 1980). According to Berkowitz, (1986), if an important person encourages somebody to behave in a certain way, he or she will accept it. The influence of an important person is so strong that even the individual may change his or her attitude in agreement with that of the important person (Berkowitz, 1986).

As confirmed in Lelmokwo Zone, it is only those pupils who portrayed self interest in mathematics because of the influence of important persons visiting their schools such as bankers, engineers or doctors who excelled in mathematics and science. The relationship between self-concept and math achievement is another area that has been investigated by researchers Marsh, 1992, Hamachek, 1995). Franken 1994 states that there is a great deal of research the basis for all motivated behaviour. Therefore those pupils who have higher self-concept that is being more confident in mathematics have higher scores in mathematics, (Willhite, 1990). In the study area, gender disparity in mathematics was due to poor self-concept especially among girl-child which resulted in underperformance in math.

In order for pupils to achieve well in mathematics they often attribute their outcomes to variables like hard work, good luck and natural talent (Frizzes et al. 1983 and Weiver, 1985). The efforts that they make in order to learn mathematics at school or do homework at home probably have an effect on their achievement due to gender. Education is aimed ensuring the youth play a more effective role in the life of the national building by imparting the necessary attitudes. Education was designed to provide life long skills to make individuals self-reliant and productive, health,

industry and other sectors. For one to be involved in these sectors, mathematics education is a very essential subject.

At home parents have been reported talking either positively has been reported about math depending on their previous experiences. Children may develop the same attitudes towards as their parents even before they came to school. When they come to school it is the teachers' responsibility to develop a positive attitude in all the pupils towards maths. However some of the teachers may also have a negative attitude through their talk towards mathematics. Girls end up creating negative interest in mathematics thus performing poorly in KCPE.

2.6 Attitudes of Parents towards Mathematics

Parents negative attitudes towards education and its significance are responsible for the under enrolment, high drop rates for girls, lack of encouragement to pupils, lack of guidance and counselling and uncooperative with the school authorities. This has been revealed when the pupils were sent home to collect school uniforms and school levies. This made the pupils in the poverty stricken homes not returning immediately to school of which this brought deterioration in mathematics performance and achievement. Low number of girls enrolled in mathematics. (FEMSA, No. 6). Negative attitudes from parents have been sited as a major cause of low enrolment and high dropout rates for girls.

Traditional beliefs segregated roles a long gender lines, most parents in Lelmokwo zone have not accepted to equip girls with skills and knowledge through education to enable them to function effectively in the modern world. Negative parental attitudes based on perceived gender role led to biased socialization of girls at home and in the community. Such practice denies girls the opportunity to explore and experiment to the same extent as boys are encouraged to do. Lateness and skipping of classes due to household chores, health problems, all hinder the mastery

of school work. Studies have also shown that that parents hold the view that girls were academically less capable than boys. (FEMSA, report no. 6)

Deeper forces in society that extend well beyond the boundaries of educational systems, institutions and processes cause gender inequalities in mathematics. As observed in some studies (Alele-Williams, 1988; Adelman, 1991; Morgan, 1992; Erinohso, 1994; Khalile and Meece 1994), the basic causes of gender discrimination against women involvement in education generally, are deeply rooted in socio-culturally determined as discrimination against females sex stereotype, division of labour in domestic chores at home are assigned to females these factors discouraged females from more active participation in maths. For instance, in some homes, particularly of illiterate parents who still form the majority of the residents of Lelmokwo Zone, education of boys was given priority and more prominence in view of the need to perpetuate family name in a competitive society. This has led to majority of girls with potentials for mathematical skills being discouraged from pursuing SMT subjects. As observed by Khalile and Meece(1994), it is not that girls cannot and do not have the ability to succeed in mathematics course, but rather that obstacles arise in recruiting and retaining girls.

Studies have also, shown in that girls are facing many obstacles caused by societal ills such as poverty (Alele-Williams, 1988; Erinosh, 1994). Girls are still largely under-valued by society in that when family members become incapacitated by illness or old age, girls are often the first to be relegated to the caregiver status and thus further comprising their chances of self-development and success. Poor households are unable to access basic services like food, education and health. Indeed, their ability to support and invest in their children education was very limited. A girl-child in such a household is more disadvantaged than boy-child. It was clear that where resource and scarce and the school demands for expenditures from

household, a girl-child is likely to be pulled out of school compared to the boy child, Erinoshu (1994), noted that both boys and girls participation in mathematics education is constrained by gender roles and expectations. These include domestic chores, perceptions of communities towards education of boys and girls, and the relative opportunity cost of sending child to school.

Education is thought to be more beneficial in preparing girls for their roles as mothers and wives than for employment, (Burchfield and Kadzamira, 1996) in the society area therefore, the research found out that parents forced their girls into early marriages in order to get dowry. In the face of economic recession, inflation, unemployment and poverty, the poor families are preference to boys' participation in mathematics because the returns on boys' participation are assumed to be more beneficial than those of the girls. In general most children, and girls in particular, especially those in rural areas, fail to enrol in or to complete primary schooling because their parents do not value education in most cases because they themselves are uneducated or illiterate. There is also a 'myth' among most illiterate parents that "boys" are generally clever and hardworking in school. Their minds are always in school; Girls on the other hand like playing and when they mature they are difficult to deal with and they get difficult to deal with and they get pregnant" The implication is that they should not be given opportunity to go to school. Such messages demotivating to girls who internalize them and return in end up believing that school, is not for them and more so mathematics education.

Some parents also believed that it was their sons who would take care of them in old age and thus boys were educated at the expense of their daughters. The aim of the government in starting the free primary Education was to ensure that all children benefited from the basic education for all. It wanted to enhance that all children from all sorts of socio-economic and socio-cultural backgrounds received education

without any form of discrimination in terms of sex, age and origin. Parental negative attitudes towards education and its significances were responsible for gender disparity in mathematics especially in girl-child. Lack of parental encouragement, guidance and counselling among pupils resulted in poor participation.

The policy Framework paper on economic reforms for 1996-1998 noted that, the government had given clear priority to education and had taken a programmatic approach in respect to private provision of education. However main challenges remained in that child status indicators showed significant differences according to the education of the mother, in which was a proxy for incoming differences. While there was no indication of major discrimination against females in access to basic education, the completion rate for primary school education was lower for females and at times of economic difficulty , female students were more likely to dropout of primary school all these resulted in denying girl-child math education which is essential for economic development.

CHAPTER THREE RESEARCH METHODOLOGY

3.0 Overview

The chapter contains the following: Research Design, Location of the study, Population of the study, Sample selection and sampling procedures, Instrumentation, Data collection, procedure and Data analysis.

3.1. Research Design

This study adopted survey method on the descriptive mode of design. This was because this design was most appropriate in investigating the causes of gender disparity in mathematics performance and was not time consuming.

