THE FACTORS AFFECTING GIRLS’ PERFORMANCE IN MATHEMATICS IN SECONDARY SCHOOLS IN RUCHU ZONE, MARAGUA DISTRICT, KENYA.

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NOVEMBER, 2008
DECLARATION

I Jane M. Gichane declare that this research report is my original work and has not been presented for an award of a degree in any other university or institution of high learning.

Signed: JANE M. GICHANE  Date: 23/8/2008
APPROVAL

This research report has been submitted for examination with my approval as a university supervisor.

Signed: Nakbinge Immanuel

SUPERVISOR

Date: 23.08.2008
DEDICATION

I dedicate this work to my husband Stephen Thuku and my children Bernard, Richard and Alex for their moral encouragement and material support.
ACKNOWLEDGEMENT

To begin with, I wish to express my sincere gratitude and thanks to Mr. Nakibinge Immanuel, my supervisor in Kampala International University, who has guided throughout the time of writing this report by correcting me where need arose.

My sincere thanks also go to Kampala International University staff that assisted me in getting the research materials and the relevant books concerning the project.
Special thanks go to Ruchu Zone principals, teachers and students who cooperated very much by responding positively to my needs.

Thanks also go to the S.M.A.S.S.E. trainers who equally supported me in terms of materials the relevant information towards the project.
Finally, special thanks go to my husband who has assisted me financially and cooperated very well and gave me time to move from one school to another in search of information.
# TABLE OF CONTENTS

DECLARATION ................................................................................................................................... i
APPROVAL ........................................................................................................................................ ii
DEDICATION ........................................................................................................................................ iii
ACKNOWLEDGEMENT ....................................................................................................................... iv
TABLE OF CONTENTS .............................................................................................................................. v
LIST OF TABLES ........................................................................................................................................ viii
LIST OF ACRYNOMS .............................................................................................................................. ix
ABSTRACT ............................................................................................................................................... x

## CHAPTER ONE ..................................................................................................................................... 1

INTRODUCTION ................................................................................................................................. 1

1.0 Overview ........................................................................................................................................ 1
1.1 Background to the Study ................................................................................................................. 1
1.2 Statement of the Problem ............................................................................................................... 3
1.3 Objectives of the Study .................................................................................................................. 3
  1.3.1 General Objective ..................................................................................................................... 3
  1.3.2 Specific Objectives .................................................................................................................... 3
1.4 Research Questions ....................................................................................................................... 4
1.5 Significance of the study ................................................................................................................ 4
1.8 Conceptual Framework .................................................................................................................. 6
1.9 Organization of the rest of the report ............................................................................................. 6

## CHAPTER TWO ................................................................................................................................... 7

LITERATURE REVIEW ......................................................................................................................... 7

1.0 Introduction .................................................................................................................................... 7
2.1 Girls performance in mathematics in Kenya .................................................................................. 7
2.3 Gender and Attitudes ..................................................................................................................... 8
2.4 Study Environment and Performance ........................................................................................... 10
  2.4.1 Effects of school organization on girl’s performance in mathematics. ................................... 10
  2.4.2 Classroom Methodology ......................................................................................................... 11
2.4.3 Mathematics curriculum ................................................................. 12

CHAPTER THREE .................................................................................. 17
RESEARCH METHODOLOGY ................................................................. 17
3.0 Introduction ..................................................................................... 17
3.1 Research design .............................................................................. 17
3.2 Area and population of study .......................................................... 17
3.3 Sample size and selection ............................................................... 17
3.3.1 Selection of the subjects ............................................................... 18
3.4 Research instruments ..................................................................... 18
3.5 Data analysis .................................................................................. 18

CHAPTER FOUR .................................................................................... 19
PRESENTATION AND DISCUSSION OF FINDINGS ............................ 19
4.0 Introduction ..................................................................................... 19
4.1 Background Information of the participants ................................. 19
4.2 Findings from the questionnaires .................................................. 20
4.2.1 Gender of the respondents ......................................................... 20
4.2.2 Academic/professional qualifications ....................................... 20
4.2.3 Teaching/working experience ................................................... 21
4.2.4 Girls performance as they moved up from Form One to Form Four 22
4.2.5 Gender responsive language ....................................................... 23
4.2.6 Girl students’ percentage marks score in mathematics .......... 23
4.2.7 General comments why girls perform poorly in mathematics by 32 girl students 23
4.3 Interview Observation ................................................................. 24

CHAPTER FIVE .................................................................................. 25
SUMMARY, CONCLUSION AND RECOMMENDATIONS ................ 25
5.0 Introduction ..................................................................................... 25
5.1 Summary ....................................................................................... 25
5.2 Conclusion ..................................................................................... 26
LIST OF TABLES

Table 1: Number of candidates who joined Kenyan Universities from Maragua District Secondary Schools ........................................................................................................................................... 2
Table 2: Mathematics Performance by four schools in K.C.S.E. year 2005 and 2006....... 3
Table 3: Gender of respondents .................................................................................................................. 20
Table 4: Respondents' Preference .............................................................................................................. 20
Table 5: Academic/professional qualifications.......................................................................................... 21
Table 6: Teaching/Working experience ..................................................................................................... 21
Table 7: Teaching Materials ....................................................................................................................... 22
Table 8: Girls performance .................................................................................................................... 22
Table 9: Gender responsive language ...................................................................................................... 23
Table 10: Girls’ scores is less than 25% marks in mathematics ................................................................. 23
Table 11: why girls perform poorly in mathematics................................................................................... 24
ABSTRACT
The purpose of this study was to examine the factors affecting the girls’ performance in mathematics in secondary schools in Ruchu Education Zone, Maragua District, Kenya. Specifically the study determined the attitude of girl’s students towards mathematics, learning environment, culture home background, Gender, behaviour and role models. Three questionnaires were used, one for principals, another for mathematics teachers and the other for girl students. There was one interview guide for the zonal inspector of schools.
Four secondary schools out of twelve schools were randomly selected in the education zone. The sample consisted of thirty two girl students, eight mathematic teachers, four principals and one zonal inspector of schools.

