FACTORS THAT CONTRIBUTE TOWARDS STUDENT'S POOR PERFORMANCE IN MATHEMATICS IN KENYA CERTIFICATE OF SECONDARY EXAMINATION OF SELECTED SCHOOLS IN UASIN-GISHU WEST DISTRICT

BY

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DECLARATION

DECLARATION BY THE CANDIDATE

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TO MY WIFE AND CHILDREN

ABSTRACT

This was a study of factors that contribute towards students' poor performance in mathematics in the Kenya Certificate of Secondary Examination [KCSE].The authoritative reports reviewed showed that the students' performance over the years has not been satisfactory. The research specifically investigated the attitudes of students towards mathematics, the effect of instructional methods towards the subject ,and the availability, and use of learning resources. A descriptive survey design was adopted. Data were collected by use of questionnaires. The sample for the study comprised 300 students and 40 teachers drawn from 15 secondary schools in Uasin Gishu West District. Stratified sampling was used to categorize schools into boys, girls and mixed. Simple random sampling was then used to select 15 schools from 32 secondary schools in the district. At school level, the researcher applied simple random sampling technique to select 20 students who filled the questionnaire .The data collected were analyzed by use of descriptive and inferential statistics. For descriptive statistics, percentages and frequencies were used while the chi-square was used for inferential statistics .

The study showed that students in Uasin Gishu West District had positive attitude towards mathematics and that there was significant relationship between students' attitude and performance. Also, there was significant relationship between teaching methods, teaching and learning resources and students' performance.

From the findings, some recommendations were suggested. Positive attitudes should be fostered among all the students. All stakeholders should strive to provide the needed resources for mathematics learning.

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LIST OF ACRONYMS and ABBREVIATIONS

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

K.C.S.E.: Kenya Certificate of Secondary Education

WESCSA: Western, Eastern, Central and Southern Africa

JICA: Japan International Co-operation Agency

SMASSE: Strengthening of Mathematics and Sciences in Secondary Education

CHAPTER ONE

1.0 Introduction

This chapter gives an overview of the study. It presents an outline background of the study and the statement of the problem. It states the objectives of the study, the research questions that guided the study and research hypotheses. Theoretical framework on which the study is based, the significance of the study, the scope and the limitations of the study are also highlighted. Assumptions made in the study and variables of the study are stated, and the operational terms used in the study defined.

1.1 Background of the Study

Students' performance in mathematics at Kenya Certificate of Secondary Education (K.C.S.E) level has been poor as documented in various reports such as The Baseline Report of 1998, and yearly reports from Kenya National Examination Council (K.N.E.C). The reports indicate that students' performance in mathematics has always been poor. Since mathematics is a strategic subject in the learning of other subjects, a deliberate effort should be made to change this poor performance if high and adequate levels of scientific and industrial development are to be achieved. Buxton (1984) asserts that;

> Mathematics is the gate and key of science, neglect of mathematics works injury of all knowledge, since he who is ignorant of it cannot view science or the things of the world…(pg,214)

Students' performance in mathematics has been poor in many countries of the world and especially in developing countries. Japan International Co-operation Agency (JICA) initiated the idea of improving mathematics through strengthening of Mathematics and sciences in Secondary Education (SMASSE) in Western, Eastern, Central and Southern Africa (WESCSA) in 2001. The same was extended later to

West Indies and Philippines in 2003. In a paper presented in Nairobi at the first regional conference on students' performance in Mathematics, Kiragu, (2001), stated that the objectives of mathematics teaching have largely not been achieved as indicated by students' poor performance in National examinations. Similarly, when releasing K.C.S.E results for the year 2003, the Minister for Education expressed concern about the continued poor performance in mathematics over the years (Daily Nation, 28th February 2004).

Wasonga (2006) stated that "For learners to perform better in mathematics, they must have mastered basic facts and be skilled in basic operations such as multiplication and division." He further pointed out that poor performance in mathematics is also seen in standard eight KCPE results. For example the mean score for standard eight pupils in 2005 was 23.56. From the analysis done on sample Kenya Certificate of Primary Education (KCPE) questions, it was realized that 43% of the candidates perform poorly in questions that tested skills on interpretation of data from tables, and geometry.

However, better performance was recorded on questions that tested skills on graphs, algebra and arithmetic. This poor performance in primary school is likely to be transferred to secondary school. Results for the whole country and Uasin Gishu District for the year 2007 in K.C.S.E for instance were as follows in the tables below:

Table 1.1 Candidates Overall Performance in Mathematics Nationally for the period 2002-2007

YEAR	ENTRY	MEAN SCORE	STANDARD DEVIATIONS
2002	197,118	39.39	37.17
2003	205,232	38.62	36.17
2004	221,295	37.20	35.85
2005	259,280	31.91	31.00
2006	267,341	29.25	28.99
2007	271,422	30.39	29.33
2008	283450	31.34	29.95

Source; KNEC Report,2008

The information in the table indicate that the overall mean score in mathematics examination changed from 30.39 in the year 2007 to 31.34 in the year 2008 while in the same period the number of candidates increased from 271,422 to 283,450 which was about 4.43%.

Table 1.2: Uasin Gishu West KCSE mathematics analysis for the period 2002-2008

YEAR	ENTRY	GRADE	CANDIDATES
2002	3788	B+ and above D+ and below	265 2768
2003	4287	B+ and above D+ and below	190 3169
2004	4636	B+ and above D+ and below	1121 3515
2005	5320	B+ and above D+ and below	1025 4095
2006	5940	B+ and above D+ and below	1204 4235
2007	6020	B+ and above D+ and below	1103 4502
2007	6224	B+ and above D+ and below	1005 5219

(Source; KCSE analysis report 2008)

The results clearly indicate that majority of the candidates obtained low grades, that is D+ and below. There is clearly a problem as it relates to both quality and quantity of good grades, an indication of low attainment in mathematics. This evidently can be attributed to poor quality of teaching and learning in our schools. In order to address this situation, change has to be considered to reverse this poor performance.

1.2 Statement of the Problem

Students' performance in mathematics in National Examination has remained generally poor compared to other subjects. It therefore means that the future of mathematics seems to be uncertain. This prompted the researcher to try and identify the factors that contribute towards students' poor performance in mathematics in K.C.S.E

Mathematics is needed in the learning of other subjects since nearly all of them need supportive information from mathematics to make them meaningful in real life situations. Asworth (1981) stated that "mathematics is a way of life, it enables us organize our experiences in life". He further stated that a good mathematics education is important for various reasons:

(a) Mathematics has a practical or utilitarian value. It helps to prepare the individual to a life useful to him or her in the society e.g. as a businessman, an engineer, surveyor e.t.c.

(b) Mathematics has a communication value. It is actually a way of communicating symbols numbers and operations to make communication complete and precise.

(c) Mathematics has a disciplinary purpose. It shapes the minds and prepares an individual for the future career. The person is trained to think logically and creatively, hence, mathematics is a basic requirement for many careers.

(d) Mathematics has a recreational value. Many Mathematical games can be played either in class or out of class. These games help in refreshing and re-invigorating the mind so that performance of Mathematics in secondary schools can be improved.

The students' poor performance in Mathematics needs to be addressed all the way from training institutions to the schools. This can be done through the change of approach in methodology, in-service training, seminars, conferences, e.t.c, at District, National or even regional level. Focus should be on the learners, parents and community to overturn the gravity of poor performance in the subject. The Importance of Mathematics at all levels of learning has been stressed. At the secondary school level for instance, it is a core subject and a lot of teaching time is allocated to it. It is important therefore that students' perform well in Mathematics.

In Kenyan institutions of higher learning, all scientific courses borrow about 80% of their knowledge from mathematics and products of these courses will be the ones to push the country forward in development. However poor results in mathematics will in one way or another retard development of the sectors of the economy. Today, on realization of the importance and impact of science and technology to the modern society, it is necessary as educators do take into account, not only the societal needs, but also mathematical needs of the students.