The researcher chose three different types of questionnaires and prepared them to ease data collection. These included questionnaires administered to teachers, pupils and parents.

The questionnaire for teachers, parents and pupils had 12 items each answering the research questions in section 1.5 attached in Appendix 1, 2 and 3 respectively. The researcher also adopted observation and interview schedules for Teachers, Parents and Pupils.

3.2 Location of the Study

The research study was intended for Lelmokwo zone of Kosirai Division, Nandi North District. Its population was approximately (estimated) to be 12000 people as a projection of 2009. The schools in the study area were found in highlands with an altitude of about 2200m above sea level. The terrain of the land is generally flat as swampy areas. The neighbouring zones of Lelmokwo zone were; Mutwot to the East and Kabisaga zone to the West in Kabiwet Division.

The area was administered by the chiefs and assistant, chiefs distributed in four locations of Itigo, Biribiriet, Sigot and Lelmokwo.

According to the researcher's observation, the population had steadily increased; therefore the area was densely populated due to favourable weather conditions. This has enabled the residents in the zone to practice mixed farming. The area of the study was generally cool during dry spell.

3.3 Population

The targeted population was the primary school pupils, head teachers, teachers and parents of Lelmokwo zone, Kosirai Division of Nandi North District. 20 Primary schools with 3270 pupils and 120 teachers. There were five public secondary schools of which three of them were mixed day schools while the remaining two were one for boys and the other for girls, both boarding.

The main educational Zonal office was located at Lelmokwo High Boys School. The targeted population as per the Zonal education records in March 2009 were 3270 pupils of which 1590 were girls while boys were 1680 there were 120 teachers in the zone.

The researcher's targeted population was teachers, parents and the learners. The study area was chosen because the researcher found it convenient to reach the targeted population with minimal limitations. The rate of poor performance in mathematics was high in relation to gender disparity of which girls were recorded highly. The study area was also chosen because there was the existence of families from different socio-economic and socio-cultural backgrounds.

3.4 Sample Selection and Sample Size

The sample consisted of 80 respondents. There were 40 pupils, 20 parents and 20 teachers. The researcher targeted teachers from lower primary and upper primary classes who comprised of female and male teachers. Parents and pupils were also having both sexes. The researcher chose to use the stratified method of sampling

because the targeted population comprised different genders. This ensured that the targeted population was to be represented in the sample. The simple random sampling method was used in selecting the four schools.

Ten pupils from each of the four schools were randomly selected and so was the case of teachers who were randomly selected of which four were from each school. Parents were also randomly selected from both sexes, five from each the four locations where the study area was located. The reason for sampling these respondents was because the researcher saw the need to actually meet the participants who were expected to respond clearly to the research questions.

3.5 Research Instruments

The researcher aimed at investigation the causes of gender disparity in access to mathematics performance, participation and achievement in primary schools. The researcher also prepared an interview guide for the collection of data.

The researcher formulated questionnaires along side research questions and objectives. The research questions covered suitability of finding out the reasons as to why mathematics was performed poorly in Lelmokwo.

The researcher selected then questions which were open ended and closed and ended. The Yes/No responses instruments were also used.

The targeted population who were the respondents or participants were teachers, pupils and parents.

The instruments were chosen for quick sending to distant respondents through mailing, the respondents had the freedom to say what they want because they did not have to reveal their identities. The researcher made appointments with the head teachers of the primary schools and the parents where the study was to be carried out. The researcher then visited schools selected for the study and personally administered the questionnaires to the respondents. The researcher had to explain and clarify

certain items to the respondents before they answered the questions in the questionnaires.

The researcher approached and discussed with the respondents the procedure to be used. The respondents were required to answer all the questions on questionnaires on the study area by ticking the response which was appropriate to each of the respondent.

3.6 Data Collection and Procedure

The researcher travelled to the selected schools and personally administered the questionnaires to the respondents. The response was individual based. The researcher went to the randomly selected schools and explained the purpose of the study to the head teachers who in turn informed the teachers. This was done in different days for each school selected. The researcher sampled the respondents randomly and asked them to fill the questionnaires and complete them honestly, frankly and assured them of confidentiality of the information given. Pupils' respondents were also randomly selected and instructed to answer the questions on questionnaires under the researcher's guidance. Parents' respondents were also informed by the head teacher of the researchers visit to the school and that assisted the researcher to meet them and selected them randomly to respond to the questions on the questionnaires and to respond to the interview questions on the factors leading gender disparity in mathematics.

The researcher used observation and interview schedules to collect data on how teachers used their teaching methods and teachings and learning materials in teaching mathematics. The researcher used interview and observation to collect data on how pupils responded to questions on mathematics lesson and how they interacted with the teachings /learning materials and resources.

3.7 Data Analysis

The researcher employed the survey descriptive statistic analysis. The data was presented and analyzed in tables, figures and charts.

CHAPTER FOUR RESULTS AND DISCUSSIONS [FINDINGS]

4.0. Introduction

This research was aimed at investigating the causes of gender disparity in access to mathematics in primary schools in Lelmokwo Zone. The researcher applied the use of questionnaires, interviews and observation schedules research instruments to aid in achieving the set objectives. The respondents gave the following reasons as responsible for the gender disparity in access to mathematics.

The responses were tabulated against cause in form of tables and figures.

4.1 Lack of Role Models and Gender Disparity in Mathematics

The following findings were deduced from the analysed data on the object to find out whether lack of role models emerged as a cause towards gender disparity in mathematics performance.

