AN ASSESSMENT OF THE IMPACT OF TEACHING METHODS ON EFFECTIVE PERFOMANCE OF MATHEMATICS AS A SUBJECT ON STUDENTS IN KENYA.

BY

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A RESEARCH PROJECT SUBMITTED TO THEINSTITUTE
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N PARTIAL FULFILMENT OF
THE REQUIREMENT FOR
COMPLETION OF A
BACHELOR IN
EDUCATION

APRIL, 2010

DECLARATION:

I declare that this research project is my original work and has never been submitted to any university for any award. Where the works of others have been cited acknowledgment has been made.

Signature.. Date...August 26, 2009

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APPROVAL

I certify that the work submitted by this candidate was under my supervision. His work is ready for submission, to be evaluated for the award of a Bachelor of Education at Kampala International University.

Supervisor.................... Date 28/Aug/09

DEDICATION

I dedicate this research project to my husband Benard Gichimu and son Christian Karanja to you both with love.

ACKNOWLEDGMENTS

My gratitude goes to my supervisor for the advice and guidance while I was writing this project and also for providing useful references in order to improve the quality of this project.

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CHAPTER ONE

1.0 Background of the study

Considering the contributions of mathematics, science, and technology to today's world, one would have expected mounting interest in these disciplines, but the reverse seems to be the case. Indeed, there is declining enrolment in mathematics and science subjects among the youth, and poor performance in examinations, such as those taken in high school math and science courses (especially physics) by the brave few who enrol **(Ezeife, 1999)**.

It is ironical that in our pro-science and technologically oriented world, the youth who would take charge of global affairs in the future - the running of industries and the means of production, research laboratories, space technology, and international politics - are shying away from the very subjects that should adequately prepare them for such roles.

Improvement of the quality of education in Kenya has been a key feature of reform proposals of the government. These educational reforms largely focus on basic education, which in Kenya covers both primary and secondary education. Attempts towards realizing these proposals have been made in many ways.

Free primary education is now being offered to ensure every child has an equal opportunity to the primary education. While the government is trying to ensure this, a lot of work is being done to improve the quality of the same education. Focus is on better student achievements in all the areas covered in the syllabus at all levels.

A lot of research has been done too to find out ways of producing better quality education for the Kenyan children. For instance a lot of research has been done in the area of mathematics because poor performance in the subject at the end of secondary school has been an age long problem.

Studies done show that there is constant poor performance in the subject and that gender differences, in favour of boys, is a major issue that influences the poor performance in mathematics (**Eshiwani, 1985; Mondoh, 1986; Samumkut, 1986; Mwangi, 1986; Boit, 1986; Irumbi, 1990; Njuguna, 2002; Katiambo, 2002**).

These studies point out that the girls underachieve in mathematics due to lack of self confidence and poor attitudes towards the subject. The gender differences in mathematics were found to be more persistent in upper grades than in lower grades (primary school) and that the girls in single sex schools performed better than those in mixed schools.

1.2 Statement of the problem

Mathematics teaching as a subject has drawn a lot of controversy on the appropriate methods to be applied for student's better understanding. Yet no clear method can be plainly pointed as the most appropriate since there is a decline in enrolment from the youth.

Hence the study investigated how the teaching methods affect a student's perception of mathematics.

1.3 Objectives of the Study

1.3.1General objective

Investigate the impact of teaching methods on performance of mathematics by students

1.3.2 Specific objectives

1) Ensure that students appreciate and understand mathematics
2) Ensure that teachers are able to use better teaching methods for their students
3) To raise awareness of the importance of mathematics in the technological field

1.4 Research questions

1) How does the teaching method affect performance in mathematics?

2) *How effective are teaching methods on student's perception of mathematics?*

3) Does the language use scare away students from the subject?

1.5 Scope of the study

The study was conducted in Muran'ga North division in the following school; Kirogo boys high school, Kahuhia girls, Koimbe boys, Gitige Mixed and Gitui secondary schools.

The respondents to the research were the students and teachers in the school.

The study was based on the teaching methods effects on performance of students

1.5 Justification of the study

The research found out what the teachers do in class as compared to what they prepare their lessons, how they handle the students in these mathematics lessons and their perceptions towards the teaching and ability of students in the subject. The researcher also endeavored to find out the students' perceptions towards the teaching of mathematics and their performance in the subject. The researcher conducted focus groups with few students and also held some interviews with teachers as a follow up of their lessons. The researcher's findings hopefully will be utilized to inform policy and contribute towards the improvement of the education sector in general.

1.6 Limitations of the study

In conducting this study, a number of challenges were encountered, including:

- Non-Availability of Some of the Respondents –some respondents were displaced by the post election violence in the country.
- Attitudes Towards the Exercise – Some respondents were unwilling to freely share the information (especially negative information).
- Nevertheless, the researcher will tried to overcome these limitations and collected sufficient and representative data to reach the conclusions made.

CHAPTER TWO
LITERATURE REVIEW

2.0 Overview of education system in Kenya

Education in Kenya consists of one to two years of pre-primary education (ages 4-6), eight years of primary education (ages 6-14), four years of secondary education (ages 14-19), and four years of university education leading to a bachelors degree. Two major examinations are set by the National Examinations Council; the Kenya Certificate of Primary Education (which takes place at the end of primary school), and the Kenya Certificate of Secondary Education (which takes place at the end of secondary school). Each exam determines whether or not students progress to the next level of education.