1. 3 Purposes of the Study

Based on the statement of the problem stated above, the purpose of this study was to investigate factors that contribute towards students' poor performance in mathematics in the Kenya Certificate of Secondary Education Examinations.

1.4 Objectives of the Study

The main objective of the study was to investigate the factors that contribute towards students poor performance in K.C.S.E Mathematics. More specifically, the study focused on the following areas:

(i) To assess the attitude of students on performance in Mathematics.

(ii) To determine the effect of instructional methods on students performance in mathematics.

(iii) To establish the influence of availability and use of teaching and learning resources on students performance in Mathematics

1.5 Research Questions

The main research question in this study was:

What factors contribute towards students' poor performance in K.C.S.E mathematics?

Based on the main research question, the study attempted to answer the following specific questions:

1. What is the attitude of students' towards performance in mathematics?
2. What is the effect of instructional methods used on the students' performance of mathematics?
3. What is the effect of teaching and learning resources on students' performance in Mathematics?

1.6 Research Hypotheses

The hypotheses of the study as stated in the null form were will as follows:

HO_1 There is no significant difference between the attitude of students towards mathematics and their performance in mathematics .

HO_2 There is no significant difference between effects of instructional methods and students performance in mathematics.

HO_3 There is no significant difference between the availability of teaching and learning resources in mathematics and students' performance in mathematics.

1.7 Significance of the Study

1. The findings of the study would be useful to the Quality Standards and Assurance Department of the Ministry of Education that is responsible for curriculum development, interpretation and implementation.
2. The research findings would also be useful to the Kenya Institute of Education (KIE), which produces and provides guidance on the production of instructional materials for schools.
3. The research findings would also be useful to teachers of mathematics since the study focused on the factors that contribute towards student's poor performance in mathematics to plan on improvement of mathematics performance in school.

1.8 Theoretical Framework

From the Systems theory, mathematics can be taken as a system, which has aims, objectives and goals to be achieved. In the present study, achievement of mathematics goals calls for the cooperation of all the elements in the system. The

latter are referred to as the exogenous and the endogenous variables. Exogenous variables are those that are located outside the institution of learning process. Examples of these factors include the socio-economic status of the students' sex, family size and students birth order. On the other hand endogenous variables are those factors which can be influenced directly by the school. They include teaching strategies, school facilities, teaching and learning environment, availability of textbooks and other resources. These factors affect the learner in the learning process in one way or another. Effective and efficient learning process is not guaranteed out-side the internal and external conditions of a learner (Gagne and Briggs, 1979). The internal conditions of the learner can be referred to as his physiological readiness, which are the pre-conditions for learning to take place. The external conditions can be viewed as methods of teaching, use of various instructional media and learner attitudes. The theory behind instruction media is rooted in Piaget's (1953) theory of cognitive development. The theory asserts that children, through the experiences in the environment, develop mental consistence. The cognitive structure develops sequentially, invariantly and interrogatively from the concrete to more abstract ones (Wadsworth, 1984). Piaget (1953) says in the realm of education, students should be allowed maximum activity on their own directed by means of materials, which permit their activities to be cognitively useful. Ideally, they make it easier for learners to follow, understand, respond to and retain the content of the lesson (Gamble: 1984).

From the systems theory, an instructional system is defined as a series of interrelated and inter-dependent parts designed to accomplish a goal (Gamble; 1984). The learners' conditions, therefore, are components of this system and in order to make the system effective, the interaction of these exogenous variables needs to be synthesized.

The research postulates that if the learners' conditions are synchronized and manipulated appropriately, greater achievement will be realized.

1.9 Scope of the Study

The research study was confined to Uasin Gishu West District of Rift Valley province, Kenya. Data was collected from form three students from 15 selected schools out of 32 secondary schools in the area. The study investigated the factors that contribute towards students' poor performance in mathematics in KCSE.

1.10 Limitations of the Study

The following might limit the scope of this study;

1. Various learners respond directly to different methods of teaching mathematics. Some would like group work while some likes individual work at desk. They might not all perceive teacher practices in the same way.

2. Several factors can influence students' interest in mathematics. This study did not consider all factors that are likely to impact on students' attitude due to limitation of time. The study only considered students' perception in relation to teaching methods, teaching and learning resources and attitudes.

3. The research was limited to only fifteen secondary schools in Uasin Gishu District and therefore findings may not directly apply to other schools where research was not carried out.

The research was limited to form three students in the selected schools and as such findings might not reflect views of the entire students fraternity.

1.11 Assumptions of the Study

The assumptions of the research study were:

(i) The population under study was a homogeneous one, therefore the sample was a representative of the entire population.

(ii) The instruments used by the researcher were reliable and valid.

(iii) The teaching and learning resources are equitably distributed in the selected institutions.

1.12 Variables of the Study

In this study, the independent variables were

1. attitude of the students
2. methods of teaching
3. learning and teaching resources

Student's performance in Mathematics examinations was the dependent variable.

1.13 Definition of Terms

Attitude: Readiness to react to or against some situations, person or things in a given manner for example with love or hate or fear or resentment to a particular degree of intensity.

Evenly: Distributed equally within the selected area.

Performance: Achievement of a student in the K C S E with respect to attained skills or knowledge as compared to other students.

Systems: A collection of integrated and related activities that have arbitrarily been designated as being of central interest.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The review of literature drew information from Secondary school sources in the libraries and the internet. Specifically, it dealt with empirical evidence on students' attitudes and performance, teaching methods and students' performance, teaching and learning resources and students' performance.

2.1 Students' Attitudes and Performance in Mathematics

According to Munn et al (1972), attitudes are learned predispositions towards aspects of our environment. They involve the tendency to evaluate something in a positive or negative way.

Attitude to mathematics is multi-dimensional in nature. Recent research on attitude distinguishes a number of different components of attitude to mathematics as a whole, as well as to specific mathematical topics (Aiken, 1976; Bell et al (1983). These include liking and enjoyment, difficulty, confidence, anxiety and valuing. Attitudes are acquired through experiences in our environment and learned in much the same way as skills and habits. They may be resistant to change because they are wrapped up with a pension's needs, feelings and self – concept.

As pupils develop throughout the different phases of schooling, they become increasingly aware of mathematics as a subject and this awareness clearly affects the growth of their attitudes to mathematics (Bishop and Nickson, 1983). This is particularly evident during the transition from primary to secondary school level. Difficulties arise in secondary schools since pupils from different primary schools

with varied experiences and background meet at this level. Newbold (1977) cited in Redpath et al (1989) has observed that different experiences at primary school level result in a variation in attitude and achievement at secondary level, which critically affect the pupils' choices of subject for further studies.

Most researches have shown that student attitudes have a powerful influence on learning. Gernstein (1964) asserts that experienced feeling lead to a particular self-image which in turn influences pupils' expectation of future performance and affects their actual performance.

Ogoma (1987) conducted a study on attitudes and achievement in mathematics among standard seven pupils in Nairobi primary schools and found that attitudes affect achievement. Neale (1969) refers to this relationship as a dynamic interaction between feelings and behavior as observed in the performance.

Ethington (1982) carried out a research on gender differences in psychological model of mathematics achievement and found out that there is a significant relationship between attitude and performance in a mathematics class.

Other studies by Fennema (1990), Eshiwani (1975) and Mwangi (1983) revealed that attitudes were related to achievement in mathematics.

Husen (1967) had also studied students' attitude towards mathematics and found that attitudes do affect student's performance in mathematics. He observed that in general, a positive attitude towards mathematics leads to good performance and students who show positive attitude towards mathematics spend more time on the subject. On the other hand Aiken (1976) notes that if students have negative attitudes towards mathematics, then their performance will be low.

Although many researchers have confirmed the existence of a relationship between mathematical attitude and achievement, Begle et al (1979) and Bell et al (1983) found

this relationship to be weak. The present study aimed at establishing the attitude of the students of Uasin Gishu District and its influence on mathematics performance.