Table 1. Lack of Role Models

RESPONDENTS	YES	%	NO	%
TEACHERS	17	85	3	15
PUPILS	26	65	14	35
PARENTS	16	80	4	20
MEAN	19.67	76.67	7	23.33

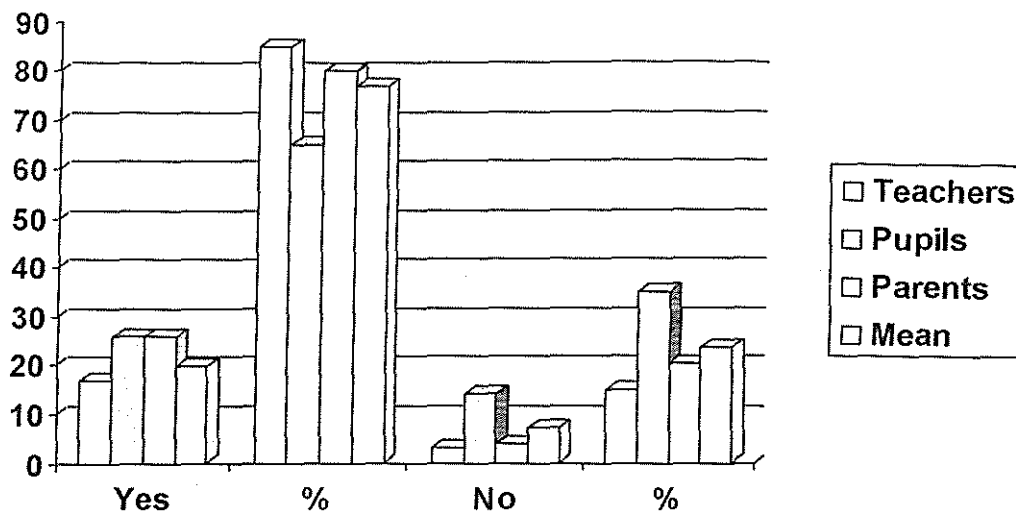


Figure 1. Lack of Role model

From the tabulated data in table 1 and figure 1 it is evident that lack of role models was the major factor related to gender disparity in mathematics in Lelmokwo zone 76.67 percent of the respondents indicated that lack of role models in mathematics affected girls most since most of the female teachers did not participate in teaching mathematics. In other sectors in the community that required mathematics such as engineering, accountancy among others, female was under represented.

4.2 Teaching Methods versus Gender Disparity Mathematics Performance.

The following findings were found from the analysed data on the objective that sought to find out whether teaching methods and learning/teaching resources emerged as a cause towards gender disparity in mathematics performance.

Table 2 Teaching Methods on Gender Disparity towards Mathematics

Respondents	YES	Percentage%	NO	Percentage%
Teachers	11	55	9	45
Pupils	25	60	15	40
Parents	10	50	10	50
Mean	15	55	11.3	45

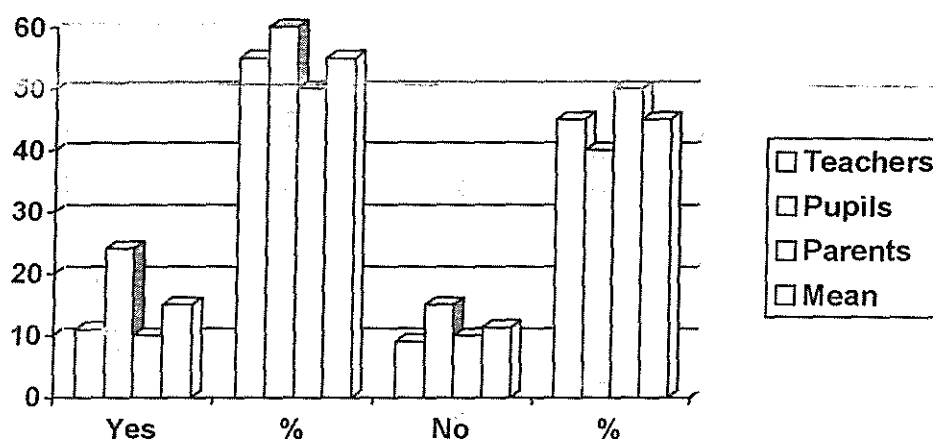


Figure 2. Teaching Methods

From table 2 and the figure 2 shows that 55% of the respondents positively agreed that, poor teaching methods contributed to gender disparity in mathematics while 45% said that teaching methods did not affect mathematics performance due to gender disparity. Lack of teachers preparedness to captivate imagination or develop critical thinking in young people also leads to poor performance in mathematics, girls learn mathematics best when it is related to real life situation but from the findings of this study teachers did not vary their methods of teaching thus discouraging the girls most.

4.3 Teachers' Attitudes and qualifications versus Gender disparity in Mathematics performance.

The following findings were discovered from the analysed data on the objective that sought to find out whether teachers' attitudes and qualification emerged as a cause towards gender disparity in mathematics performance.

Table 3 Teachers' Negative Attitudes and Qualification towards Mathematics

Respondents	YES	%	NO	%
Teachers	13	65	7	35
Pupils	25	55	15	45
Parents	15	60	5	40
Mean	17.67	60	10.67	40

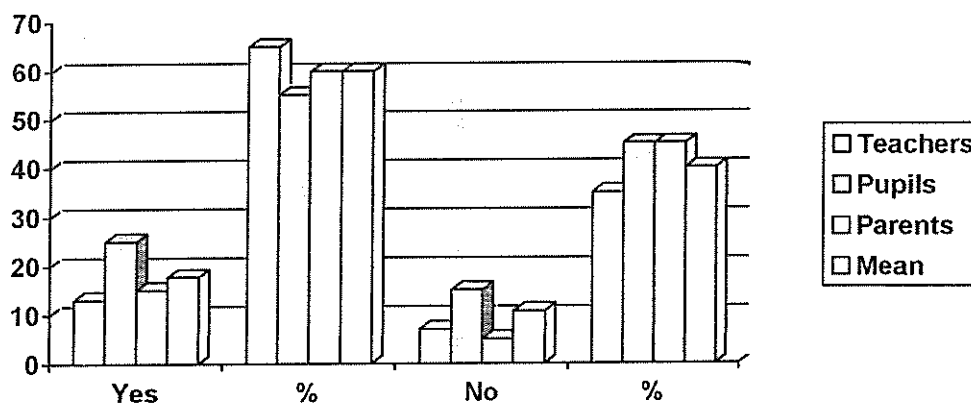


Figure 3. Teachers' Negative Attitudes and qualification towards Mathematics

From the table 3 and the figure 3 it is clearly observed that the majority of teachers (65%) responded in the opinion that classroom interaction (Participation) affected girls' performance, which contributes to gender disparity in mathematic. Male teachers treated boys positively by asking more questions to them, treated them harshly and became soft towards the girls. They also believed that boys were best in

mathematics while girls performed dismally because they fear the subject, have low-esteem and low self concept than boys. These findings confirmed what (Bali, 1997) concluded that, majority of teachers believed that most boys joined universities to train as doctors, engineers and architects whereas girls go for tailoring, secretarial and teaching. 60% of the respondents agreed that teachers' negative attitudes and poor qualifications contributed to gender disparity in mathematics. On the other hand 40% of the respondents disagreed with the view that, teachers' attitudes caused gender bias in mathematics.

4.4 Teaching and Learning Resources versus Gender Disparity Mathematics Performance

On investigating whether this was the cause of disparity, the following results were found out.