The study found out that experience of mathematics teachers and behaviour of girls had no major influence on the girls’ performance in mathematics. Girl’s attitude towards mathematics, culture, learning environment, home background, Gender and lack of role models greatly affected the girl student’s performance in mathematics.

The study concluded that more female principals and mathematics teachers are needed so as to raise girl’s performance in mathematics. Learning environment, culture and girls attitudes towards mathematics need to be changed positively.
CHAPTER ONE
INTRODUCTION

1.0 Overview
This chapter gives an overview of the study; specifically the chapter presents the background of the study, the research objectives, and research questions, scope and the significance of the study. It also gives the conceptual framework upon which the study was based.

1.1 Background to the Study
The research set out to examine the factors affecting girls’ performance in mathematics in Secondary Schools in Kenya, taking Ruchu Zone as a case study.

Following the researcher’s observation for a period of 5 years, girls’ performance in mathematics led to low numbers joining tertiary institutions. For example a girl who wished to join a tertiary institution for a course like Bachelor of Commerce and had scored a grade C- (Minus) in mathematics was not considered even though she had passed well in other subjects. For her to qualify, she must do a bridging course of mathematics to upgrade her mathematics low grade (C-).

This bridging course in mathematics was not only very expensive but also time consuming. In most cases most parents were not able to pay for it and so many girls end up being shut out of various career opportunities like Nursing Courses, Diploma Courses in Education, Engineering Course, Laboratory Technician, Bachelor of Commerce and many other courses.

Statistics also showed that the number of girls taken for the course were on the decline as a result of getting low grades in mathematics.

It has also come to the researcher’s notes that most careers that are mathematics based were taken by men. For example, in Ruchu location, male teachers who teach mathematics are more than females. Statistics show that out of 100 maths teachers 27 are
females and 73 are male. Other careers include doctors, laboratory technicians, and others. This was because girls have consistently scored low marks in mathematics, which cannot make them qualify for these jobs.

Table 1: Number of candidates who joined Kenyan Universities from Maragua District Secondary Schools

<table>
<thead>
<tr>
<th>Year</th>
<th>Boys</th>
<th>Percentage</th>
<th>Girls</th>
<th>Percentage</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>278</td>
<td>92.7</td>
<td>22</td>
<td>7.3</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>2001</td>
<td>278</td>
<td>93.3</td>
<td>20</td>
<td>6.7</td>
<td>298</td>
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<tr>
<td>2002</td>
<td>288</td>
<td>90.6</td>
<td>30</td>
<td>9.4</td>
<td>318</td>
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<td>32</td>
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<td>2004</td>
<td>352</td>
<td>88</td>
<td>48</td>
<td>12</td>
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<td>354</td>
<td>83.9</td>
<td>68</td>
<td>16.1</td>
<td>422</td>
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</tbody>
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Table 2: Mathematics Performance by four schools in K.C.S.E. year 2005 and 2006

<table>
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<tr>
<td>C+</td>
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<td>7</td>
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<tr>
<td>C-</td>
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<td>-</td>
<td>5</td>
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</tr>
<tr>
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<td>160</td>
<td>40</td>
<td>75</td>
<td>32</td>
<td>35</td>
</tr>
</tbody>
</table>

1.2 Statement of the Problem

The girl students have performed poorly in mathematic examinations in secondary schools in Ruchu Education Zone from 2000 to 2005, for example in 2005 Ruch Secondary school produced only four girls with C+ and above in KCSE while most candidates got C and below. Poor performance was also seen in other schools in the zone and it’s against this background that the researcher thought of this study which explored the factors behind this poor performance of the girls in Ruchu Education Zone.

1.3 Objectives of the Study

1.3.1 General Objective

The purpose of the study was to examine the factors affecting girl’s performance in mathematics in secondary schools in Ruchu Education Zone.

1.3.2 Specific Objectives

1. To determine the profile of the respondents in terms of:-

(i) Age level

(ii) Gender
2. To determine the level of math performance of girls in forms 1, 2, 3 and 4 in Ruchu Education Zone Maragua District.

3. To determine the factors affecting girls performance in mathematics in secondary schools in terms of:
   (i) Girl students attitude towards mathematics
   (ii) Girl student learning environment
   (iii) Girl student home-background

1.4 Research Questions

1. What is the performance level in mathematics for girls in secondary schools Ruchu Education Zone Maragua District?

2. What are the Girl’s attitudes towards mathematics in Ruchu Education Zone?

3. What is the effect of the learning environment of Girl student’s performance in mathematics?

4. Does the girls’ home background affect their performance in mathematics?

1.5 Significance of the study

The finding of the study will be of importance in the following ways

The Ministry of Education will be able to organize the Secondary School curriculum in such a way that it will cater for gender equality. For example use of language that is not gender biased.

The findings of the study will provide information to the ministry of education that will enable it to advice the Government to lower the costs of learning materials and textbooks to make education affordable and more practical.

The Ministry of Education will organize projects that cater for improvement in performance. For example SMASSE project and other In-Service courses for mathematics teachers.
The District Supervisors will be able to; through the quality assurance standard, officers hold seminars regularly where they will educate girls on importance of mathematics either at zonal level or school levels.