2.2 Teaching Methods and Students Performance

Teachers use variety of teaching approaches and techniques in their daily practice while some teaching methods such as class practical (demonstration), discussion and fieldwork are more student – centered, others, like the lecture method involve less pupil participation. A Chinese proverb by the educationist, Confucius, gives support to the value of student- centered learning as;

> *"When I hear and I forget,*
> *When I see and I remember and*
> *When I do and I understand" (Wadsworth, 1978:61)*

The Kenya National examination Council (KNEC, 1992) report asserts that teachers should combine both the discovery method and didactic exposition when teaching. The report pointed out

> *"Sometimes using one and sometimes the other, taking the best of both"*
> *(Kenya National examination Council, 1981:28)*

This advice is based on the successful experience of 'skilful' teachers who have realized that shortage of time does not allow children to discover everything but who have also realized that most children do not learn to think scientifically or with understanding unless they plan to carry out some investigators experiments themselves. Using bother approaches ensures

> *"…… The pupils are introduce to all the material relevant to the syllabus while also developing the other skills and abilities associated wit both theory and practical work" (Kenya National Examinations Council, 1981b:29)*

Maundu (1986) while reviewing literature on teacher methods asserted

> "……a teacher would have to combine such methods as lecture and

demonstrations with class practical, discussions, and field trips. The choice of the method(s) would vary from one teaching situation to another depending on teaching facilities, teacher competency in the topic at hand" (Maundu 1986:107).

Kathuri (1982) also studied teaching methods as influencing factors that affects students achievement and established that allowing children to be involved in practical activities, giving assignments, and less "teacher talk" were considered as evidence of "modern" teaching methods. Rosenshine (1979) reported that in addition to teacher's enthusiasm in promoting academic success , also the clarity of the teachers' presentation, his constructive criticism of the learner and his use of various questioning techniques (especially probing) were consistently related to student achievement. All the above findings on teaching methods were broad and not specific to a particular subject. However, the present study focused on performance only.

2.3. School Facilities and Students Performance

School facilities have been shown to be important contributors to academic success in developing countries (Heyneman and Jamison, 1980). Among the crucial facilities that promote student achievement in the Kenya Certificate of Secondary Examinations (KCSE), is the availability and efficient of teaching and learning resources. Eshiwani et al ;(1988), asserted that schools with (good) teaching and learning resources should have good examination performance when compared with those possessing none. The present study investigated teaching and learning resources for the following reasons. Mathematics is an empirical science, which deals with daily mathematical problems of life. It relies on statistics and is applicable in real world situations. Teachers and students of Mathematics are, therefore, required to be conversant with what is happening in the world around them.

However, introduction of mathematics in many schools has not been matched with the development of teaching and learning facilities. The development of the teaching and learning resources should include the stocking of mathematics periodicals like journals, mathematics surveys, financial reports, development plans, newspapers and magazines.

2.4 Summary of Chapter Two

In this chapter, the various studies reviewed have revealed that students' performance in mathematics examinations is related to the nature of attitude toward mathematics learning, students who had positive attitude performed better than those with negative attitude. Teaching approaches, learning and teaching resources influence performance of students in Mathematics.

The next chapter discusses research design and methodology of the study.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

This chapter deals with research design, methodology, and procedures followed in carrying out the study. The chapter also describes the area of study, sample and sampling procedures, data collection procedures, the research instruments used, and data analysis.

3.1 Area of Study

A study was conducted in 15 secondary schools in Uasin Gishu West District. Uasin Gishu West District is one of the thirty three districts in the Rift Valley Province. Uasin Gishu West District is a region bordered by Cherangani District to the North, Uasin Gishu East to the north East, Wareng district to the East, Nandi North District to the South and Lugari District to the West. The district has high potential in terms of dairy farming and maize production is the main cash crop of the area (Uasin Gishu District development plan 2005-2010)

3.2 Research Design

A description design was used for this study. Descriptive designs are used in preliminary and exploratory studies (Lucky and Reuben 2000), to allow the researcher to collect information, summarize, present, and interpret the information for the purpose of clarification.

A survey design was considered because surveys designs are the only instruments through which desired information can be obtained more easily and less costly when compared to other sources (Sharma et al, 1989).

3.3 Sample and Sampling Procedures

Data was collected by use of questionnaires. The sample for the study comprised 300 form three students and 40 mathematics teachers drawn from 15 schools. Mathematics teachers who were respondents were those present at their stations at the time of administering the questionnaires. Stratified random sampling was employed to categorize schools. Simple random sampling was then used to select 15 schools from the 32 secondary schools in the district as reflected in table 3.1 below. At school level, the researcher-applied simple random sampling technique to identify one stream and selected form three students in each of the schools identified, to fill the questionnaires. Simple random sampling was used to ensure that each school in each category and each student in each stream selected had an equal chance of being selected and being included in the study (Kerlinger, 1983).

In the study, the respondents were the form three students and mathematics teachers in the district. The reason for choosing form three students was that these students have covered more information and were more likely to respond to the questionnaire items more steadily and satisfactorily than the form two and form one students. The form four students were not considered since they were preparing for their national examinations as the study was conducted in 2nd term when the form fours were very busy.

Table 3.1: Number and Percentage of Study Sample by Types

Type of schools	Number of schools	Number of schools in the

	selected	district
Girls	5	5 (15.63%)
Boys	5	5 (15.63%)
Mixed	5	22 (15.63%)
Total	15	30(46.35%)

3.4 Research instruments

The researcher developed two types of questionnaires after examining and critically studying the ones designed by Bii (2005), Jepkoech (2002) and Muruguru (2000). Jepkoech (ibid) had used the questionnaires to collect information regarding the factors influencing the performance of students in economics at KCSE level. The questionnaires were for the secondary school mathematics teachers and form three students. These instruments were used because they normally give the respondents ample time to provide well thought out responses in the questionnaire items. It also makes it possible for large samples to be covered within a shorter time. The questionnaire comprised both closed and open-ended items.

3.4.1 Student Questionnaire

The secondary school mathematics questionnaire was divided into three parts, part one: Students' characteristics and background; Part two: Students' attitudes towards mathematics. Part 3: Information on learning mathematics, it required the students to give their views concerning the instructional materials, methods, evaluation problems and suggestions on how to improve the learning of mathematics.

3.4.2 Teacher's Questionnaire

The questionnaires for teachers of mathematics were divided into five parts. Part one sought information regarding teacher characteristics, part two; information on Kenya Certificate of Secondary Education (KCSE) performance in mathematics, part three;

information on instructional materials and facilities, part four information on the syllabus coverage and part five information on instructional methods used in mathematics education.

3.5 Reliability of Data Collection Instruments

For research data to be reliable, data collection tools must be reliable. This means that the tools must have the ability to consistently yield the same results when repeated measurements are taken under the same conditions elsewhere (Sharma et al, 1989; Lokesh, 1992).

The questionnaires were pre-tested through a pilot study to ascertain their reliability in soliciting information regarding factors that contribute towards students' poor performance in mathematics in Kenya Certificate of Secondary Examination (KCSE).

One secondary school in Nandi South District, which is a two-streamed mixed school, was selected for this purpose. Reliability of the instruments was established through test-retest method in a sampled school. The school did not constitute the final sample for the study. Questionnaires were administered to 20 form three students and 2 out of 4 mathematics teachers in the school. Simple random sampling technique was used to select the students and the teachers. The same questionnaires were administered to the same students and teachers after a period of three weeks. The following Pearson's product moment correlation (r) coefficient was used to compute the correlation coefficient between the two scores.

$$r = \frac{N \sum x Y - \sum x \sum Y}{\sqrt{[N \sum x^2 - (\sum x)^2][N \sum Y^2 - (\sum Y)^2]}}$$

Where

r = co-efficient of reliability

n = Total number of subjects

x = rated value of one half

y = rated value of the other half

Σ = summation

The computed Pearson product moment correlation coefficient yielded a reliability coefficient of 0.854 and 0.904 for students and teachers respectively. This was considered as high enough to justify the instruments are reliable to use in the study.