Table: 4. Teaching and Learning Resources

Respondents	YES	%	NO	%
Teachers	12	60	8	40
Pupils	30	75	10	25
Parents	10	50	10	50
Mean	17.3	61.7	9.3	38.3

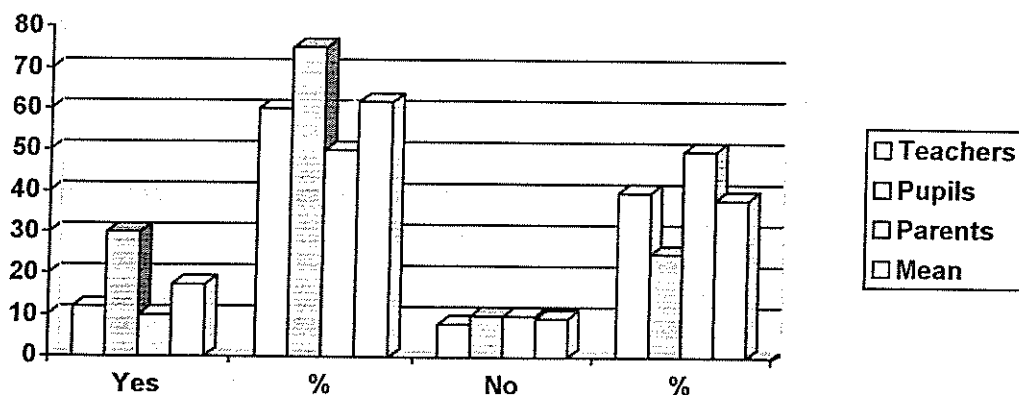


Figure 4. Teaching and Learning Resources

From the table 4 and the figure-4 above it is evident that 61.7% of the respondents positively agreed that lack of teaching and learning resources affected the teaching of mathematics. Most schools in the study area did not have adequate teaching and learning resources. Teachers were reluctant in making teaching aids or even using the few available resources or teaching materials. Where equipment were available, both male and female students view them as teachers expect boys to work with the equipment while girls watch.

4.5 Parents' Attitudes and poverty versus Gender Disparity Mathematics Performance.

On investigating whether Parents' Attitudes and poverty was the cause of disparity, the following results were found out.

Table 5. Parents' Attitudes towards Mathematics

Respondents	YES	%	NO	%
Teachers	15	70	5	30
Pupils	30	75	10	25
Parents	16	80	4	20
Mean	20.3	75	6.3	26

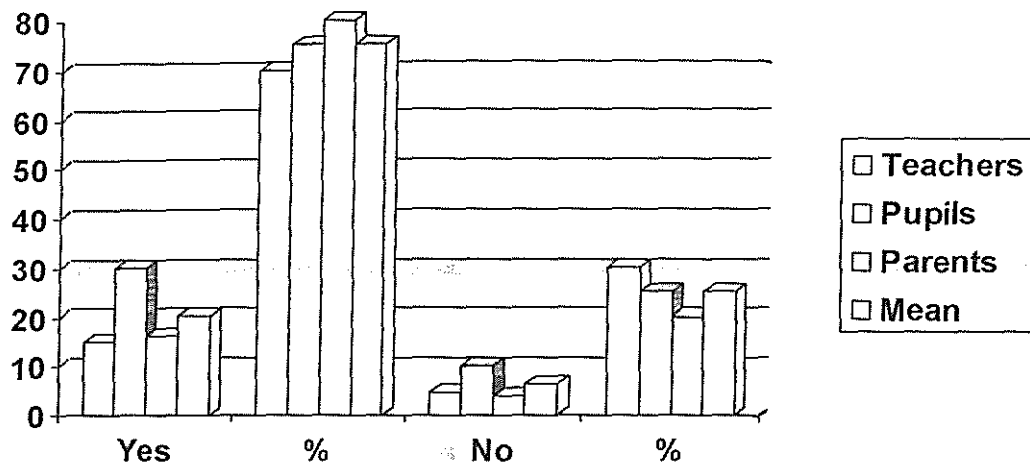


Figure 5: Parents' Attitudes towards Mathematics

Table 5 and figure 5 reveals that the respondents agreed that negative attitudes by parents towards mathematics contributed to gender disparity in mathematics. Illiteracy rate among most parents in Lelmokwo zone was negatively affected education standards and especially that of mathematics. This was clearly manifested by pupils not returning back to collect school levies such as building funds, wages of PTA teachers or even to buy school uniforms went out one way never to come back.

Due to high cost of education and the deteriorating economy, poor parents found it hard to provide education for all his/her children. Parents with scarce resources chose to educate their sons instead of their daughters thus creating gender disparity in mathematics because girls will fail to enrol on other classes. On the other hand, most parents felt that it was a waste of time and resources if girls were educated as they will eventually be married off and their education will benefit their husbands and the family they marry. Sons were believed to take care of their parents at old age thus merit being educated in favour of girls.

Gender was also affected girls' education in that girls were overworked with domestic chores while boys were mostly free and had a lot of time to study. Gender disparity cropped in thus affecting girls performance in mathematics. Of the respondents 75% saw that negative attitudes by parents towards mathematics caused

gender disparity. Parents who encouraged their showed at difference in their performance of their sons and daughters in that they equally performed well and were have good self-concept in mathematics. Those who were negative about schooling and especially mathematics talked negatively about mathematics and mathematics teachers discouraged their children and especially their daughters who later did poorly in mathematics. 80 percent of the parents were of the opinion that illiterate and uneducated parents hampered their children's education in mathematics as they failed to support positively to like mathematics

4.6 Pupils Self-Concept and Attitudes versus Gender Disparity Mathematics Performance.

On investigating whether pupils' self-concept and attitudes was the cause of disparity, the following results were found out.

Table 6 Pupils Self-Concept and Attitudes towards Mathematics

Respondents	YES	%	NO	%
Teachers	13	80	7	20
Pupils	30	60	10	40
Parents	15	65	5	45
Mean	19.33	68.33	7.33	35

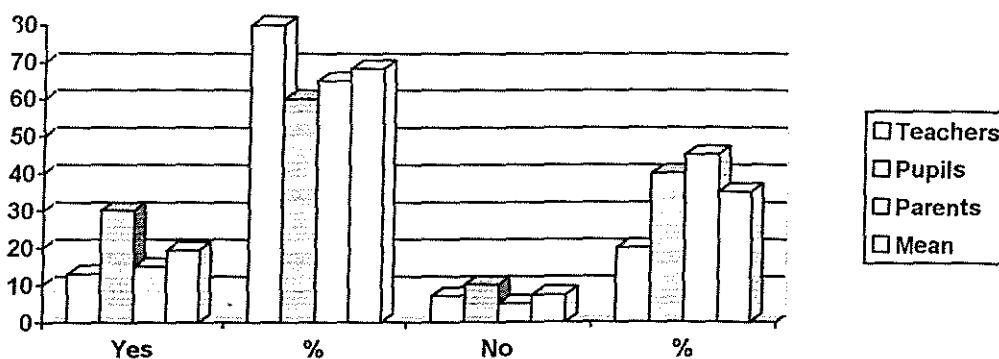


Figure 6. Pupils Self-Concept and attitudes towards Mathematics

The table 6 and figure 6 indicates that 68.33% of the respondents have positive attitudes towards mathematics while 35% of the respondents have negative attitudes towards mathematics. 80 % of teachers greatly confirmed that pupils self concept and attitudes had a lot in contributing to gender disparity in mathematics. Pupils especially girls had poor self concept and negative attitudes towards mathematics in relation to languages and non-science and mathematics as it was a male based subject as constructed by traditional gender stereotyping. Poor lack of role models caused gender disparity in mathematics as shown in the findings of the study.