In Kenya the curriculum is controlled by the Kenyan Institute of Education, which draws its representation from a wide range of teachers and experts from universities. **(MOE, 1976)**

The secondary school mathematics syllabus is very demanding on the majority of students, many of whom find certain topics extremely difficult to comprehend.

In the first year of secondary mathematics education, algebra content emphasizes coordinates and graphs and simplifying expressions.

In the second year, students encounter linear equations; quadratic expressions and equations; linear inequalities; and basic statistics.

In the third year of secondary mathematics education, students continue their work with quadratic expressions and equations and are introduced to binomial expansion, matrices, sequences and series, and probability.

In the fourth and final year of secondary mathematics education, students study matrix transformations, statistics involving variance and standard deviation, time series and trends, and indexed numbers including weighted averages. In addition to these topics, students in the fourth year also study linear programming, differentiation, and integration.

2.1 Mathematics as a challenge

In Kenya about 10% of the children like and are willing to study math. The rest have to be persuaded or forced to study mathematics because it is compulsory. They have a completely negative attitude towards the subject (especially the girls), and therefore, teaching mathematics in Kenya has been, and still is, an uphill task. **(Eshiwani, 1983)**

The main reason for these problems is that up to the late 1970s, nobody chose to go to the university to study education as a profession. The good mathematics students studied engineering, medicine, accounting, or any other course but teaching.

Many of those who failed to meet the minimum requirements for their preferred careers became teachers. Such mathematics teachers tended to scare the learners to cover up their lack of content knowledge and their inadequate preparation to teach the lessons.

Children seem to find the learning of mathematics difficult and painful. It took a very bright and brave child to accept the pain and learn mathematics. It was even worse for girls as they often could not withstand the fear.

The situation got even worse in the 1980s as those educated in this manner became the educators. In addition, many students came to school having heard horror stories about mathematics learning from their parents. These factors gave mathematics a monstrous face, and to date, we are still trying to change this image to one with a more friendly face.

In the early eighties the government restructured the mathematics syllabus, which previously had options to take care of varied potentials in mathematics. Now there is a common syllabus for all.

Allowing different options of mathematics had a very negative effect on learners who ended up with the option considered to be for weak students, while encouraging arrogance in those who took the option for stronger students. This arrogance developed at an early stage in life and unfortunately spilled over into the teaching of mathematics by those students who ended up being mathematics teachers. **(Eshiwani, 1983)**

The common syllabus used now is appropriately designed to take care of students with different potential. While there are many textbooks, they have the same basic content. The Kenyan Institute of Education approves books, and teachers have a vote in approval. These steps have helped to improve the image of the subject. Many people now appreciate the value of mathematics.

Also, since March of 2001, the Kenyan government has banned corporal punishment in schools. This should go a long way toward making mathematics acceptable and, therefore, easy to teach. The good news is that in the year 2000, only 12% failed mathematics at the KSCE (secondary) level. Four years ago the failure rate was 38%. This is a great improvement. (MOEST. 2002).

Different strategies

Different strategies have been used across our countries to motivate students to learn mathematics. High stakes national examinations that have serious consequences for students are one means. Sometimes in the past, punishment has been used. Making mathematics interesting, meaningful, and useful to students is seen as a way to motivate their learning.**(Akpan,1986)**

An individual's perceived ability to do well in a subject is one variable that has received considerable attention in psychological literature considering American females. Within an African context, **Lee and Lockheed (1990)** conducted a study of 1,012 students enrolled in single-sex and mixed-sex secondary schools from ten Southern states in Nigeria. The authors found that perceived ability positively related to higher achievement in mathematics.

Similarly, in a study of secondary and college students selected from seven state secondary schools and one federal college in Nigeria, **Aghenta (1989)** found that "perceived difficulties of science occupations" was a significant factor in preventing girls from entering STM fields.

The attitude that one holds towards mathematics or science appears to be a powerful predictor of achievement in the respective fields. A prior positive attitude towards STM

(Aghenta 1989), the development of a positive attitude towards STM by a teacher **(Mordi 1991),** or a strong positive attitude toward science **(Akpan 1986)**

In her study of secondary students, **Aghenta (1989)** found that a poor attitude towards STM was a barrier to access of STM fields. Conversely, she found that a good or positive attitude was one of several factors that facilitated performance in STM

Understanding the complexities of gender and mathematics achievement

Eshiwani (1983) reported that girls in Kenya generally have negative attitudes towards math and these attitudes tend to depress their achievement.

Generalizing from STM education to the broader context of women's education, a review of sector studies reveals a positive relationship between female education and several well-being indicators.

According to **King**, "All of the evidence from Third World countries shows a close link between women's education and social and economic development, and between the size of the education gender gap and national development" (1990:6).

The links are already well-established between women's education and fertility, child health and survival (**US-AID 1982; Bourque and Warren 1990; King 1990**); formal labor force participation (**OE & OWD 1990**); income and wage employment (**King 1990**); and women's empowerment into the rights and responsibilities of citizenship (**King 1990**). Furthermore, the links for education in the STM fields are presumed to be particularly strong for women.

Girls who become interested in, persist in studying, and then work in STM fields, significantly improve their life chances (e.g., standards of income, health, fertility, and productivity), as well as those of their family (e.g., through increased resources, and by being available as a role model for younger female kin).