3.6 Validity of Data collection Instruments

The questionnaires for the study were given to two academic advisors in the department of Curriculum Instruction and Educational Media in the School of education to determine their workability. The corrections, suggested changes and advice given was taken by the researcher to improve the questionnaires.

3.7 Data Collection Procedures

Before proceeding to Uasin Gishu West District to conduct the study, the researcher obtained a research permit from the Ministry of Education, Science and Technology with the assistance of the School of Education, Moi University.

At the time of the study, the researcher made courtesy call on the District Education Officer and the District Commissioner, Uasin Gishu West District. Notification letters to carry out research in the selected schools in Uasin-Gishu West District were availed to the head teachers and heads of Mathematics Departments. Questionnaires were delivered to the respondents and collected at the appropriate

time. It was the intention of the researcher to administer the questionnaires and collect them after two days. However, this plan never materialized. The questionnaires were given to the heads of Mathematics Departments and in some schools head teachers, who distributed the same to form three students to fill. Before leaving each school the researcher would agree with each of the subject heads or the head teachers when to return for the completed questionnaires

3.8 Scoring of the Questionnaires Items

Different forms of scoring were used depending on the nature of the items in the questionnaire. For attitude items, respondents were required to rate statements dealing with selected aspects of mathematics on a five-point Likert type scale. These were; strongly agree (SA), Agree (A), undecided (U), Disagree (D) and strongly Disagree (SD). For positive questions SA, A, U, D, SD were rated as 1,2,3,4, and 5 respectively and vice versa for negative questions. The weight of five was allocated to the response that was hypothesized to have the most positive effect on the learning of mathematics. The Likert scale was used in this study for it was easy to construct, more reliable and objective (Mugenda and Mugenda, 1999). Likert scale can easily indicate the presence or absence of the attitude being measured.

The attitude of students fell under three categories that were described as positive, neutral and negative to find out the students' attitude towards mathematics, the mean scores for each student was calculated and compared with the mean score of 36 for the entire sample. The sample mean score was obtained by multiplying the neutral mark, 3 by the total number of attitudinal questions, 12. A student who scored below the mean was regarded as having a negative attitude. A score above the mean was

considered as a positive attitude, while a score equivalent to the mean meant neutral attitude towards the learning of mathematics. For open-ended items, the most common responses were coded and frequencies analyzed. The remaining items were directly analyzed after coding.

3.9 Data Analysis Technique

Descriptive and inferential statistics were used to analyze the data collected. Responses to the test items in the questionnaire were coded appropriately and analyzed using SPSS and Excel programs. Excel programs was used to draw bar graph. The Chi-Square (X^2) test was then used to measure relationship between the independent (attitude, teaching methods, teaching and learning resources) and dependent (performance in mathematics examinations) variables and validity of the null hypothesis based on selected variables.

In order to determine the magnitude of relationship or association between independent and dependent variables coefficient of contingency (c) a rough and conservative index of strength of relation was calculated from each of the obtained Chi-Square (X^2) values using the following formula

Where C = Coefficient

$$C = \frac{X^2}{X^2 + N}$$

N = total sample used in the study

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0 Introduction

This chapter presents analysis and interprets the data collected from the respondents by means of a questionnaire. This study was designed to answer the following three

research questions.

1) What is the attitude of students towards performance in mathematics?
2) What is the effects of instructional methods used on students performance in mathematics?
3) What is the effects of teaching and learning resources on students performance in mathematics?

This chapter is sub-divided into two parts. The first part of the chapter deals with presentation, analysis and interpretation of data and other factors that affect students' achievement such as attitudes of students and effects of instructional methods on performance in mathematics. The second part deals with the presentation, analysis and interpretation of data and the effects of facilities towards teaching of mathematics. The students and teachers' open-ended questions that required them to express their opinions or views on the stated problems were grouped and directly reported. However, at the end of the chapter is a summary conclusion.

4.1; Attitude of Students towards Mathematics.

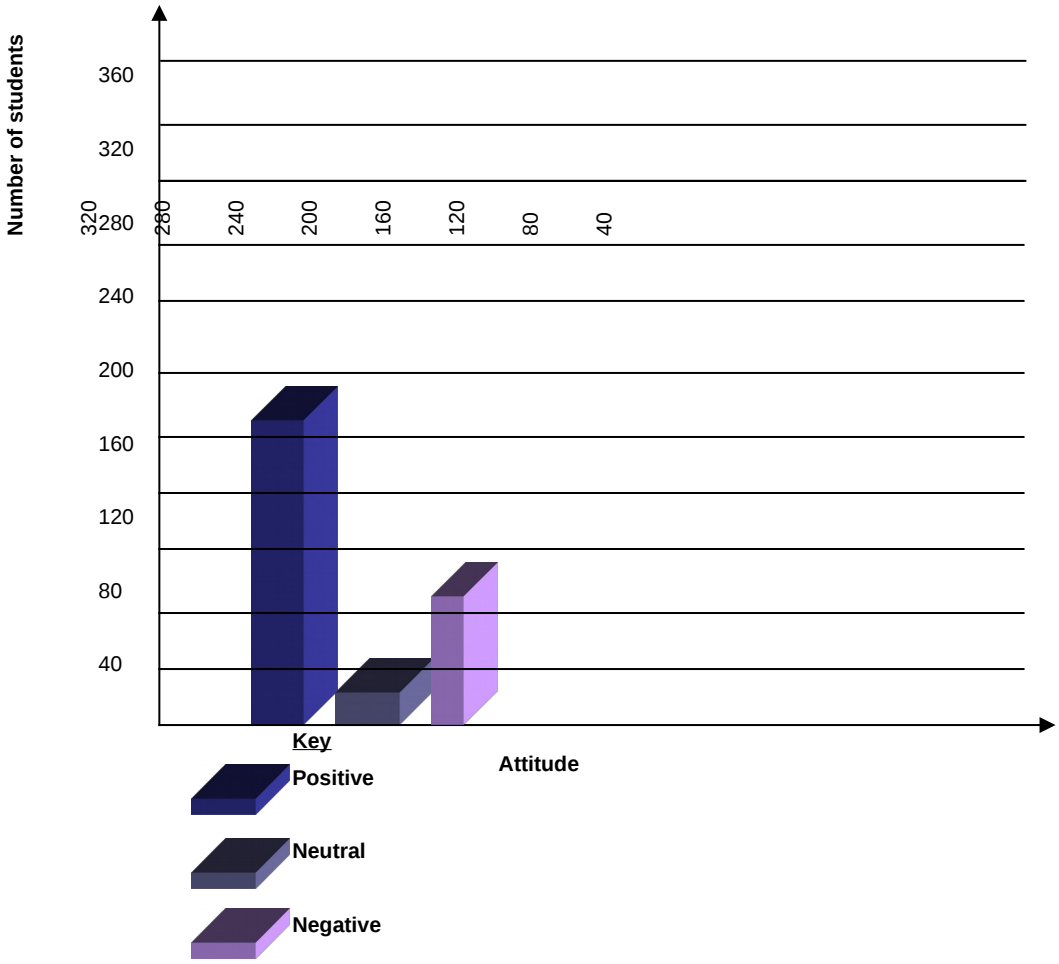
4.1.1: Research Questions One;

What is the attitude of students towards performance in mathematics?

Out of the 300 students who participated in the study, 182 (60.7%) had positive attitudes, 25 (8.3%) had neutral attitudes whereas 93 (31%) had negative attitudes, (see figure 1 below). These percentages show that a large proportion of the students

had positive attitudes while a small proportion had negative attitudes towards mathematics. However, the smallest proportion was neutral. The findings agree with those of Owiti (2001), Jepkoech (2003) and Bii (2005).