4.7 A CASE STUDY OF FOUR SELECTED PRIMARY SCHOOLS

SAMPLE 1 PRIMARY SCHOOL

Table. 7. KCPE PERFORMANCE IN MATHEMATICS BASED ON GENDER

YEAR	No. Of Boys	Total Marks	No. of Girls	Total Marks	% mean score Boys	% mean score Girls
2004	12	648	11	577	52.73	47.27
2005	10	540	8	376	58.95	41.08
2006	11	644	6	285	69.32	30.67
2007	9	541	11	485	52.72	47.46
2008	7	357	20	943	27.46	72.84
Total	49	2730	56	2766	261.16	238.85

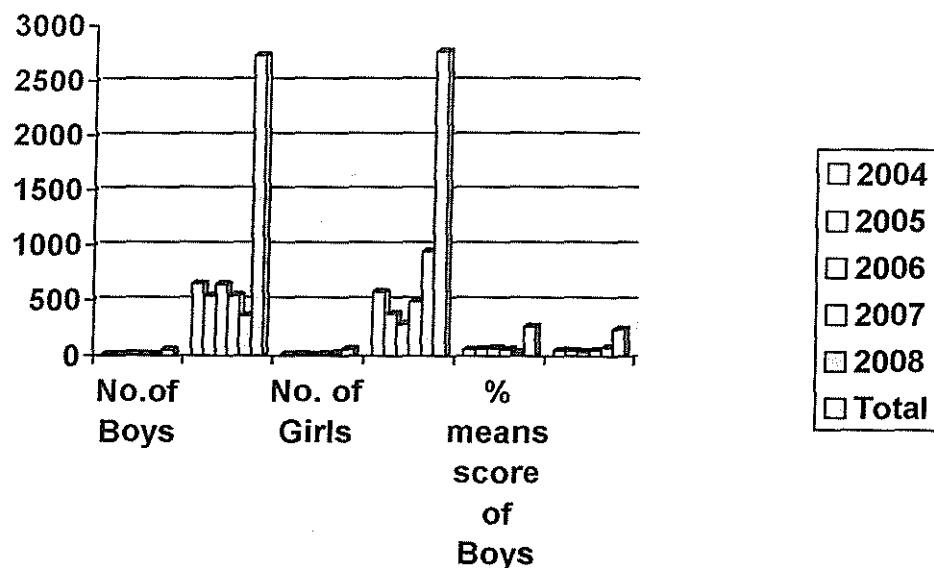


Figure 7. KCPE Performance in Mathematics based on Gender

From the tabulated data in table 7.1 and figure 7.1 it is evident that boys have been out-performing girls in mathematics from year 2004 to 2007, thus causing gender stereotypes from parents, teachers and pupils themselves. Girls were viewed as weak and not fit to do mathematics as it was meant to be male dominate. Poor self concept and negative attitudes towards mathematics also caused poor performance among the girls.

Poverty among parents paved way for discouraging their daughters from attending school always or even forcing them to drop out of school in favour of their sons who were believed to care parents during old age when girls are married off. Girls' education was also disrupted by gender roles where parents made them to do home domestic chores while boys had little or no chores to undertake making them do a lot in solving problems in mathematics.

Lack of role models among girls also de-motivated girls. Most female teachers do not like teaching mathematics in primary school in upper classes as compared to majority male teachers who dominated the teaching of mathematics making boys imitate them positively. From year 2008 girls had been motivated to like mathematics and other subjects more equally. Girls were made aggressive by the Government and other stakeholders of education to make them excel like the boys in all fields including those based in mathematics and science. Competition for good results in their education also made them work harder to secure good secondary schools. Boys received no more support and attention and thus they deteriorated due to in discipline and external de- motivation from peer pressure

SAMPLE 2 PRIMARY SCHOOL

Table 8. KCPE PERFORMANCE IN MATHEMATICS BASED ON GENDER

YEAR	No. Of Boys	Total marks	No. of Girls	Total marks	% mean score Boys	% mean score Girls
2004	8	360	11	400	47.37	52.63
2005	11	557	12	597	48.27	51.73
2006	10	558	13	761	42.30	57.70
2007	7	358	14	664	35.03	64.97
2008	12	564	19	992	36.25	63.75
Total	48	2039	69	3414	209.22	290.78

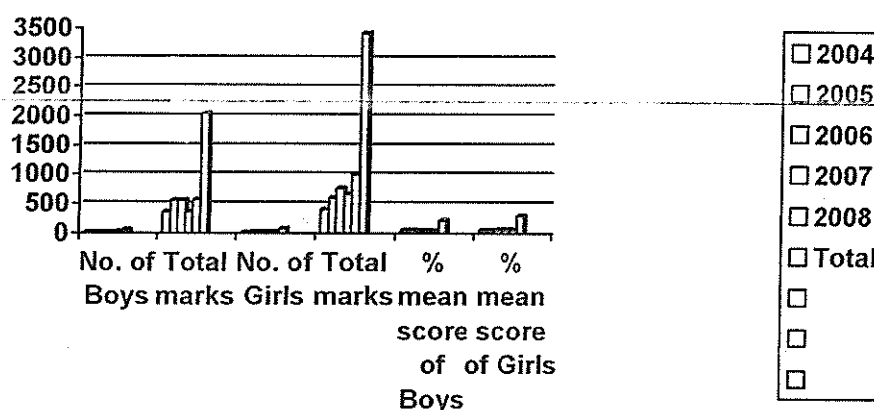


Figure 8. KCPE Performance in Mathematics Based on Gender

From table 7.2 and the figure 7.2, it is evident that girls performed better than boys as a result of mass campaigns in the zone. The school was still new and there was a positive attitude from the parents, teachers and pupils (girls) toward mathematics and education as a whole. Girls were highly motivated in all areas especially when both female and male guests encourage girl – child to work harder in mathematics and science in order to compete with the boys. Having being enlightened on the importance of education, both parents and pupils especially girls started enrolling more in school and avoided early marriages and drop out.

This made the girls to put more effort in mathematics and other subjects. Boys started relaxing and loosing more in schooling thus affecting mathematics performance. Boys became indiscipline due to government withdrawal of the cane

making them not working hard. Influence of the already peer groups who are school drop outs still encourage them negatively to join in the fields of charcoal burning, sand harvesting and pool games, thus leads to truancy, absenteeism and school drop out.