Several African authors suggest that overall attitudes are partially responsible for girls' low or poor participation in mathematics and science (**Akinnuli 1982; Onobowale 1982; Oyedonkun 1983; Aghenta 1989; Bajah and Bozimo 1989; Osibodu 1989**). Yet, these authors fail to identify the specific attitudinal components presumed to have an inhibitory or enhancing effect on actual behavior.

Attitudes and their respective components deserve closer examination. This research, will attempt to critically examine specific components of attitudes towards mathematics and their relationship to achievement.

Previous research has found that students who perceive the utility of studying mathematics will tend to perform better in the subject **(McLeod 1989).** Conversely, students who fail to see the practical or future utility in studying mathematics tend to enroll less often in higher-level math courses, perform less well in math courses, or find math less than interesting than other courses.

Stereotyping mathematics as a predominantly male domain is an important variable in Understanding the complexities of gender and mathematics achievement. In both Western and African samples, stereotyping mathematics may account for poor performance of girls (**Fennema and Sherman 1977; Osibodu 1989**).

Within the West African socio-cultural context, occupational decisions frequently separate along rigid stereotypical lines with specific jobs being perceived as more masculine or feminine.

These stereotypical attitudes likewise may affect students' perceptions of their ability to study certain subjects or pursue a certain career path.

Additionally, one might hypothesize that the longer girls stay in the educational pipeline, the more likely they are to challenge existing traditional ideas or beliefs based on the rigidity of gender. Likewise, the longer they stay in school, the more chances they have to be exposed to successful female role models in mathematics and other related subjects; these role models may positively affect the formation of students' attitudes.

An additional interpretation of this finding suggests that students with less stereotypic views of mathematics might possess a history of successes in mathematics that in turn influences their idea of appropriateness of the subject for them as a female.

It is possible that rural mothers perceive the value of education as higher than that of urban mothers, and thus, are more likely to encourage their daughters to achieve. The fact that their daughters have persisted to the secondary level of formal schooling suggests that there is family support for their continued education.

Along this line of reasoning, one might expect that girls would be more likely to be withdrawn from school in the rural area due to conditions such as: the high demand for their labor contribution, early or forced marriage, lack of family financial resources to support further education, and distance between home and school. These conditions are believed to be more pronounced in the rural area in contrast to that of the urban area; thus, those who do remain in school might have been more strongly encouraged to do so.

Educators and parents alike need to become active change agents in fostering positive attitudes in young girls and women in order to enhance their interest and achievement in mathematics.

"Because teachers are important role models and career counselors for students, the participation of women in the teaching profession can be a critical factor in challenging existing stereotypes and in promoting and supporting the expanded aspirations of female students" **(Adams and Kruppenbach 1986:9).**.

An overview

The role of teachers cannot be overemphasized, particularly when "entry barriers against women serve as obstacles for education. Some of the barriers begin at the primary school level with teachers and textbooks projecting attitudes that discourage school attendance and performance of girls, or promoting stereotypes of girls not being as good as boys in technical subjects or mathematics" **(King 1990).**
The role that parents play should not be overlooked. Much of the socialization that shapes a child's life comes from the family, especially from mothers.

CHAPTER THREE
RESEARCH METHODOLOGY

3.0 Introduction

This section entails the methods used to collect the data necessary to answer the research. It is divided into;

3.1 Research design

The study used Descriptive research design. This enhanced the researcher to obtain a better understanding of the problem of mathematics as a subject. The method chosen was to allow a collection of comprehensive intensive data and provide an in-depth study on why past initiatives had not produced the desired results.

3.2 Population of study

The populations of study were teachers and students in schools; Kirogo boys high school, Kahuhia girls, Koimbe boys, Gitige Mixed and Gitui secondary schools.

3.3 Study sample

With regard to above the study employed stratified sampling,

Sampling as follows: -

- For students – 10 to 30 of the sample suffice.
- Teachers- at least 3 teachers in the department of mathematics in the school.

3.4 Scope of the study

The study was carried out in Murang'a North division kiharu, in Kenya. The area of the study is in central province Kenya.

3.5 Research instruments

- **Questionnaire**

Primary data was collected by use of questionnaire and interviews, filled by relevant parties to obtain ideas on what constitutes teaching methodology.

These were designed in both open and closed ended form.

The method ensured high proportion of responses and higher returns rate.

- **Interview method**

This entailed face-to-face interactions with the teachers in the mathematic department of the school.

Secondary data was obtained from the ministry of education magazines annual report records and other researches done to give other information required in the research.

3.6 Data analysis and interpretation

The information collected was analyzed and edited to create consistency and completeness. After collecting the questionnaires they were edited for completeness and consistency across the respondents and to locate omissions. Information obtained from the research study was presented and analyzed using bar charts, narratives, and statistical figures. That is:-

Descriptive statistics: This was used to measure central tendency, variability and relationship between variables. It included proportions, mean scores and percentage.

Summary statistics: This was used in the presentation of analysis. It included use of mean & percentages, summarized tabulations and frequency distribution.

3.7 Research procedure

The researcher had an introductory letter from the university to present to the area authority to obtain permission for study. This gave directive to the local administrators at grass root level for acceptance. On acceptance by the authorities the major task of collecting data started immediately.

CHAPTER FOUR
DATA ANALYSIS AND PRESENTATION

4.0 Introduction

In this chapter an attempt is made to interpret and explain the findings. Also key information enables to relate to the specific objectives and give a clear picture of the results.