Figure 4.1: Students Attitude towards Mathematics



Mean attitude score was calculated. Scores for each cell were determined by multiplying each frequency by the corresponding values of SA (strongly Agree), A (Agree), U (undecided) D (Disagree) and SD (strongly Disagree)

The computed attitude score for the whole group was 4.01. Generally the whole group of students had positive attitudes towards mathematics since their score was above mid-point 3 which stood for neutrality. To further test the significance of the mean Z- statistics was applied. The determined value Z = 2.84 was greater than 1.645 at 0.05 level of significance. This justified the conclusion that the obtained mean was statistically significant. This findings agrees with those of Bii (ibid)

Table 4:1 Students Attitudinal Scores

	SA	A	U	D	SD	TOTAL	MEAN
Frequency	763	770	187	896	559	3175	
Total Score	3,815	3080	561	1792	559	9807	3.089

Rounded to three decimal places. SA, A, U, D, SD are awarded as 5, 4, 3, 2, and 1 respectively for positive.

4.1.2: Hypothesis One (HO1);

HO_1 : There is no significant deference between the attitudes of students towards mathematics and their performance in mathematics examinations.

According to the stated grading of the examinations by the Kenya National examination Council. In mathematics, 40% and above is considered as a pass and 39% and below is considered as a fail. In this study, a student who scored 40% and above was considered to have passed while a student who obtained 39% and below was considered to have failed. Students' scores were obtained by taking the average of three consecutive terminal examinations in mathematics. Out of 300 students selected 105 students scored over 40% and 195 scored below 39%.

Table 4.2: Students Performance in Mathematics.

	Frequency	Average Mark	Total	Overall Mean
Pass	105	43.13	4528.65	20.37
Fail	195	08.11	1581.45	14.74

A Chi-Square test for any significance relationship between students' attitudes towards Mathematics and students performance in mathematics examination gave x^2 calculated value of 47.099 which was more than the x^2 critical value of 5.991 at 2 degrees of freedom and at 0.05 level of significance (Table 4.3 below). The null hypothesis was therefore rejected. This means that there is a significant relationship between students' attitudes and their performance in mathematics examination. This justified the conclusion that the performance of the respondents relied entirely on their attitudes.

Table 4.3:Chi-Square Summation for Mathematics Performance and Attitude.

Performance		Attitude		
	Positive	Neutral	Negative	Total
Passed:	81(58.85)	4(8.08)	12(30.07)	97
Failed	101 (123.15)	21(16.92)	81(62.93)	203
Total	182	25	93	300

X^2(calculated) = 47.0989,

X^2 (critical) = 5.991

df = 2

$\propto$ = 0.05

Column=0.20

4.2; Effect of Instructional Methods on Students' Performance in Mathematics

4.2.1: Research Questions Two.

What is the effect of instructional methods on students performance in mathematics?

To answer this question, students' performance in mathematics was compared to the number of methods used (Table 4.4). 77 (25,4%) were taught using 5 to 6 methods 125(40.7%) were taught using 3 to 4 number of methods, while 98 (33.4%) of the students were taught using 1 to 2 number of methods.

Table 4.4: Number of Methods and Students Performance in Mathematics Examination.

Performance		**Methods**		
	6-5	4-3	2-1	Total
Passed	70	23	9	97
Failed	7	102	94	203
Total	**77**	**125**	**98**	**300**

4.2.2; Hypothesis Two (HO2)

HO_2: There is no significant difference between the effects of instructional methods and students' performance in mathematics.

To test this hypothesis, a chi-square test was calculated. It gave X^2 calculated value 54.746 which was more that the X^2 critical value of 5.991 at 2 degrees of freedom and at 0.05 level of significance (See table 4.5 below) The null hypothesis was therefore rejected. This means that there is a relationship between methods used in teaching and students' performance in mathematics examinations. This justified the conclusion that the performances of the respondents relied entirely on methods used.

Table 4.5: Chi-square computation for methods and students performance

Performance	**Methods**			
	6-5	4-3	2-1	Total
Passed	70 (24.9%)	23(39.45)	9 (32.66)	97
Failed	7 (52.10%)	102 (82.55%)	94(68.34)	203
Total	**77**	**125**	**98**	**300**

X^2(calculated) = 547.46

X^2 (critical) = 5.991

df = 2

$\propto$ = 0.05

Column = 0.20

4.3; The availability and use of teaching and learning resources.

4.3.1; Research Questions Three.

What is the effect of teaching and learning resources on students performance in mathematics?

Table 4.6 (i) below presents availability of teaching and learning resources. It shows that 147 (49%) out of 300 students said teaching resources were adequate, 137 (45.7%) out of 300 students said teaching learning resources were inadequate while 16 (5.3%) out of 300 students said teaching learning resources were not available in school. From this percentages it can be noted that half of the students suggested that the learning and teaching resources were adequate.

In order to answer the above research question, teaching/learning resources were considered against the students' performance in Mathematics (see table 4.6 (ii) below. From the table it can be noted that from the 105 students who passed the examinations, 86 (81.9%) suggested that learning/teaching resources were adequate and the remaining 19 (18.1%) suggested that learning/ teaching resources were inadequate or not available. Out of the 195 students who failed in examinations, 61(31.3%) suggested that learning/teaching resources were adequate and 119(61.08%) suggested that teaching/learning resources were inadequate or not available. These percentages show that a large number of students who failed in the examination had suggested resources were inadequate or not available.

Table 4.6 (i): Teaching and Learning Resources

	Adequate	**Inadequate**	**Others**	**Total**
No. of Students	147	137	16	300

Table 4.6 (ii): Resources and Students Performance in Mathematics

Performance	**Resources**			
	Adequate	**Inadequate**	**Others**	**Total**
Passed	86 (81.9%)	18 (17.1%)	1 (5%)	105 (100%)
Failed	61 (31.3%)	119(61.0%)	15 (6.7%)	195 (100%)
Total	**147 (49%)**	**137 (45.7%)**	**16 (5.3%)**	**300**

4.3.2; Hypothesis Three (HO3)

$HO_{3:}$ There is no significance difference between the availability of teaching and learning resources in mathematics and students performance in mathematics.

Chi-square was computed to test for any significance of resources on students performance. It gave (x^2) a value of 52.75 which is more than the (x^2) critical value 5.991 at 2 degree of freedom and at 0.05 level of significance (table 4.7). The null hypothesis was therefore rejected. This implied that there is a significant relationship between teaching and learning resources and students' performance in mathematics. The conclusion drawn therefore is that the performance of students in mathematics is affected by teaching and learning resources. These findings are consistent with Mwangi's (ibid) and Bii's (ibid).

Table 4.7: Chi-Square Computation for Resources and Students Performance

Performance	Teaching and Learning Resources			
	Adequate	**Inadequate**	**None**	**Total**
Passed	77 (47.63%	18 (44.3%)	2 (5.17%)	97
Failed	70 (99.47%)	119(92.70%)	14 (10.83%)	203
Total	147	137	16	300

X^2(calculated) = 52.75

X^2 (critical) = 5.991

df = 2

$\propto$ = 0.05

Column = 0.02

4.4 Endogenous Variables that Affect Students' Performance in Mathematics.

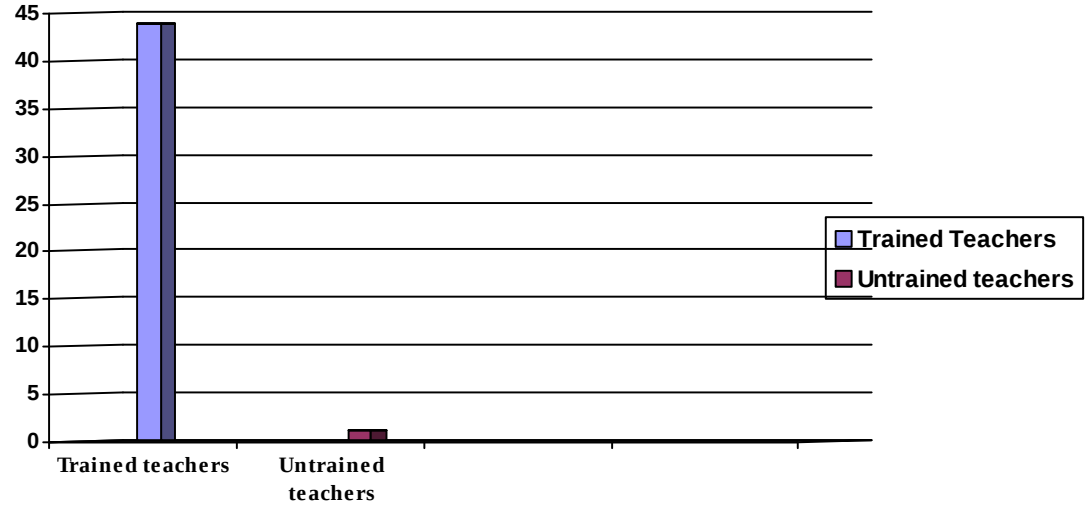
In this section, the data from teachers reactions to questionnaires was analyzed in order to investigate the extend of their effect on students' performance in mathematics.