SAMPLE 3 PRIMARY SCHOOL

Table 9. KCPE PERFORMANCE IN MATHEMATICS BASED ON GENDER

YEAR	No. Of Boys	Total marks	No. of Girls	Total marks	% mean score Boys	% mean score Girls
2004	14	560	16	460	54.90	45.10
2005	19	580	10	440	56.86	43.14
2006	12	668	14	504	57.00	43.00
2007	14	478	12	434	52.41	47.59
2008	9	550	18	460	45.45	54.55
TOTAL	68	2836	70	2298	266.62	233.38

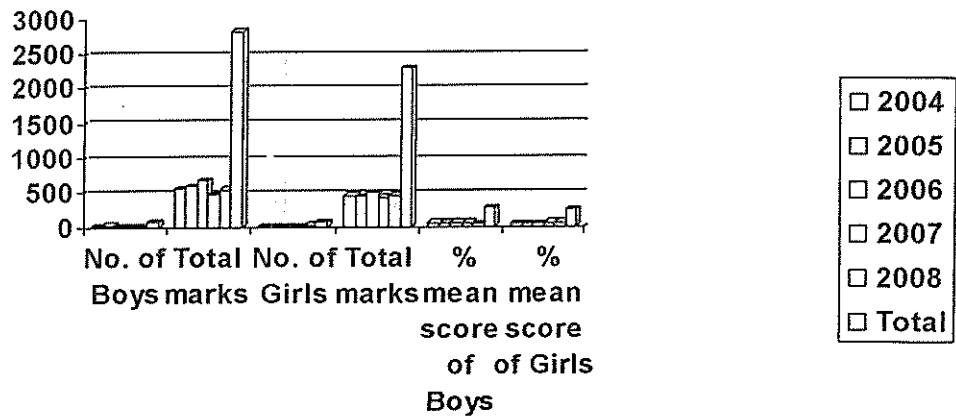


Figure 9. KCPE Performance in Mathematics based on Gender

From the tabulated data in table 7.3 and figure 7.3, the overall performance of boys is generally above 50% from year 2004, 2005, 2006 and 2007 while girls did slightly below that of boys. This showed gender differentials. The influencing factors were lack of role models among girls while boys had more good role models ranging from male teachers teaching mathematics and majority of male found in the society working in mathematics and related fields. Gender stereotypes in the society and among the teachers, parents and pupils all contributed to good performance among the

boys and not among girls who were demoralized and lacked interest in mathematics. In 2008 boys were overtaken by girls who got external motivation from the vigorous campaigns to uplift girl – child education.

SAMPLE 4 PRIMARY SCHOOL

Table 10. KCPE PERFORMANCE IN MATHEMATICS BASED ON GENDER

YEAR	No. Of Boys	Total marks	No. of Girls	Total marks	% mean score Boys	% mean score Girls
2004	6	520	5	380	57.78	42.22
2005	9	542	6	378	58.91	41.09
2006	12	600	6	400	60.00	40.00
2007	6	540	2	452	54.44	45.56
2008	8	680	4	530	56.20	43.80
TOTAL	41	2882	23	2140	287.33	212.67

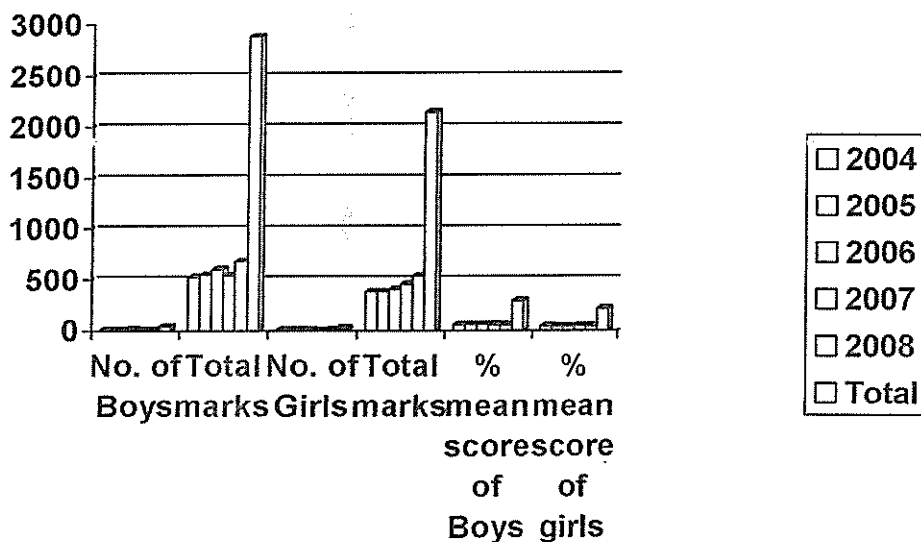


Figure 10. KCPE Performance in Mathematics based on Gender

From the above tabulated data in table 7.4 and figure 7.4, the researcher found out that there was gender disparity in the K.C.P.E performance. Boys performed above average score which was over 50% percent. Girls did not perform so well as compared to boys. They got mean score of less than 50%. Lack of role models among girls, gender stereotypes from the teachers, parents and pupils themselves especially girls affected their results negatively as compared to boys. Boys were retained in

school during economic hard times while girls were retained at home because they were seen by their parents as only being prepared for marriage. They also helped parents at home in domestic chores or even caring for their sick parents. Boys were seen as the bread winners in the old age of their parents. Lack of good teaching methods due to lack of qualified teachers who applied wrong methods and lack of good rapport towards girls discouraged them from participating actively in the mathematics lessons. The results also show that by the time pupils sit for their KCPE most of them particularly girls perform very poorly and already have developed a negative attitude towards mathematics. It was also found that once the girls performed poorly, teachers did not make any more efforts to support them to excel in mathematics due to gender stereotypes.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Overview

This chapter presents a summary of the study findings, conclusion, and recommendations and suggestions for further research.

5.1 Summary

The study sought to investigate the salient causes of gender and disparity in mathematics in Lelmokwo zone, Kosirai Division, Nandi North District with an aim to establish the trends in how mathematics is done poorly by pupils in primary schools. The most affected learners are girls who have always lagged behind in mathematics participation, performance and achievement. From the study, poor performance in mathematics is attributed to a number of factors which the researcher collected views and opinions from the respondents such as head teachers, teachers, pupils and parents in the study area.

These factors are; lack of good role models amongst the pupils, parents and teachers especially female teachers who like mathematics and those female working in mathematics related fields such as accountancy, banking, engineering among others are very minimal. Teaching methods used by the teachers also caused gender disparity in that male teacher uses positive reinforcement and make close attention to boys than on girls. Male teachers make negative remarks about girls' abilities in mathematics. Lack of appropriate resources could come about as a result of limited funds in the school of little support from the head teacher. This can reduce the teachers' and pupils' morale and affect the performance in mathematics.