4.1 Data analysis and processing

RESPONSE RATE

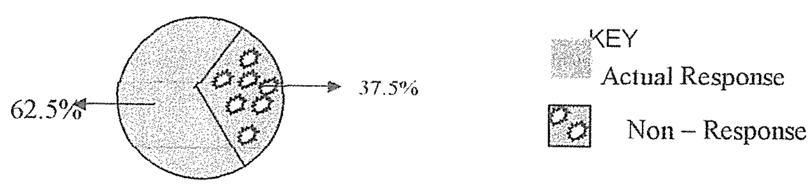
4.1 Table 1

Planned no of response	40	100%
Actual response	25	62.5%
Non Response	15	37.5%

Source primary data (2009)

Response Rate = $\frac{\text{Actual response} \times 100}{\text{Planned No of response}}$

25/40 x 100 = 62.5 %



Comment

The shortfall was due to some problems like unwillingness of some respondents to produce information regarded as confidential in floor of victimization another major problem was the displacement of people witnessed after the post-election violence in the country which made it difficult to get the required information from some of the respondents. However 62.5% is and adequate proportion of the sample size. A breakdown of the above is shown in the table below:-

4.2 TABLE 2

Type of response	Planned Response	Actual Response	Non- Response
Teachers	10	7	3
Students	30	18	12
Total	40	25	15

Source primary data (2009)

4.1.2 TEACHERS
Age of respondents

According to study, 14% of the teachers who responded are below 30 years of age. This implies that they form the minority within the teaching staff. 43% of the respondents are between 31-35 years of age.29% of the respondents are between 36-45 years. 14% also of the respondents are above 46 years. This shows that the respondents cut across all the age groups.

TABLE 3

Distributions of staff by age

Categories	Number	Percentage
Below 30 years	1	14%
Between 31-35 years	3	43%
Between 36-45 years	2	29%
Above 46 years	1	14%
Total	7	**100%**

Source primary data (2009)

Distribution of staff by gender

Majority of respondents represented by males with 56% this shows more than half of the respondents are men while female respondents were 44%.

TABLE 4

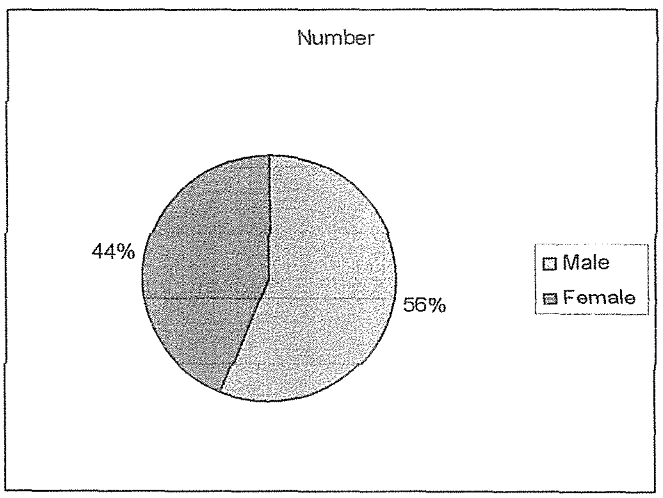
DISTRIBUTIONS OF STAFF BY GENDER

category	number	Percentage
male	4	56%
female	3	44%

Source primary data (2009)

FIGURE 1

An illustration of the above table inform of a pie chart



Source primary data (2009)

4.1.3 Staff experience

From the research findings we can establish that 14% of the teachers have been teachers for less than 2 years, 43% of the teachers have been in the profession for 3-5 years, and 29% have worked for 6-10 years.14% have been in the profession for 11-15 years.

This shows that most of the teachers in school can boost the morale of the students in mathematics learning as they are young. Hence the information obtained was highly credible.

TABLE 5: length of staff experience

Categories	**Number**	**Percentage**
0-2 years	1	14%
3-5 years	3	43%
6-10 years	2	29%
11-15 years	1	14%
Total	7	***100%***

Source primary data (2009)

4.1.4 STUDENTS

Out of the 30 target students, only 18 responded. The researcher deemed this as adequate and sufficient for the purpose of data analysis since it represented 80%.

Table 6

Category	**Frequency**	**Frequency (%)**
Form one	0	0
Form two	5	28%
Form three	7	39%
Form four	6	33%
Total	**18**	**100**

Source primary data (2009)

From the table above it can be seen that most of the respondents were from the upper classes.

Age of respondents

According to study, 11% of the students who responded are below 15 years of age. 28 % of the respondents are between 15-16 years of age.39% of the respondents are between 16-17 years. 22% also of the respondents are above 17 years. This shows that the age of the respondents is representative of all age groups at secondary school level..

TABLE 7

Distributions of students by age

Categories	**Number**	**Percentage**
Below 15 years	2	11%
Between 15-16 years	5	28%
Between 16-17 years	7	39%
Above 17 years	4	22%
Total	**18**	**100%**

Source primary data (2009)

Majority of respondents represented by female students with 56% this shows more than half of the respondents are girls while male students were 44%.