4.5 Teacher Characteristics

4.5.1 Teachers Professional Qualifications

Teachers were categorized as professionally trained if they took educational courses in their training at university or any other institution offering education courses. These include those trained in M.Ed, B.Ed, BA, or B. Sc with PGDE certificates, Diploma in education and SI. Those without the above mentioned courses or certificates were considered not to be professionally trained. Out of 45 teachers who were randomly sampled to respond to the given questionnaires, 44(97.8%) had been trained (See Figure 2 below). From this information, it can be concluded that many of the secondary school teachers of mathematics in the selected schools were professionally trained.

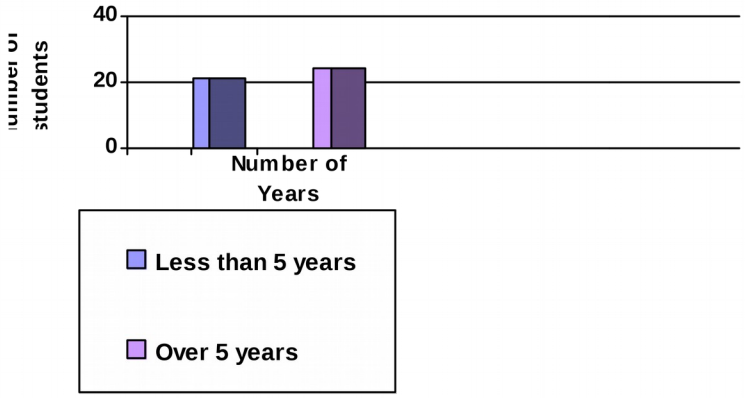
Figure 2: Professional Qualification of Mathematics Teachers



4. 5. 2 Teachers' Teaching Experience

Figure 3 below shows teachers' teaching experience in years. For the purpose of this study, experienced teachers were those who had taught mathematics for a period of five or more years. Out of 45 teachers considered in the study 21 (46.7%) had taught for a period less than five years while 24 (53.3%) had taught for over a period of five years. From Figure 3 below, it can be concluded that more teachers were experienced as compared to few teachers, who had less experience in teaching of mathematics in secondary school.

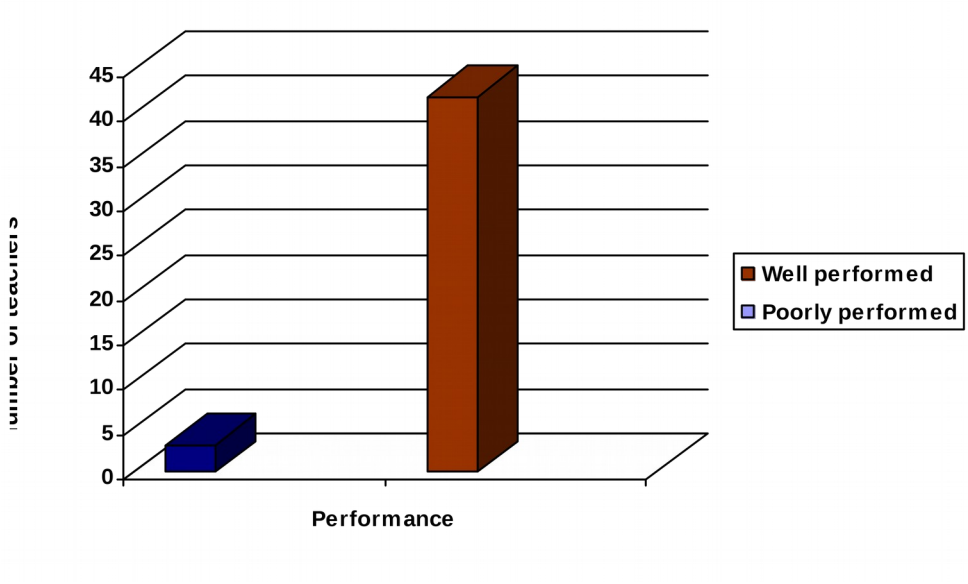
Figure 3 : Teachers Teaching Experience



4.5.3 KCSE Performance in Mathematics

Teachers rated their students' performance in mathematics according to their general performance. Out of 45 teachers, 3(6.7%) stated that students performed well and 42 (93.3%) stated that students performed poorly in mathematics as compared to other compulsory subjects in group 1 (see figure 4 below). From this, majority of students in their schools performed poorly in mathematics in relation to other subjects taught in secondary school.

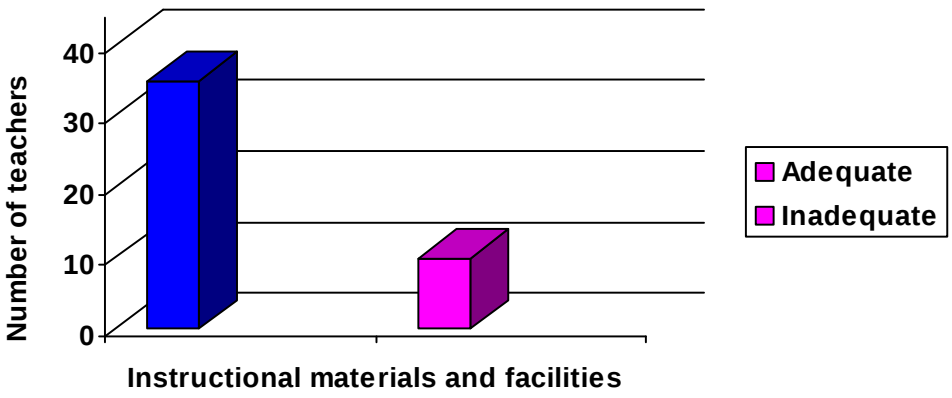
Figure 4: KCSE Performance in Mathematics



4.5.4 Instructional Materials and Facilities

Instructional materials and facilities are resources used to enhance teaching. For the purpose of the study, "adequate" means schools have enough teaching aids while "inadequate" means teaching aids are not proportional to the number of students. Out of 45 teachers, 35 (77.8%) stated that their schools have enough teaching aids while 10 (22.2%) stated that their schools have few teaching aids (See Figure 5). It can be concluded that majority of the schools have enough instructional materials and facilities.

Figure 5: Instructional Materials and Facilities



4.5.5 Information on the Syllabus Coverage

Syllabus coverage is presented in Figure 6 below. For the purpose of this study, syllabus coverage is content of work to be covered in a given period of time. Out of 45 teachers who responded, 18 (40%) stated that the syllabus was large while, 27 (60%) stated that the syllabus was manageable. These percentages show that most of the syllabus content is manageable.