The Teachers will be able to use relevant teaching aids after the seminars/in-service. They will be able to use real life experiences in practical teaching in various topics.

The teachers will be able to handle individual difference of the girls in class after the seminar and also prepare themselves adequately as they will be aware that they will be inspected.

The parent, having attended the Annual General Meeting will be able to provide necessary materials for learning mathematics in school for example, Geometrical / Mathematical Sets, Calculators and Mathematics Tables. They will also be encouraged to pay fees promptly to avoid girl’s wastage of time which can result in poor performance in mathematics.

1.6 Scope and limitation of the study

The study was carried out in Public and Private Schools in Ruchu Educational Zone of Maragua District in central province Kenya. Maragua district is bordered by Murang’a District in North, Thika in the south, Makuyu district in the East and Kikuyu district in the west.

The sample population included one Quality Assurance Standards Officer (QUASO) in charge of the Ruchu Educational Zone, the principals of the selected schools, teachers teaching mathematics in the selected public and private secondary schools and the girls in Forms: One, Two, Three and Four in the selected schools.
1.8 Conceptual Framework

Factors affecting girl’s performance in mathematics in secondary schools in Kenya can be diagrammatically represented.

![Conceptual Framework Diagram]

1.9 Organization of the rest of the report

While this section marks the end of chapter one, the remainder of this report will compose of chapters two, three, four and five. Chapter two is the literature review in which views of other scholars and studies related to the study were discussed. Chapter three presents the research design and methodology that was used in the study. Chapter four involved the data collection and analysis, and chapter five involved summary, conclusions and recommendations.
CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction
This chapter gives a review of related literature. The literature is organized according to the objectives of the study.

2.1 Girls performance in mathematics in Kenya
The performance of girls in mathematics subject is raising concern in Kenya. The Government, Non-Government Organizations (NGO’s), Parents Teachers’ Associations (P.T.A.) and other stakeholders are getting concerned over the issue.

In Kenya the population of females is more than of males (Ratio 2:1) but when it comes to performance especially of mathematics the boys get better grades. When it comes to joining the tertiary institutions for example Universities and teacher training colleges, Girls are admitted with low cut-off points in mathematics than boys and they are few.

The Japanese Government in collaboration with Kenya Government established a project known as SMASSE whose aim was to strengthen the teaching of mathematics and sciences in secondary education. The SMASSE Project team came with the factors mostly affecting girl’s performance in mathematics. They are:-

(i) Girls attitudes towards mathematics
(ii) Gender
(iii) Environment and
(iv) Home background failure among others.

In this chapter lot of emphasis is put in the discussion of first three aspects.

2.2 Attitudes towards mathematics
The term attitude can be defined as a way of thinking, acting or feeling. It can also be defined or behaviour of a person towards a situation. Attitudes and interests are closely related, interests are attitudes which cause a person to seek more activities in a given
area. They are positive attitudes about selected aspects of the environment. Attitudes are directed by emotions and feelings.

Many girls have formed a negative attitude towards mathematics. The subject has been performed poorly by girls compared to other subjects like languages and ARTs. This is evident from past performance records in National Examinations (KCPE) – Kenya Certificate of Primary Education and Kenya Certificate of Secondary Education.

The negative attitudes towards mathematics can be learnt from school or at home by teachers and parents talking negatively about the subject for example they argue that mathematics is a difficult subject which can be afforded by male students.

The primary school background also contributes to the negative attitude toward mathematics. Some girls form negative attitudes in mathematics long before they enroll in secondary school. At times negative attitudes towards mathematics are acquired due to the methods used in teaching. Girls will express the negative attitudes formed in ways such as

- Poor attendance of lessons
- Low participation in class
- Low performance in the evaluation tests.

Mathematics teachers have also formed negative attitudes towards mathematics which they have transferred to girls, due to the various factors like;

(i) Deficiencies of teachers in their schools
(ii) Frustrations in their schools
(iii) Nature of Girls (Performance low)
(iv) School administration

2.3 Gender and Attitudes
The society we are living in has different expectations for boys and girls as they grow. Difficult tasks are associated with men and light ones with women. This has been
extended to education such that mathematics which is believed to be difficult is associated with boys.

Some parents even discourage their daughters from taking mathematics seriously. Some ladies even after passing well in form four are discouraged from taking courses like engineering and architecture on the basis that they are masculine.

The teachers too, have a role to play in instilling the negative attitude to the girls. They expect boys to perform better than girls in class. This is evident in the comments they make to the boys e.g. How can you be defeated by a girl. You cannot make it in mathematics, and many more comments.

Research has shown that many teachers account for poor performance for girls in terms of intellectual inadequacies (SMASSE Research, 2001). Girls are seen as innately incapable and unlikely to improve. These issues are important because girls learn about themselves while interacting with others. Teachers are therefore a powerful source of information about the self or personal identity for girls, since they act on role models. Girls actions are thus directed by their sense of self identity as which in turn may be determined by what the students feel is allowed to do.

The Primary School enrolment reached 1,076,066 (554,386 and 522,230 girls), Peak in 1998 which approximately a ratio 55.52 female: female ratio (SMASSE Project, 2000).
There has been a continuous increase in the number of candidates entered in K.C.S.E. in the last five years. It is notable that the percentage increase for girls has been higher than that of boys in the last five years. Girls perform better than boys in languages while boys perform better in Maths (SMASSE Project, 2000, KLB).