TABLE 8

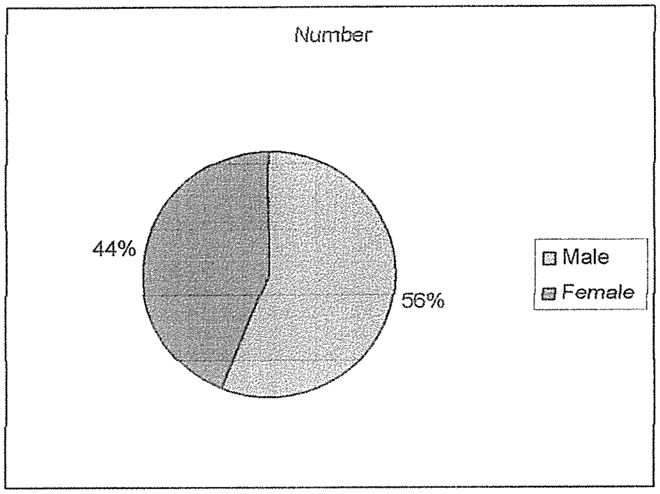
DISTRIBUTION BY GENDER

Category	Number	Percentage
Female	10	56%
Male	8	44%
TOTAL	**18**	**100%**

Source primary data (2009)

FIGURE 2

An illustration of the above table inform of a pie chart



Source primary data (2009)

TEACHERS ANALYSIS

4.2 Responses to whether mathematics is important in the technological field.

Out of 7 respondents 60 percent said that mathematic is important for one to venture in the technological field while, 40 percent said it's not vital.

TABLE 5

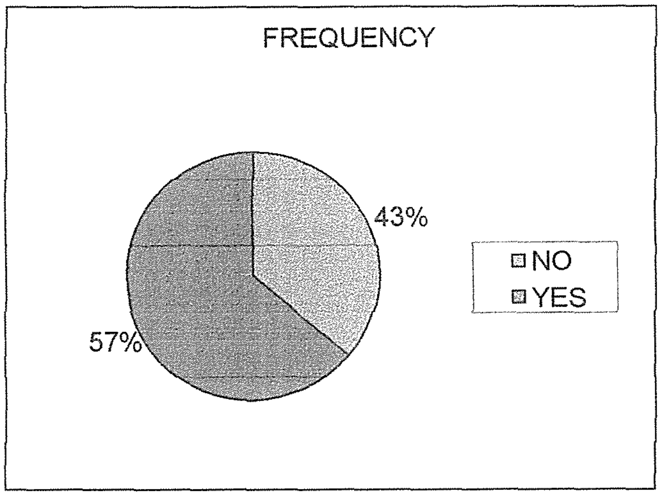
Responses to whether mathematics is important in the technological field.

8 RESPONSE	**FREQUENCY**	**PERCENTAGE**
Yes	4	57
No	3	43
Total	7	**100**

Source primary data (2009)

FIGURE 5

An illustration of the above table inform of a pie chart



Source primary data (2009)

4.3 Response on whether students appreciate and understand mathematics

Majority of response represented by 86 percent indicated that most students do not appreciate and understand mathematics as a subject. While 14 percent indicated that students appreciated mathematics as a subject.

TABLE

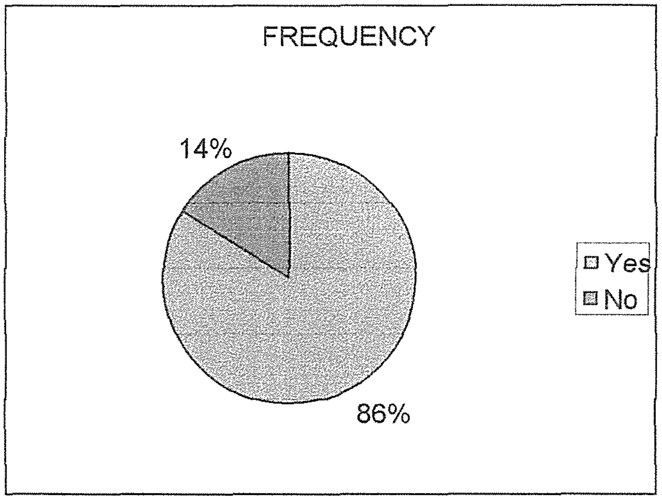
Response on whether students appreciate and understand mathematics as a subject.

RESPONSE	FREQUENCY	PERCENTAGE
NO	6	86
YES	1	14
Total	7	**100**

Source primary data (2009)

FIGURE 6

An illustration of the above table inform of a pie chart



Source primary data (2009)

4.4 Response on whether boys are outperforming girls in mathematics

57% of the respondents said that boys were outperforming girls in mathematics as a subject, while 43% of the respondents said girls performed better.

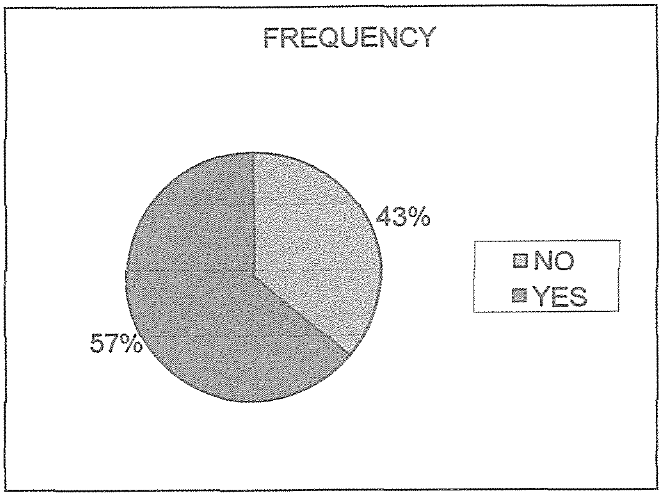
TABLE 8: Response on whether boys are outperforming girls in mathematics.