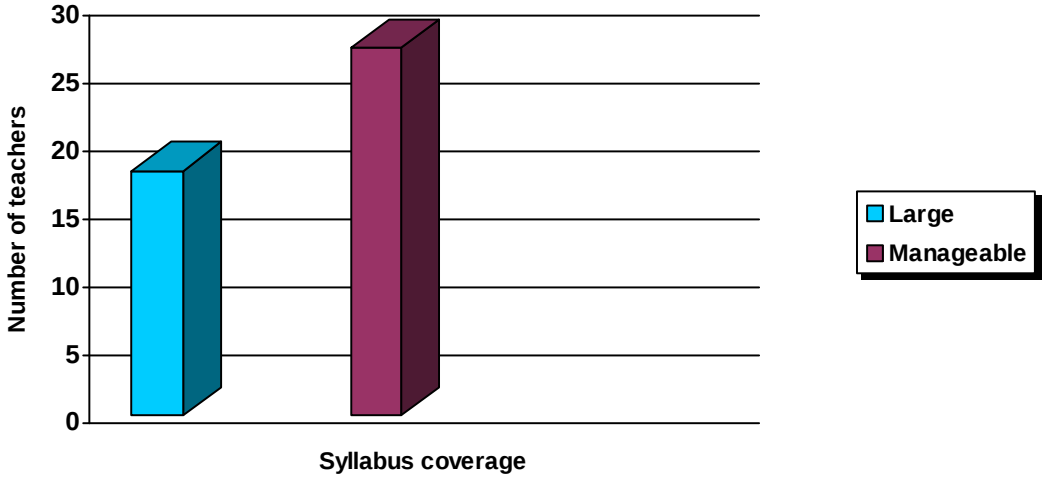


Figure 6. Syllabus coverage

4.5.6 Teachers Teaching Load

Teaching load is the number of lessons a teacher is expected to teach per week in the institution. A teacher is normally expected by the Teachers' Service Commission (TSC) to teach two subjects in the school in which he/she is stationed. Recommended lessons for mathematics by the Ministry of Education on the basis of the Curriculum Based Establishment (CBE) are six per week in form one and two. There are seven lessons per week in form three and form four. The recommended load for a classroom teacher is 27 lessons per week, the Head of department, 18 to 22 lessons per week, the deputy head teacher, 10 to 20 lessons per week and the principal, 4 to 12 lessons per week.

Figure 7 below presents data on the teacher's teaching load per week. These are combined lessons for mathematics and other teaching subjects. From the figure, it can be seen that 5 (11.1%) of the teachers indicated that their teaching load is below 20, while majority of the teachers 26 (57.8%) have lessons between 21-25 per week. The remaining 19 (31.1%) teachers have a teaching load of between 26-30 lessons per week. Lessons more than the maximum number means that the concerned teachers are over loaded, while lessons below the minimum means that these teachers are underutilized. From the analysis it appears that most of the teachers were within the recommended number of lessons per week. However they are not comfortable with their teaching load since in their comments, majority of them 32 (71.1%) indicated that their lessons were many while 10 (12.2%) stated that their lessons were of manageable size and only 3 (6.7%) stated that their teaching load was small.

Figure 7 (i) Teaching load per week.

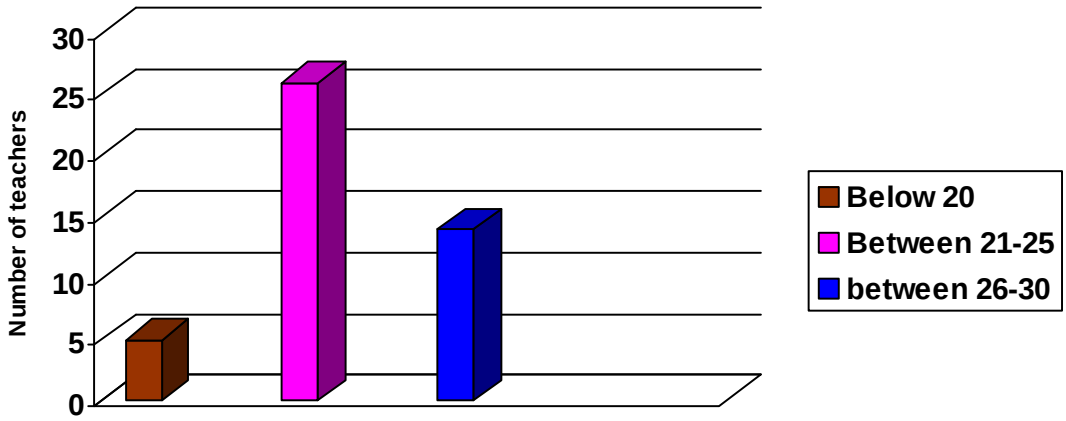
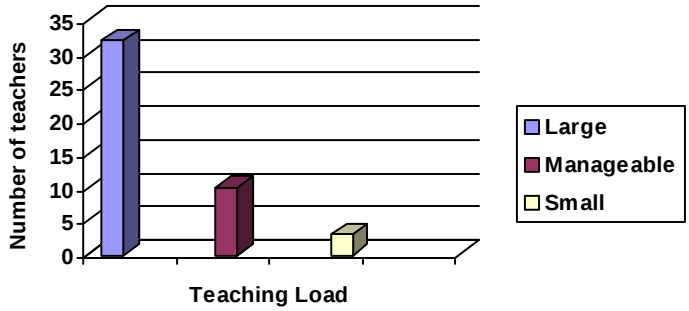


Figure 7 (ii) comments on their teaching loads



4.6 Analysis of the Comments written by the Students

The questionnaire for students had a section to be responded to by the students by giving their independent comments. Concerning grades students obtained in Mathematics, out of 300 students 105 (35%) scored grades A, B, and C while 195 (65%) scored grades D and E. Those who scored grades, A, B and C were considered as having passed while those who scored D and E were considered as having failed.

Concerning learning of mathematics in relation to other subjects in the 8-4-4 curriculum (student questionnaire question one part 3), out of 300 students 165 (55%) stated that mathematics is very difficult, also 56 (18.7%) agreed with the notion that mathematics was fairly difficult while 64 (21.3%) stated that mathematics was easy and the remaining 15 (5%) agreed that mathematics was very easy.

On general comment about the above, majority of the students stated that mathematics was generally difficult because of its abstractness, teaching approach, wide coverage of work and lack of motivation from both students and teachers.

In the second question about supply of textbooks, many of the students 147 (49%) reported that there was adequate supply of textbooks, 137 (45.7%) stated that text books were inadequate while a very small number 16(5.3%) reported that the textbooks were not available in their institutions.

The students were required to give the type of textbooks in teaching of mathematics. Majority of the students (78.33%) reported that mathematics books (Advancing in Mathematics) written by Kinyua (2003) and also those written by Owondo (2005) (Discovery Mathematics) were the main class textbooks while the rest were used as

class references.

Although quite a number of textbooks were stated as being used in teaching of mathematics, students encountered a number of problems in using them. Quite a number of students stated that the language used in some of the textbooks was beyond their level of understanding and the reference books were lacking answers at the back which made it difficult for them to study on their own both at home and at school.

The fourth question required students to state other instructional material apart textbooks. However (83.45%) of the students reported that they used mathematics revision textbooks, KCSE past papers and model papers.

The fifth question required students to state whether their schools had a library or not. Majority of them, (90.7%) reported that their school had libraries though not equipped as required. The rest (9.3%) reported that their schools had no libraries.

The frequency of using the library was sought in question six. Out of 300 students who were considered for the purpose of this study, many of them reported that they frequently visited the library for the purpose of reading. 273 (91%) reported that they frequently used the library compared to 27 (9%) who said they visit the library when need arises, rarely or never.

As concerns how they frequently use other instructional methods of learning, majority of 50 (83.3%) of the students reported that they utilize group method, discovery method and symposia though they said the latter is expensive to be used as a learning method. However problem solving was frequently used unconsciously.

On guest speakers, many students 287 (95.7%) explained that they were rarely used because it entailed a lot of money and time to get the required person. Also as

concerns Continuous Assessment Tests (CATS) all of them said that CATS were done regularly. The seventh question sought student's opinion about Mathematics syllabus. Majority of the students (96.7%) said that Mathematics syllabus was very wide. 1.3% of the students said the syllabus was fairly wide while the rest (2%) noted that it was short.