University and Higher Education has expanded. However, girls continue to enroll in traditional female courses due to poor performance in mathematics, science, cultural and technical subjects (SMASSE, 2000).
Gender refers to the social, cultural and psychological features that identify someone are a man or woman, gender is culturally defined, socially formed and psychologically instilled. Gender is constructed through the social institutions. They include home, school, Church, work, language and leisure. This is done by the socializing agents that include; parents, relatives, teachers, and other members of society.

The following gender issues affect girl’s performance in mathematics. Parent’s economic hardship. Girls roles in homes pull girls out of school to do home chores especially when their mothers are sick (Truancy).

Adolescence – When girls reach the adolescence age they feel that they become parents (woman and start preparing to become a woman). This makes here decline in perform most communities feel that they are of age and start courting her for marriage.

Sexual relationship – sexual relationship in and out of school affects girls. They are often forced to drop out of the mainstream formal education system.

2.4 Study Environment and Performance

Environment refers to situations, surroundings or area where learning activity takes place. This includes aspects like school organizations, classroom methodology, curriculum and others.

2.4.1 Effects of school organization on girl’s performance in mathematics.

Few teachers are able to organize their classes exactly as they wish. They are bound by constraints of the overall timetable, staffing and school policy. Difficulties will arise because teachers will not be able to employ setting of classes that are not differentiated by ability as most schools stream by general ability and hence difficulties to organize mixed ability sets in mathematics will usually arise in mixed schools girls are separated from boys by classes.
2.4.2 Classroom Methodology

Classroom methodology is linked to school organization. For example teacher-pupil ratio of 50:1 does not allow much personal attention to slow learners (girls). However, teaching effectiveness increase with decreased pupil: teacher ratio.

The difficulties that arise from the methodology include:-

(i) Teacher inadequate presentation. Inadequate presentation may be due to:-
   a. Overlocking gaps in girls knowledge
   b. Lack of clarity and structure in the approach
   c. It may be based on unwanted assumptions concerning pupils progress and ability.
   d. Insufficient emphasis given to key ideas
   e. Appropriate activities such as practical work, drawing, measuring, investigation or problem solving may not have been provided
   f. Few straight forwards worked examples to consolidate explanations
   g. Lack of ongoing critical supervision and appropriate assessment adds to the difficulties.

(ii) Pace of work

The speed at which the teacher develops a topic may be too rapid for some girls even if the approach is satisfactory. A speedy pace will cause stress and failure of girls who are not quick in learning.

(iii) Unsuitability of learning resources.

There are no perfect textbooks or work cards. However, some products are better than others. Visual presentation is important for all age groups and levels of difficulty.

(iv) Topic sequencing.

Difficulties can be caused for certain girls because a necessary pre-requisite skill for a new topic has not been encountered for some time. The benefits of a spiral curriculum may be greatly enough and there is not sufficiently frequent return to certain key topics.

(v) Language levels.

The language level employed by the teacher is not carefully adapted to the abilities and comprehension of his pupils. Maths is taught in a second language English which may
make it difficult e.g. worlds like product has other meaning like in Geography, and another meaning in mathematics, (use of technical language must be clearly spelt out.

2.4.3 Mathematics curriculum.

There are basically three ways in which teaching difficulties have their source in the curriculum.

(i). Lack of mastery of earlier content. An obvious example of this aspect is a girl who cannot manipulate integers is going to find difficulties in solving equations. In this case, lack of ability with integer’s manipulation is fairly obvious. But sometimes the links are not clear. A girl factoring expressions is handicapped if she has poor knowledge of basic multiplication facts, a handicap that can be overlooked because the teacher is concentrating on other concepts involved which are demanding in themselves.

(ii). Level of abstraction.

The girl will not be ready for the degree of abstraction expected for example; Geometry in our schools is often presented in the abstract with very little practical work. Girls are expected to grasp the properties of a parallelogram by looking at a drawing on the blackboard. Such drawings will make the symmetry properties hard for girls to appreciate, where a cutting folding and rotating shapes greatly reduces the difficulties of perception involved.

(iii). Innate ability

The third source of a curriculum based learning difficulty concerns intelligence level. The views of this aspect remain personal because some people think that mathematics ability is not for every one. They will take that, while some boys may benefit from remedial tuition, some girls are late developers, some girls who may be prevented by low general ability from going beyond a certain point in a particular topic. It is also assumed that every girl can achieve some measure of success in every mathematics lesson depending on the teacher’s attitudes and methodology.
Learning difficulties inherent in the subject.

Girl’s poorer performance in Math’s in secondary schools results from the:

Abstract nature of the content involved

Abstract nature of the concepts involved for example, introduction to trigonometric functions (sine, cosine and tangents) in relation to right angled triangles – The context deals with heights, distances and angles of elevation or depression. There is no mention of periodicity (which has no meaning in right-angled context) or functional nature

Complexity of the concept.

Mathematics is complex underestimation of this complexity by the teacher creates learning difficulties to girls. A teacher needs to analyze features of an idea (or concept or technique) which a girl must understand before she can be fully conversant with it.

The hierarchical nature of mathematics.

Mathematics is probably the most hierarchical subject in nature. If this hierarchy of content is allowed to dominate the teaching sequence, substantial learning difficulties, boredom and apathy will arise.

The logical nature of mathematics

The logical nature of mathematics inability to carry through a logical argument is the cause of considerable learning difficulties in mathematics. The playing down of this skill in favour of instrumental application of rules even with girls of limited mathematical ability is always bad practice.

Mathematical notations.