Inadequate teaching and learning resources lead to teachers practising 'rote teaching' or teacher – centred learning approaches. This resorts to learners being passive and lost of interest in the subject because the content looks abstract and may

not be relevant to every – day life. The head teacher should be aware that the teaching and learning resources are availed in advance to avoid inconvenience.

The other factor leading to gender disparity in the findings of the study is teachers' attitudes and qualification towards mathematics. Teachers are faced with lack of confidence in handling mathematics because they graduated from P.T.C as it is a mandatory for all teachers in primary schools to train in mathematic irrespective of whether they did well or failed in secondary mathematics. Teachers also practise gender stereotyping thus affecting girls' performance and participation in mathematics and making limited choices of fields related to science, mathematics and technology. Untrained teachers also hinder the development of pupils' interest in mathematics because they lack professional ethics and proper methods of teaching mathematics. Mathematics is taught well by trained teachers with positive attitudes in mathematics.

Teachers also lack updated information and exposure in mathematics. Pupils self concept and attitudes towards mathematics also causes gender disparity in mathematics. Girls have a low self esteem relative to boys. They also lack self- image and confidence and end up choosing arts based subjects avoiding mathematics related subjects. Fewer girls choose mathematics and the overall performance is generally much worse than that of boys. Boys show positive interest and have self confidence in mathematics because of their teachers' support and traditions in terms of gender stereotypes. Teachers should be positive to both boys and girls when teaching mathematics, parents' attitudes towards mathematics is based on gender bias. Parents' traditional beliefs segregated roles along gender lines whereby girls are discouraged from going to school when economic times are hard.

They support boys in their education by providing all their needs while learning girls to languish at home because parents believe girls are waste of time and

resources. The poverty of the parents contributes a lot in determining whether boy – child or girl – child must continue with schooling or not affecting girls’ access, participation and performance in mathematics.

5.2 Conclusion

From the research findings the salient causes of gender disparity in mathematics included the following:

1) Lack of role models caused gender disparity in performance in mathematics.

Majority of female teachers taught lower classes while in upper classes they showed no interest in teaching mathematics. The lack of self- confidence had misconceptions based on gender bias that mathematics is best suited to male teachers. There was also no good role models among females in fields such as banking, accountancy, and engineering among others in the community where the study was carried out. This therefore shows a great impact on girls’ performance, participation and achievements in mathematics.

2) Poor teaching methods as well as inadequate teaching and learning resources -

encouraged gender disparity in mathematics. Kenya’s school syllabus is too long and gender bias. Teachers try to chase syllabus according to time available thus they use such methods as teacher – centred, leaving good methods such as group work, collaboration which encourage child – centred learning in mathematics. The content is presented in abstract and may not provide real life experience to the learners. Girls’ mathematics should be real life experience to capture their understanding and interest. Teachers un preparedness, lack of materials, lack of confidence created by lack of resources and imparting a negative attitudes to the learners (girls) by their comments affected girls’ mathematics performance.

3) Teachers' attitudes towards mathematics as well as their qualification caused gender disparity in mathematics. From the research findings it is evident that many teachers are aware that they do not know enough about some of the topics in the mathematics syllabus as they did not study them at school or during their initial teachers training. Almost all teachers admitted that they found some topics more difficult to teach. Most teachers do not up- date their knowledge neither did they study new topics to be taught in the syllabus, teachers may also develop poor attitudes in mathematics.

Teachers cause gender disparity as they teach mathematics in that they (male teachers) treat boys harshly and give them harder questions. They also give boys more difficult questions relative to those of girls who are treated softly. Boys are given more time to answer questions and more often make negative remarks about girls' abilities. On the other hand both male and female teachers created negative attitudes towards girls' access to mathematics in that they saw boys as more capable and suited to do mathematics and science while girls are said to be good in languages and art subjects. Teachers who are prepared, and with confidence as well as mastery of mathematical concepts and interested be it male or female encouraged pupils irrespective of sex to access, participate and excel in mathematics.

4) Parents also played a great role in the shaping of their children to either like or hate mathematics. They discourage girls mainly by not responding immediately to their school demands such as school levies, and uniforms. They prefer boys' education than girls' education. Poverty determined who should continue schooling.

5) Pupils' self- concept and attitudes towards mathematics created gender disparity in mathematics. Positive self-concept and positive attitudes boosted interest in mathematics and performance respectively. Gender bias needs to be stamped out because it affects all sectors of life and especial in education where girls and women are really disadvantaged. Females are blocked from advancing in fields related to science mathematics and technology in the economic development of Kenya and the world.

5.3 Recommendations

The researcher wishes to make the following recommendations in order to fill the gender gap in mathematics among boys and girls.

- i. The government should ensure that no untrained teachers are allowed to teach in the schools since they are un professionals and lack the basic of teaching mathematic.
- ii. The government should also train more teachers basically for guidance and counselling who will be useful in guiding and counselling in subject area and help the learners, parents and other teachers create positive attitudes towards mathematics.
- iii. Teachers should act as good role models to their pupils. Female teachers in particular are encouraged to take their lead in participating actively in the teaching of mathematics. Guests speaker to speak to the pupils during trophy presentations awards of Kenya Certificate of Primary Examination should emphasize on female representation and not gender bias. All mathematics teachers should ensure that their teaching is not biased but emphasize on motivation of both girls and boys equally. This will enhance equal participation of both boys and girls in mathematics.

- iv. Head teachers should support the teachers in availing the teaching and learning resources in time in readiness for teaching and learning. They should be appropriate to the topics at hand. Parents should also assist when need arise in provision of teaching and learning materials.
- v. Parents are also encouraged to support the schooling of their children by providing conducive environment for learning at home. They should shun from gender disparity at the times of economic hard times and ensure children (sons) and daughters' are not discouraged from attending school.
- vi. The government should enhance that teachers both female and male should attend in-service courses, work shops and seminars in order to up- date themselves in new skills of how to teach mathematics confidently. This should be done without favouring any gender.
- vii. In order to seal the gap of under staffing in schools the government should ensure that all trained teachers to be employed.
- viii. It is the researcher's views that if all these recommendations are adhered to it will help boost the teaching of mathematics and produce performance for all pupils in Lelmokwo zone and entire country.

5.4. Suggestions for Further Research

From the project report there were a number of possible causes for gender disparity in mathematics in primary schools. Due to lack of time, funds, weather conditions and distance it was not possible for the researcher to do beyond the causes of disparity in mathematics performance. The researcher did not exhaust certain regions of the study area as it was vast. The researcher therefore found it paramount to propose further research on:

- i. The effects of gender disparity in primary schools and the possible impact on transition to secondary school and higher levels of learning.