RESPONSE	FREQUENCY	PERCENTAGE
YES	4	57
NO	3	43
Total	7	**100**

Source primary data (2009)

FIGURE 8

An illustration of the above table inform of a pie chart



Source primary data (2009)

4.5 Response on whether language is a hindrance to students understanding of mathematics?

The findings imply that students understanding of the subject is being affected by the words used , representing 86 percent, , while 14 percent shows that they do not have any challenge.

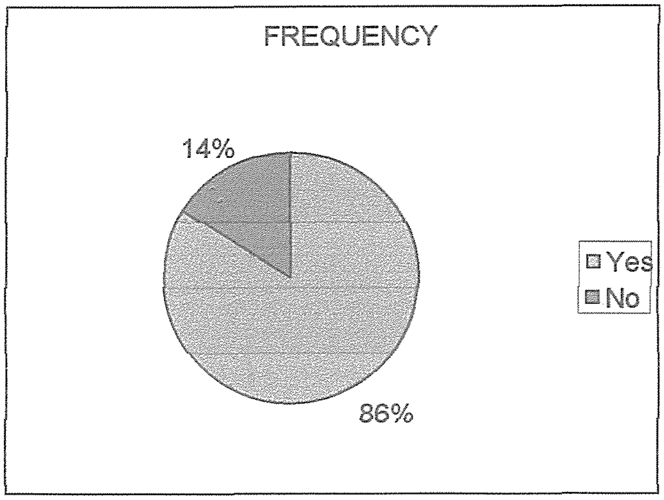
TABLE 9 Response on whether language is a hindrance to students understanding of mathematics?

RESPONSE	**FREQUENCY**	**PERCENTAGE**
YES	6	86
NO	1	14
Total	7	**100**

Source primary data (2009)

FIGURE 9

An illustration of the above table inform of a pie chart



Source primary data (2009)

STUDENTS ANALYSIS

Response on whether teachers attitude affect students performance in mathematics

Majority of response represented by 76 percent indicated that most students will love the subject where the teacher's attitude towards the subject is positive. While 24 percent indicated that they do not mind the teacher's attitude towards the subject.

TABLE 6

Response on whether teachers attitude affect students performance in mathematics.

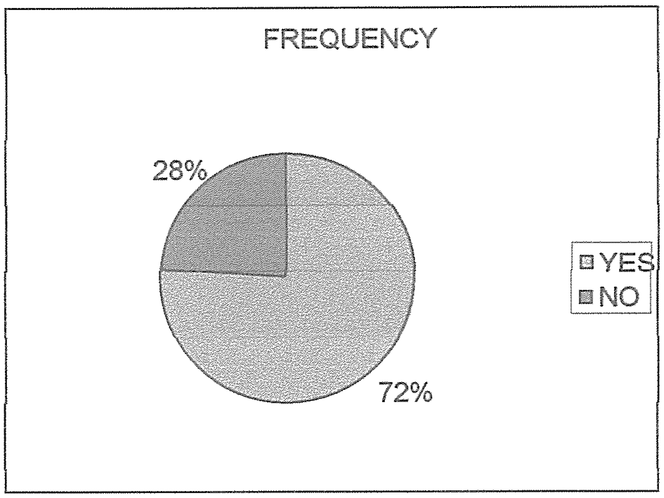
RESPONSE	FREQUENCY	PERCENTAGE
NO	13	72
YES	5	28

Total	18	100

Source primary data (2009)

FIGURE

An illustration of the above table inform of a pie chart



Source primary data (2009)

4.2 Responses to whether students are satisfied with the teacher's strictness when teaching mathematics.

Out of the 18 respondents 56 percent said that they were satisfied while, 44percent said they were uncomfortable.

TABLE 5Responses to whether students are satisfied with the teacher's strictness when teaching mathematics.

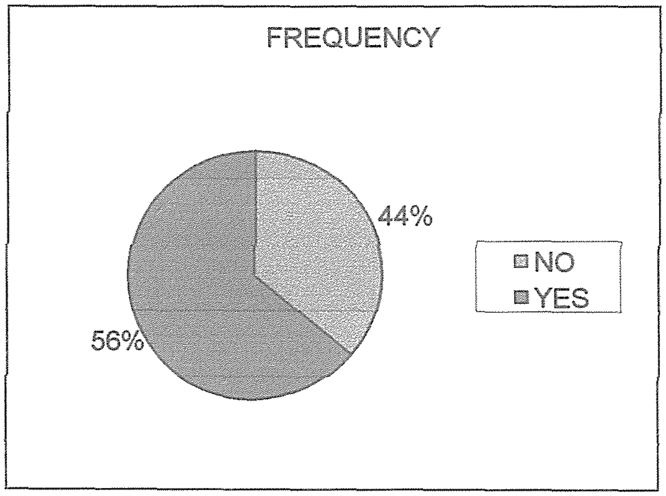
8 RESPONSE	FREQUENCY	PERCENTAGE
Yes	10	56

No	8	44
Total	**18**	**100**

Source primary data (2009)

FIGURE 5

An illustration of the above table inform of a pie chart



Source primary data (2009)

4.3 Response on whether teachers act as role models to students

Majority of response represented by 86 percent indicated that most students do look up to their teachers as their role models in the study of mathematics and the whole course as a whole. While 14 percent did not.