Mathematical notation, which is concerned to development of the subject cause considerable confusion in the minds of many girls. This is partly due to the fact that notation makes mathematics visible, and various misconceptions arise from separation of this visible appearance from the underlying meaning. More precisely, girls tend to attempt to attach meaning to notations solely on the basis of its visible appearance such as $3x - x = 3$ and $3^2 = 6$. 
Spatial concepts and geometric thinking.
The study of Geometry pauses a number of difficulties for girls of a somewhat, different nature from those of arithmetic and algebra due to its primarily visual nature while in arithmetic written numerals merely represent numbers, the actual shape of the numeral bearing no relationship to the number. In geometry, a geometrical concept of say a triangle and its written form are essentially one and the same. An arbitrary triangle, once drawn, its features will become specific in shape, size and orientation and no longer generalizes triangle in its form. Care needs to be taken to ensure that such accidental features of the particular configuration drawn are not thought by girls to be part of definition or idea. For example, girls will fail to see that squares are rectangles due to the unequal adjacent sides that are always drawn. The arms of an angle are not part of the definition of the size of an angle, but, since longer arms increase the overall size of the angle configuration, it can easily be thought that, longer arms mean larger angles.

A second difficulty that arise in dealing with spatial concepts and geometry is the relationship between visual experience and logical thought most girls believe that visual experience is a proof as a result of geometry level of an observational activity is reduced and this makes the appearance of geometrical shapes and figures the major determinant of their properties. A rectangle, which looks close to square, will be given as a square and a chord drawn close to the diameter will be given as a diameter.

The other aspect in geometry where visual sense is predominant is first, the perception of facts about a geometrical configuration, as a result of identifying or isolating parts of the figure within a whole. Secondly, is the representation in plane or three dimensional objects while visual aids are obviously important in three-dimensional work, the ability to translate from two to three dimensions and vise versa is very important. Usually, the two dimensional representation has an ambiguous visual appearance, being one and the same time, interpretable both as a flat diagram and as solid object.

Other difficulties occurs for pupils since angles which in the solid object are right angles may well appear in two dimensional diagram as non right angles, and the effect of visual perceptive will make some parallel lines appear to diverge.
Mathematics across the curriculum.

For many girls, it is only in applications that mathematics acquires any real value. There are three main reasons for the difficulties pupils find in applying mathematics in other areas of the curriculum.

i. **Mismatch of the syllabus.**

A mathematical topic may be met in another area of the curriculum, before it has been developed in the mathematics class or in a form different from that in which it is learned in mathematics or without recent revision. For example, the introduction of vectors using physics approach may have many accounts for the difficulties girls encounter this in this topic.

ii. **Attitudes of teachers of other subjects to mathematics.**

Teachers of other subjects may give impressions to pupils that, they themselves regard mathematics as necessary aid but not a subject which one needed bother too much to understand.

iii. **Attitude of teachers of mathematics to other subjects.**

Teachers of mathematics may show no great interest in the way their subjects is used in other areas of the curriculum, consequently, they teach mathematics related activities.

2.5 **Home background and social effects factors.**

The home backgrounds where the girls come from also affect the girls performances in that, mathematics for some girls who come from poor families; they find themselves overloaded with home chores immediately they arrive home from school. They spend a lot of time in cooking, fetching firewood, water etc. and by the time they finish to go and study or do assignments, they are already tired and so retire to bed.

At other times, the girl child is to be absent from school to do the roles the mother play especially when the mother falls sick. At other times, the girl child is to labour in order to get daily bread for the family. At some points, the girl child will not get enough facilities required to pursue her studies like enough paraffin to put in the lamp, geometry sets and...
other learning materials. All these affect the performance of mathematics by girls. “Truancy is very strong factor”

The culture has in it that, girls are the ones who contribute in the house chores and boys are let to be in school.
CHAPTER THREE
RESEARCH METHODOLOGY

3.0 Introduction.
This chapter on methodology covers the research design, area and population of study, sample selection and size, the instruments, quality control of instruments and procedure for data collection.

3.1 Research design.
A across section design was employed to collect views about the, attitudes, and opinions of the respondent’s concerning the factors affecting the girls performance in mathematics in secondary school, Ruchu zone (Kenya). This particular research design is chosen because it is the most appropriate way to collect data from across section of people through questionnaire.

3.2 Area and population of study.
The study targeted both female students and in secondary schools in Ruch zone (Kenya) and mathematics teachers and principals of those schools.

3.3 Sample size and selection.
There are twelve secondary schools in Ruchu Educational Zone. Four of these schools were selected for the study.

(i) One private school was selected because there is only one private secondary school in the zone.
(ii) One day and mixed school was randomly selected from three such schools
(iii) One full boarding school was randomly selected from four such schools in the zone.

These schools turned out to be:
(i). Kangui day mixed
(ii) Githumu – full boaring
(iii) Munoru - private
(iv) Gacharage – mixed day and boarding
3.3.1 Selection of the subjects.

The population that was investigated includes students, and academic staff selected from four schools. The girls from each school were randomly selected. Two mathematics teachers were also randomly selected from the selected education institutions. The principals from the selected institutions were taken and finally the zonal inspector of that education zone.

The total respondents were:

(i) Thirty two girls from the four schools
(ii) Eight mathematics teachers from the four schools
(iii) Four principals of the same schools
(iv) One Zonal Inspector of Schools from that zone

The girl students, mathematics teachers and principals were investigated and responded through one questionnaire each. The Zonal Inspector responded through an interview guide.

3.4 Research instruments.

The researcher used questionnaires for the key informants that are the girl students, the mathematics teachers and principals to collect data. An interview guide was used to collect data from the Zonal Inspector of schools.