- ii. There is need to investigate on what is takes place concerning in the class room that is teacher-pupils interaction, in order to boost female participation both in quantity and quality.
- iii. There is need to investigate the value of parents involvement towards performance of mathematic parents.
- iv. A study ought also to be done on the linkages between schools, Parents and Teachers so as to review the roles each play in mathematics performance.
- v. There is also need to conduct a research to find out the effect of mathematics congresses between public and private schools which would encourage both boys and girls to participate in mathematics for better performance.
- vi. It is also worth investigating if field trips to other performing schools and other math oriented organizations in mathematics can improve the performance across gender.

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TIME SCHEDULE

PHASE	DESCRIPTION	DURATION
1	Pilot Study	1 ½ week
2	Adjustment	1 week
3	Data Collection	3 weeks
4	Data Coding	1 week
5	Data Analysis	2 ½ weeks
6	Report writing	3 weeks
7	Compiling & Proof reading	2 weeks
8	TOTAL	13 weeks

BUDGET

COST			
ITEM	QUANTITY	UNIT PRICE (KSHS)	TOTAL
Typed Research	1	2,500	2,500
Research copies	2	200	400
Binding	2	300	300
Travelling expenses			1,200
Cost of processing data			1,000
Stationeries		1,500	1,500
Cost of processing final document			2,000
TOTAL COST			8,900
Contingencies 10% of Total cost			890
TOTAL OVERAL COST			9,790

APPENDICES

APPENDIX 1

TEACHERS' QUESTIONNAIRE

Please tick One

1. What is your gender?
Male []
Female []

2. What is your attitude towards Mathematics as teacher?
Positive []
Negative []

3. Is Mathematics important for Boys and Girls ?
Yes []
No []

4. what is the attitude of girls towards mathematics?
Positive []
Negative []

5. Do lack of good role models among female teachers cause gender disparity in Mathematics?
Yes []
No []

6. Who dominate the teaching of Mathematics in upper classes?
 - i. Males only []
 - ii. Females only []
 - iii. Untrained Male teachers []

 - iv. Untrained female teachers []

7. Do you think teachers should encourage girls just as they do boys to participate actively in Mathematics?
Yes []
No []

8. Is lack of proper qualification among Teachers a contributor to gender disparity in Mathematics?
Yes []
No []

9. How often do you use teaching/ learning aids?
 - i. Often []
 - ii. Not often []
 - iii. Not at all []

10. Do teachers have a positive attitude towards preparation of teaching / learning aids?
Yes []

No []
If "No," why?-----

11. What are your reactions when boys perform poorly in mathematics?

- i. -----
- ii -----
- iii -----

12. If girls performed poorly in mathematics how do you react?

- i. -----
- ii -----
- iii -----

APPENDIX 2

PUPILS' QUESTIONNAIRE

Please tick One

1. What is your gender?
Male []
Female []

2. Do you like mathematics?
i. Yes []
ii. No []
iii. Sometimes []

3. Who teaches mathematics mainly in upper classes?
i) Males []
ii) Females []
iii) Untrained female teachers []
iv) Untrained male teachers []

4. Do you like being given home assignment by your mathematics teachers?
Yes []
No []

5. Is mathematics good for boys and girls?
i) Yes []
ii) No []
iii) More for boys []
iv) More for girls []

6. Do you get any help at home when solving mathematics problems?
i) Yes []
ii) No []
iii) If "Yes" who helps you?
iv) Mother []
v) Father []
vi) Brother []
vii) Sister []

5. Do you like participating in mathematics lessons?
Yes []
No []

6. How do you find mathematics when the teacher uses teaching aids?
i) Interesting []
ii) More interesting []
iii) Easier []
iv) Complicated []

8. How do you feel when you perform poorly in mathematics?
i) Discouraged []
ii) Not discouraged []
iii) Avoid mathematics []
iv) Put more effort []

9. How do you feel when you perform well in mathematics?
Encouraged []
More encouraged []
10. Do teachers treat you equally during mathematics lessons?
Yes []
No []
11. How do your parents feel when you perform well in mathematics?
Encouraged []
More encouraged []
12. Do lack of role models affect your performance in mathematics?
Yes []
No []

APPENDIX 3
PARENTS' QUESTIONNAIRE
Please tick One

1. What is your gender?

Male	[]
Female	[]
2. Do you like schooling?

Yes	[]
No	[]
3. How many children do you have?

Boys (1) (2) (3) (4) (5)	
Girls (1) (2) (3) (4) (5)	
4. What is your level of Education?

i) Illiterate	[]
ii) Primary	[]
iii) Secondary	[]
iv) Tertiary	[]
v) University	[]
5. Do you like mathematics?

Yes	[]
No	[]
6. Do your children both boys and girls like mathematics?

Yes	[]
No	[]
7. Do you assist your children in doing mathematics home assignment?

Yes	[]
No	[]
8. Do you encourage both your sons and daughters equally in doing mathematics?

i) Sons	[]
ii) Daughters	[]
iii) Both	[]
iv) Non	[]
9. How do you feel when your sons perform poorly in mathematics?

Discouraged	[]
More discouraged	[]
11. What are your reactions when your daughters perform poorly in mathematics?

Discouraged	[]
More discouraged	[]
Not discouraged	[]
12. Is mathematics important in life for both boys and girls?

Yes	[]
No	[]

APPENDIX 4

OBSERVATION SCHEDULE FOR TEACHERS AND PUPILS

1. How many questions did the teacher ask?
 - i) boy []
 - ii) girls []

2. When the pupils raised their hands who did the teacher select to respond?
 - i) More boys []
 - ii) More girls []
 - iii) equal number of boys and girls []

3. Who dominated the answering of the teachers' question?
 - i) boy []
 - ii) girls []

4. Did the pupils answer question during the lesson?
 - Yes []
 - No. []

5. Who asked more questions?
 - i) boy []
 - ii) girls []

6. Were boys motivated by the teacher?
 - Yes []
 - No []

7. Were girls motivated like boys?
 - Yes []
 - Girls []

8. Were pupils grouped in mathematics lesson?
 - Yes []
 - No []

9. The type of grouping was based on
 - i) Mixed ability []
 - ii) Boys only []
 - iii) Girls only []

10. Did the teacher use teaching and learning resources?
 - Yes []
 - No []

APPENDIX 5

INTERVIEW SCHEDULE FOR PARENTS

The interview questions were intended to collect information on parents' attitudes towards education.

1. Do you allow your children to attend schoolings?

2. Do you value the education of boys and girls?

3. Are you able to support your daughters and sons by paying for them the school levies and buying for them school uniforms?

4. Do you support the school when they ask for support of teaching / learning resources?

5. How are your children performing in mathematics?

6. Do you help your daughters and sons to do mathematics home assignment?

7. How do you ensure that they do the mathematics home work?

8. Do you think pupils' self- concept and attitude contribute to gender disparity in mathematics?

9. What are your views towards improving the general academic performance in maths in your school?

10. From your views, the teachers who are trained and employed by the Teachers Service Commission (T.S.C) teaches better than the untrained teachers?