TABLE

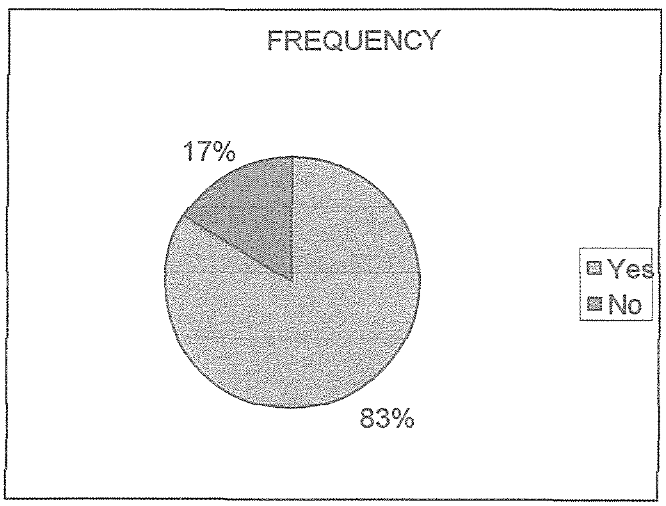
Response on whether teachers act as role models to students.

RESPONSE	FREQUENCY	PERCENTAGE
NO	15	83
YES	3	17
Total	**18**	**100**

Source primary data (2009)

FIGURE 6

An illustration of the above table inform of a pie chart



Source primary data (2009)

4.4 Response on whether a student's friends influence his or her learning habits in mathematics

56% of the respondents said that their friends influenced their studying habits, while 44% of the respondents said their friends did not influence them at all.

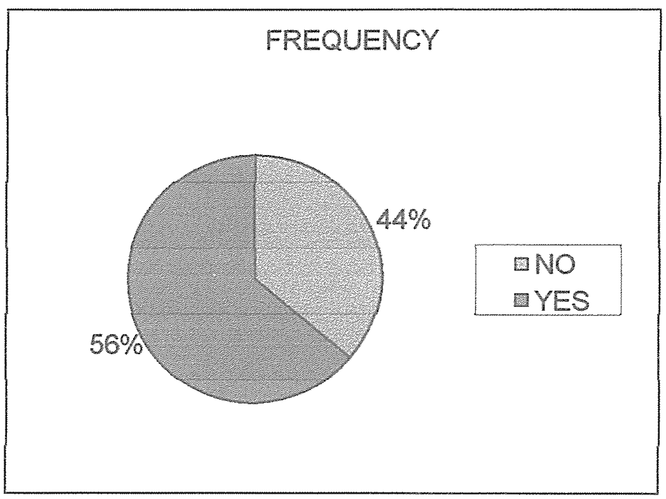
TABLE : Response on whether a students friends influence his or her learning habits in mathematics.

RESPONSE	FREQUENCY	PERCENTAGE
YES	10	56
NO	8	44
Total	**18**	**100**

Source primary data (2009)

FIGURE

An illustration of the above table inform of a pie chart



Source primary data (2009)

4.5 Response on whether language is a hindrance to students understanding of mathematics?

The findings imply that students understanding of the subject is being affected by the words used, representing 86 percent, while 14 percent shows that they do not have any challenge.

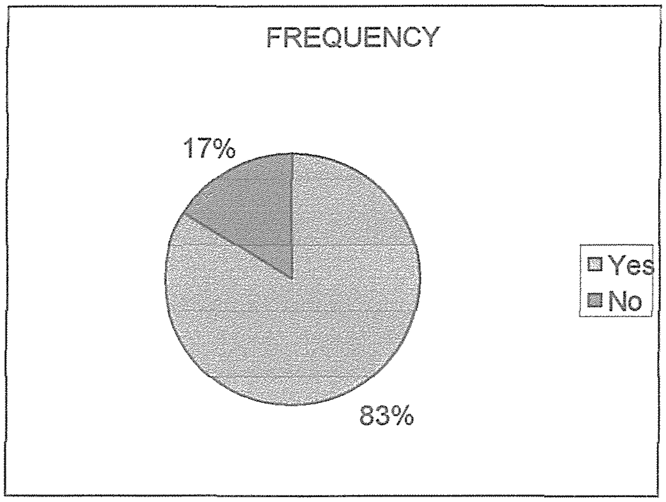
TABLE Response on whether the students were keen on fulfilling their parents aspirations?

RESPONSE	**FREQUENCY**	**PERCENTAGE**
YES	15	83
NO	3	17
Total	**18**	**100**

Source primary data (2009)

FIGURE

An illustration of the above table inform of a pie chart



Source primary data (2009)

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.0 Summary of the findings

One of the main outcomes of the study is the confirmation it has provided that boys and girls are performing differently in mathematics at the secondary level. The findings of boys outperforming girls in mathematics at primary level agree with those of **Githua and *Mwangi* (2003)** *in* Kenya,***Afrassa*(2002)** *in Ethiopia and other parts of* Africa(**Kogolla,Kisaka,& Waititu,2004**) similar findings were also reported in other studies(**Koller,Baumert,& Schnabel,2001**).These findings,however,contradict those of **Hanna(2003),Boaler(1997)** and **Vale,Forgasz,& Horne(2004)**.It seems that the western world has succefully tackled the problem of girls underachievement in mathematics as opposed to boys through different intervention programmes,while in the developing countries still remains to be done.