3.5 Data analysis

Data was analyzed using descriptive methods where by table and accompanying frequencies were presented which was followed by the discussion of findings.
Table 7: Teaching Materials

<table>
<thead>
<tr>
<th>More than enough</th>
<th>Enough</th>
<th>Very few</th>
<th>Negligible</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>Principals</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Teachers</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Students</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>20</td>
</tr>
</tbody>
</table>

All the principals (100%) that took part in the study indicated that there are very few teaching materials for mathematics. Out of the 8 mathematics teachers, 66.6% said that there were very few teaching materials for mathematics and 33.4% of the mathematics said that teaching materials for materials were negligible.

Out of the 32 girl students, 62.5% answered that the teaching materials were very few and 37.5% said that there were negligible teaching materials. This implies that lack of materials is one of the reasons behind poor performance in mathematics in the zone.

4.2.4 Girls performance as they moved up from Form One to Form Four

When the respondents were asked about mathematics performance as they moved up from Form One to Form Four, they responded in this manner:

Table 8: Girls performance

<table>
<thead>
<tr>
<th>RESPONDENTS</th>
<th>YES</th>
<th>NO</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>30</td>
<td>83.3</td>
<td>6</td>
<td>16.67</td>
</tr>
</tbody>
</table>

Out of the 36 respondents 83.3% said that girls perform poorer in mathematics as they climbed up the ladder from Form One to Form Four and 16.67% answered that they do not perform poorer as they climb the ladder. Thus as they get to upper classes the students become more serious and this brings about a slight improvement in performance.
4.2.5 Gender responsive language

Do mathematics teachers say that mathematics is difficult in class?

This is how they responded:

Table 9: Gender responsive language

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>25</td>
<td>78.125</td>
<td>7</td>
<td>21.875</td>
</tr>
</tbody>
</table>

Majority of the girl respondents of almost 78.5% showed that mathematics teacher say that the subject is hard. 21.875 did not use such language. Such a sentiment demotivate the students and this in turn affect their performance level especially in KCSE exams.

4.2.6 Girl students' percentage marks score in mathematics

When the respondents were asked whether 50% of the girls in class score below 25% marks in mathematics, this is how they responded.

Table 10: Girls' scores is less than 25% marks in mathematics

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>24</td>
<td>75</td>
<td>8</td>
</tr>
</tbody>
</table>

Out of the 32 girl students, 75% indicated that 50% of the girls in class score less than 25% marks in mathematics and 25% responded that 50% of the girls in class score more than 25% in class.

4.2.7 General comments why girls perform poorly in mathematics by 32 girl students.

When asked, they responded this way;
Table 11: why girls perform poorly in mathematics

<table>
<thead>
<tr>
<th></th>
<th>No. of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics is difficult</td>
<td>17</td>
<td>53.125</td>
</tr>
<tr>
<td>They hate mathematics</td>
<td>15</td>
<td>46.875</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 11 indicates that 17 (53.125%) of the respondents referred to mathematics being a difficult subject as the cause of poor performance and 15, (46.875%) considered hate for mathematics to be the cause.

4.3 Interview Observation

The Zonal Inspector of Schools Ruchu zone was interviewed by the researcher.

This was his observation:

(i) There are more male mathematics teachers than female teachers in Ruchu zone.
(ii) Girl students preferred male mathematics teachers than female teachers.
(iii) In his zone, he said that he had enough qualified teachers to teach mathematics who had good (enough teaching experience).
(iv) He gave his observation that there were not enough teaching materials in most of the schools in his zone.
(v) The girls’ attitude towards mathematics was negative.
(vi) The teachers were demotivated to work due to the high pupil teacher ratio and the low salary levels especially when compared to the private sector salaries.
(vii) Parents played a big role in discouraging the girl students from liking mathematics because of the language they used at home. Brothers and sisters, some teachers especially from primary school planted the negativity of mathematics to the students in class.
CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction
The study set out to examine the factors affecting the girls’ performance in mathematics in secondary schools with an aim of exploring practical solutions. The preceding chapter has presented and discussed the results of the study as obtained in the field. This chapter highlights the summary, conclusion and makes the relevant recommendations.

5.1 Summary
The objective of the study was to find whether; attitudes towards mathematics; gender; study environment and performance, home background affect the girls’ performance in mathematics and to search for possible recommendations and solutions to those problems.

Literature related to the study was reviewed that, the attitudes of the girls towards mathematics, the gender, the study environment and the home background affected the girls’ performance in mathematics.

The study adopted descriptive analysis techniques. The data was tabulated using frequency distribution tables. An interview schedule was also used. Three sets of questionnaires were prepared, one set for the principals another set for the teachers; and one set for the students;

An interview schedule was prepared for the Zonal Inspector and questionnaires were developed and pre-tested to determine their validity and reliability.
The survey sample constituted of total respondents 45 which included; 32 girl students 8 mathematics teachers; 4 principals; and 1 Zonal Inspector of schools
Data was collected and analysed using descriptive statistics. Tables with frequencies and percentages were used to illustrate the findings. Interview observations were also recorded.

5.2 Conclusion
Out of the 45 respondents, it was clearly found out that the factors affecting the girls’ performance in mathematics was as follows:

**Gender**
It was found out that males dominate in the teaching profession and in the principals of the schools. Most of the principals and mathematics teachers are male; 75% of the principals and 62.5% of the mathematics teachers are male. This means that the girl students didn’t have enough role models and therefore became discouraged in learning mathematics.

The study concluded that there are few female teachers in the zone. This means that the girl students preferred male mathematics teachers to female teachers. The Zonal Inspector of Schools confirmed that in his zone, there were more male mathematics teachers than female mathematics teachers.

The teachers did not use the gender responsive language. Instead, they kept saying that mathematics was a hard subject for girls. The majority of the teachers were well qualified which suggested that they are well trained and able to teach mathematics effectively. The teaching/working experience was also high standards and hence could not affect the girls’ performance in mathematics.

**Learning environment**
From the findings, it was clear that learning environment affected the girls’ performance in mathematics.
100% of the principals said that there are very few learning materials in schools. Most of the respondents said that there few learning/teaching materials and this contributed to the mathematics being an abstract subject, hence making it difficulty. Without the teaching aids, some topics could not be comprehended by the learners as they required visual presentations.

In the interview schedule, it was concluded that the teachers were demotivated to teach by the high teacher-student ratio of 1:50, which reduced the effectiveness in learning especially to the slow learners (girls).

The increased poor performance in mathematics by girls as they rose up from Form One to Form Four is an indication that mathematics became harder as the syllabus builds up. This is because of the learning/teaching materials, which means that a concept which was never understood in Form One could not be understood in Form Two if it formed the basis of the backbone of the next topic.

**Girl’s attitudes towards mathematics**

The 32 girl students said that they performed poorly in mathematics because it was difficult (53.125%) and the rest (46.875%) said that they performed poorly in mathematics because they did not like the subject.

From the interview schedule, it was observed that the negative attitude planted in the girls early from their homes by their parents, older brothers and sisters and early from the primary schools by the primary school teachers. This was done by the use of discouraging language to like mathematics and by not buying the relevant teaching/learning materials for the girls required for learning.

**5.3 Recommendations**

After identifying the factors that affect the girls’ performance in mathematics, the following are the suggestions which can offer practical solutions to the problems.
The Ministry of Education in conjunction with the Government should try very hard to bring in the factor of the gender parity in this field. More female mathematics and science teachers should be posted to schools.

More females should be employed in what they call men’s jobs like engineering, pilots and many more.

The society needs to be sensitized that there are no tasks for men and others for women especially at home. Those tasks considered as difficult should be assigned to the girls equally as to the boys. Parents should encourage their daughters to take courses like engineering, architecture and others which are considered masculine. The teachers too should be encouraged to stop the use of language like, “how can you be defeated by a girl?” “Girls cannot make it in mathematics,” etc.

5.3.2 Study environment and performance
The respondents clearly pointed out that lack of adequate learning resources contributed to the poor performance in mathematics by girls.

The following recommendations should be taken upon this aspect

Much attention should be given to the slow learners (girls) by lowering the teacher: pupil ratio to about 1:30 to increase the effectiveness in learning. The teachers should prepare for the lessons adequately so as to give emphasis to the key ideas of the topic.

The Ministry of Education which is responsible for preparing the syllabus to give the proper sequencing of the topics to allow the good flow of materials in the syllabus (spiral curriculum).

The teachers should pace their work to suit the slow learners that is; the speed of developing a topic should be adapted to cater for the slow learners. The teachers should use the correct (appropriate) learning/teaching materials in class – teaching aids should be used where applicable. For example, in the three-dimensional geometry, visual representation is very important to identify right angles in the solid.
Teachers should try to reduce the use of technical language in mathematics and where used to be clearly defined to avoid ambiguity.

Teachers should give precise meaning to mathematics notations and symbols. For example, $3X - X = 3$ and $3^2 = 6$. Girls should be made aware of the problems caused by visual appearance of such notations above. The teachers should give purpose to the development of algebraic notations and computations, for example, $(-2^2)$ and $-(2)^2$.

Teachers should emphasize in class the relationship between spatial concepts and geometric thinking. It should be emphasized that a square is a rectangle and a chord is close to the diameter but not a diameter should be stressed as a chord and attach meaning to such words like "Bi" means two and "Tri" means three in geometry.

Teachers should try as much as possible to relate mathematics to the other subjects.

### 5.3.3 Attitudes towards mathematics

Teachers, parents and the society at large should be encouraged to help girls develop a positive attitude towards mathematics by using gender responsive language in class, in the field and at home. Teachers should educate the girls on the importance of mathematics in life and especially in careers like engineering, architecture so as to be the role models of the other girls in school.

Teachers are supposed to improve on the methodology of teaching in class to reduce the abstract nature of mathematics. Use of "ethino" mathematics should be highly encouraged.

The Ministry of Education should work hard to come up with well sequenced topics. The number of female mathematics teachers should be increased to increase the number of role models. The teacher: student ratio should be reduced to a reasonable level of, say, 1:30 to improve on the efficiency.
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Stanley K. Muiruri, Gender Guidance and Counseling, Longhorn Nairobi.
APPENDICES I

APPENDIX I: INTRODUCTION LETTER

Letter requesting participation of respondents.

KAMPALA INTERNATIONAL UNIVERSITY
IODL
P.O. BOX 20000
KAMPALA – UGANDA

Dear Sir/Madam,

RE: INVESTIGATION OF FACTORS AFFECTING GIRLS PERFORMANCE IN MATHEMATICS IN RUCHU ZONE (MARAGUA DISTRICT)

The study aims at investigating the factors affecting girl’s performance in Mathematics in Secondary Schools.

Your school has been selected to participate in the study. Your views will be useful in this study. You are therefore kindly requested to fill in the questionnaire according to the instructions given in part.

The information you give will be treated confidential. The findings of the study will be used purely for academic purposes.

Your cooperation and honesty will be highly appreciated.