This study also aimed to determine the factors that impact on the mathematics achievement of student's in mathematics.

One of the findings of the present study relates to the method of teaching normally employed in the mathematics classrooms at secondary level in Kenya. The method was teacher-centered, and student's were passive and on the receiving end, learning algorithms to apply to solve mathematical problems. This phenomenon reflected the lessons described by nunes and Bryant(**Nunes&Bryant,1997**),and the descriptions of primary classes in Mauritius(**Griffiths,1998,2000,2002**).

It seems that insufficient opportunities are provided to be involved in their own learning, and empasises the algorithmic procedures used for solving mathematics problems. It seems that the examination-driven curriculum in Kenya leads to a more teacher-centered curriculum.

Teachers were to be playing a fundamental role in influencing students learning of mathematics, as noted by **Hanna&Nyhof-young (1995)**.They also helped student's to develop a positive attitude towards mathematics and motivate them towards the subject. The respect student's have for their teachers could be noted during the classroom observations and interviews. This supports the finding of Aldridge, Fraser and huang (**Aldridge, Fraser, &Huang, 1999**) concerning the respect student's had for their teacher in Taiwan.

It was also found that teachers were seen to be strict, and that student's appreciated the strictness, claiming that this helped them to have a displined class in which to learn mathematics. Evidence of this can be found in the transcripts of student's interviews.

Teachers were found to be acting as role models, were possessing sound leadership skills and were of helpful nature. However, there were teachers who had a gender bias in their own perception. as described by elwood(**Elwood,1999**),they tended to describe male *student's as able in mathematics and female student's as being uncertain and not* possessing enough faith in their own ability.

These findings were common for average and low performing girls-findings which are in agreement with those of **Tiedemann(2000)**.cases where negative massages were sent to girls about their performance in mathematics by teachers were noted in the present study also.

Interestingly, parental interest and involvement in their children education is high in Kenya. The contributions of parents towards the children learning in mathematics as *discussed. It was found that students are conscious of their parental aspirations and this* plays an important role in their motivation towards education. It should also be noted that parents support towards education in Kenya is no longer gender-biased now-as it used to be. Parents believe in the power of education and the success of their children depends to a great extent on their educational; success. However, the way of attributing success and failure in mathematics to boys and girls still followed the pattern as described by **Raty et al. (2002)** where the success of boys was attributed to talent, while the success of girls was *due to more effort.*

5.1 Conclusion

5.2 Recommendation

The most direct impact of this study will hopefully be in the classroom and will help teachers to use the findings, in particular;

- using student-centered teaching approaches
- using meaningful activities in their classrooms
- *promoting conceptual understanding in mathematics*
- emphasizing process rather than product during problem-solving sessions
- Promoting collaborative learning in mathematics classes.
- Helping pupils to develop a positive attitude towards mathematics.
- Motivating students in their learning of mathematics.

- Enhancing the mathematics achievement of all students.
- Promoting equity in education.

Teachers will have evidence on how different strategies can be incorporated with success into their regular classroom transactions and within their schedule of work. One teacher, who as a respondent of the study, stated that using cooperative learning and pupil-centered methods would be very time consuming and that teachers would face difficulties in completing syllabus

As argued in the previous chapters, one of the main worries of teachers and parents is that syllabus should be thoughly completed. All that is required is readjustment.

5.3 Areas for further research

Due to funding and logistic limitations, this project was conducted as a pilot study that utilized a small sample size, relatively short time duration, and a convenience sampling technique. It is suggested that a follow-up study should be carried out over a longer time span (about 15 weeks of instruction), and that the study should use a much larger sample size, and if possible, adopt randomization procedures in sample composition. A sufficiently large sample would make it possible to include a sizeable number of male and female participants in the study such that more hypotheses could be built into the research design. For example, it would be interesting to investigate both the possible effect of gender on mathematics performance, and a possible interaction effect between treatment (curriculum type) and gender.

Further studies on gender and mathematics at secondary level should be conducted in relation to single sex and co-educational schools. An investigation of the attitudes towards mathematics and the performance of boys and girls in single sex schools, as compared to those in co-education schools, could prove to be important.

This study has just touched upon relationship between culture and performance in mathematics. Kenya is a multicultural country with a blend of different cultures and an in-depth study wherein the issue of gender and mathematics in relation to ethnicity would be valued

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APPENDIX III

QUESTIONNAIRE

My name is Wanjohi Rosemary Wanja a student from Kampala international university (K.I.U.), Faculty of Education.

I am collecting data in relation to teaching methods on mathematics in Kenya, I request for your cooperation and I promise not to take much of your time.

Please note that we do not mention people's names to ensure privacy and confidentiality.

TICK WHERE APPROPRIATE

i) Do you like mathematics?

☐ Yes ☐ No

ii) Do you pass the subject?

☐ Yes ☐

iii) Do you have a relative, friend, acquaintance who dislikes mathematics?

☐ Yes ☐

iv) Is mathematics teaching interesting at your school?……………………………………………………………………………………
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iv) Do you believe that the mode of teaching mathematics affects performance at your school?

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THANKS