Yours sincerely.

Jane M. Gichane.
APPENDIX II
QUESTIONNAIRE FOR PRINCIPAL

This is part of an education study that is being carried out to investigate on the factors affecting girl’s performance in mathematics in secondary schools in Kenya. Your school has been selected for this study. You are kindly requested to complete the questionnaire as accurately as possible. The information obtained will be treated as confidential and will be used for the study intended and nothing also.

Your cooperation and assistance will be highly appreciated.

Instructions
Respond to each item by putting a tick (√) in the boxes provided and briefly write in the spaces provided.

SECTION A: Personal Information

1) What is your gender?
   Male  Female

2) What is your marital status?
   Married
   Divorced
   Single
   Separated

3) What is your age bracket?
   22-35
   36-45
   46-55

4) What is your level of education?
   SI
   Degree
Diploma
Masters
Others specify

5) (i) How long have you been a principal?
   1-5 years
   6-10 years
   11-15 years
   16-25 years

   (ii) With the above experience how do you compare performance of maths by girls in
   National Examinations? Comment briefly.
   ......................................................................................................................
   ......................................................................................................................
   ......................................................................................................................

6) How many mathematics teachers do you have in your school?
   ................................................. Are they enough? .................................................

7) Are there untrained mathematics teachers in your school?
   Yes          No
   If Yes, how do you pay them? .................................................................

8) Are there enough teaching materials for mathematics subject for both teachers and students?
   Yes          No
   If No, how do you solve the problem?
   ......................................................................................................................
   ......................................................................................................................
   ......................................................................................................................

9) What do you think is the reason (s) for girls performing poorly in maths?
   ......................................................................................................................
   ......................................................................................................................
   ......................................................................................................................
10) Do girls perform poorly in mathematics as they move up from Form one to Form Four?

Yes No

If Yes, what do you think are the reasons?

........................................................................................................................................

........................................................................................................................................

........................................................................................................................................
APPENDIX III

STUDENTS QUESTIONNAIRE

You are kindly requested to fill this questionnaire of the study about the factors affecting girls performance in mathematics in secondary schools in Ruchu Zone, Maragua District. The information you will give will be used for purely academic purposes and shall be held confidential. You should therefore give the right information that applies to you in your own opinion.

Instructions
Please tick in the boxes and fill in the blank spaces provided for each question.

SECTION I

1) (i) What is the name of your school? ...........................................................
   (ii) Are you a boarder or a day scholar?
       Boarder          Day Scholar

2) What is your gender
       Male          Female

3) What is your class
       Form I          Form II          Form III          Form IV

4) What is your age in years? .................................................................

SECTION II

5) (i) Is your school mixed or girls only?
       Mixed          Single Girls
   (ii) If mixed school, who score the highest marks in mathematics?
       A Boy          A Girl
   (b) How many boys are in your class?
       5-10
       11-16
       Above 17
(c) How many girls are in your class?
10-18
19-25
Above 26

6) Who teaches maths in your class?
Male Teacher    Female Teacher

7) How many male mathematics teachers are in your school?
1-2
3-5
Above 5

8) How many female mathematics teachers are in your school?
1-2
3-5
Above 5

9) Do students in your class like female mathematics teachers more than male mathematics teachers?
Yes    No

10) Do you think female teachers make more students pass in mathematics than male mathematics teachers?
Yes    No

Section 3

11) More than quarter of girls in your class score 50% and above in mathematics exams.
Yes    No

12) 10% of the girls get 70% and above in mathematics examinations in your class.
Yes    No

13) 50% of the girls in your class score less than 25% of the marks in mathematics exams.
Yes    No

14) Do mathematics teachers say that mathematics is a difficult subject in your class?
Yes    No

15) Do girls perform poorer in mathematics as they move from Form One to Form Four?
16) In your own opinion, comment briefly why girls perform poor in mathematics.

........................................................................................................................................
........................................................................................................................................
........................................................................................................................................

17) Do you think that the learning materials (Textbooks, Geometrical sets, Graph Books, etc) are enough for the students?

More than enough

Enough

Very few

Not available at all
APPENDIX IV
TEACHER’S QUESTIONNAIRE

Dear Teacher,

You are kindly requested to fill this questionnaire of the study about the factors affecting girls performance in mathematics in secondary schools in Ruchu Education Zone.

The information you will give will be used for purely academic purposes and shall be held confidential. You should therefore give the right information that applies to you in your own opinion.

Please tick in the boxes and fill in the blank spaces provided for each question.

Section I

1) What is the name of your school? ...........................................

2) What is your gender?
   Male                Female

3) What is your age
   20-25
   26-30
   31-45
   45 and 55 years

4) What is your highest academic qualification?
   SI
   Degree
   Diploma
   Masters Degree
   Others specify

5) How many years of teaching experience do you have?
   1-3
   4-6
   7-9
   Over 9 Years
6) How many times have you attended the In-Service Courses related to mathematics?
   Not attended any
   Between 1 and 2 times
   Over 2 times

7) Comment on girl’s performance in mathematics.
   Extremely good      Good      Fair      Extremely bad

8) In your own account state the reasons for that performance.

........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
Dear Sir/Madam,

You are requested to respond to questions of this interview guide for the study about the factors affecting girl’s performance in mathematics in secondary schools, Ruchu Zone, Kenya. The information will be used exclusively for academic purposes. You should therefore give information that applies to such institutions in your area of operation. You are assured of total confidentiality.
APPENDIX VI

A MAP OF RUCHU EDUCATION ZONE, MARAGUA DISTRICT (KENYA)