Question eight sought to find out students problems when learning Mathematics. Many students claimed that they lacked time for doing a lot of exercises and on many occasions these exercises were not marked. Others said that sometime language in mathematics made them confused hence not performing as expected. Other problems mentioned include discouragement from their fellow students, and teacher unwillingness to help in learning mathematics.

Lastly question nine required the students to give their suggestions on how to improve the learning of mathematics. A large number of students (63%) stated frequent practice on topics should be done with seriousness from both students and teachers. They advanced for thorough revision of past papers and use of revision textbooks which are relevant to the syllabus. They also advocated for use of discussion and group method mainly when revising.

In conclusion, many teachers in schools were teaching mathematics as required. Most of the schools used the relevant textbooks but the main problem was lack of required text books and reference books which were inadequate. There was a large book-student ratio. One textbook in majority of the schools was used by four or five students which was a problem with students in day schools. Concepts learned in class were a problem with students in day schools. Concepts learned in class were not effectively taken by students later because of lack of reference materials.

4.7 Analysis of the Comments written by the Teachers

The questionnaire for teachers of mathematics had a section to be responded to by the teacher by giving an independent opinion. In relation to the issue of performance in KCSE, majority of the teachers (77.8%) stated that students performed poorly in National Examinations while the rest (22.2%) stated that students performed well in examinations. However they also stated that the workload could not allow them to attend to individual problems as far as learning mathematics was concern. In reference to this, most teachers stated that they do not clear the syllabus on time because of repetition of concepts sometime for many to grasp the new concepts.

4.8 Summary of Chapter Four

The analysis done in this chapter showed that most students (60.7%) had positive attitudes towards mathematics. A Large number of teachers are trained (97.8%) and (53%) of them were experienced. From the information, the students were expected to have performed very well in mathematics examinations. Since this was not the case, the low performance in the subject was most likely to have been caused by teachers' teaching load (commented by teachers at large). A large number of students in a class with few teachers. The next chapter presents discussion, conclusion, recommendations and suggestions for further research.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter focuses on discussion of the study findings, conclusions, recommendations, and suggestions for further research.

The main purpose of this study was to investigate factors that influence the performance of students in mathematics in the (KCSE) examinations in Uasin Gishu West District. The need to investigate the factors that influence student's performance in mathematics arose from the concern by the Kenya National Examinations Council (KNEC) and the general public over the persistent students' poor performance in (KCSE). Examinations over the past many years. Research findings on factors influencing the performance of mathematics do exist and also necessitate the need for further study. The study was designed in form of a survey involving three hundred selected form three students and forty five selected mathematics teachers from fifteen selected secondary schools in Uasin Gishu West District. The researcher collected data from the respondents using questionnaires as the main research Instruments. The Statistical Package for Social Sciences (SPSS) and Excel programme were employed to analyze the data. The statistical tests used were Z-test, chi-square and contingency coefficient. The hypothesis was rejected at 0.05 level of significance.

5.1 Discussion of the Findings of the Study.

The discussion in this chapter follows the order of the hypotheses tested in Chapter Four. The major findings of the study will then be highlighted, discussed and compared to earlier studies on factors influencing the performance of students in

mathematics.

Ho_1: There is no significant difference between the attitudes of the students towards mathematics and their performance in mathematics examinations.

The findings of the study showed that most of the students who had a positive attitude towards mathematics performed well in the examinations than those who had a negative attitude (Figure 1). However on the strength of this finding, the null hypothesis was therefore rejected. It was then concluded that attitude has impact on performance of Mathematics in the examinations. It meant that performance was dependent on attitudes. These findings are in line with the findings of Hussein (1978) and Bii (2005). This implies that students' attitudes play a key role in preparation for the national examinations at secondary school level. Other researchers such as Fennema (1990) found similar results in their studies. The researcher found that students with positive attitudes towards learning of mathematics in any institution of learning performed better than students with negative attitudes towards the learning of mathematics. It is therefore necessary to note that attitude has a strong influence on learning mathematics, Eshiwani (1983) stated that effective learning promote good performance.

HO_2: There is no significant difference between the effects of instructional methods and students performance in mathematics

The results obtained showed different approaches used in teaching enhance good performance. For this reason, the null hypothesis was rejected. It meant that there was a significant relationship between the effects of instructional methods and students' performance in mathematics examinations. These findings are supported by those of Owiti (Ibid) and Jepkoech (2002). It meant that the more the methods (5-6) the better

the results or performance. Other researchers such as Merwin (1976) found similar results in his findings. He found out that the success of students in Mathematics is dependent on the number of teaching approaches to different concepts.

HO_3 : There is no significant difference between the availability of teaching and learning resources in mathematics and students' performance in mathematics

This study found that teaching significantly affected the performance of students in mathematics examination. This however led to the rejection of the hypothesis. Good results are obtained when there are enough teaching and learning resources.

5.2 CONCLUSIONS

The following conclusions were made basing on the research findings:

(a) The student's attitudes influence their performance in mathematics examinations. Those with positive attitudes performed better than those who had negative attitudes towards the learning of mathematics

(b) Teaching methods influenced the performance of students in mathematics examinations. Use of a number of different approaches in teaching made Students to perform better.

(c) Teaching and learning resources influenced performance of students in mathematics examinations. In schools that are well equipped with adequate resources, students performed better in the national examinations.

5.3 RECOMMENDATIONS

The study dealt with student's performance in mathematics in selected secondary schools in Uasin Gishu West district. The discussion led to various findings. In this part, various recommendations are given based on the findings and conclusions.

From the findings, there is a significant difference between student's performance in mathematics and factors such as teacher's professional qualifications, workload per week, and the number of students in each class. This being the case, it implies that the Ministry of Education should increase the number of mathematics teachers in secondary schools. The study also showed that textbooks are key promoters towards better performance. This therefore calls for all schools to provide enough textbooks. It is necessary to have the ratio of textbooks to students to be 1:2 and not 1:6 as is the case in many schools. This will enhance effective learning and hence better performance in mathematics. From the study, the researcher found that most teachers used "Advancing in Mathematics by Kinyua (2003). They need to have variety of books to reinforce the course text.

The study revealed that different approaches to teaching influenced performance in mathematics and probably other subjects. It is important for teachers to vary methods of teaching depending on situations prevailing.

The finding showed that there is a positive relationship between attitude towards mathematics learning and students performance in mathematics examination. All stakeholders in education should strive to promote positive attitude towards the learning of mathematics among all the students. Efforts should be made by employing highly qualified psychologists to assist students develop positive attitude.

5.4 SUGGESTIONS FOR FURTHER RESEARCH

This study suggests the following areas for further research:

(a) A similar study should be carried out in other areas in Kenya. This will make it possible to determine whether the findings obtained in this study hold the same in other areas.

(b) The same research should be conducted in other districts using different approaches of collecting data like interview schedules and also increase the sample to be studied.

(c) The research study was mainly quantitative in nature and there is need to carry out a qualitative study to determine the causes of students' poor performance in mathematics in Kenyan secondary schools.

(d) The research study considered only three factors that contribute towards poor performance in national examinations. Similar research should be conducted to determine the extend to which other factors have contributed towards poor performance.

(e) The Ministry of Education should start units of research that will mainly be looking at the causes of failure in Mathematics every year and providing the results to all secondary schools and other stakeholders.

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APPENDIX I: LETTER TO SCHOOL PRINCIPAL

OLE CHOKY M. ABRAHAM.

DATE.....

THE PRINCIPAL

_____

_____

Dear Sir/Madam,

RE: REQUEST TO CARRY OUT RESEARCH IN YOUR SCHOOL.

I am a student at Moi University pursuing a Masters Degree course in Mathematics Education. As part of my course, I am required to carry out research on factors that contribute towards poor performance in mathematics in Kenya Certificate of Secondary Education (KCSE).

The purpose of this letter is to seek your permission to collect relevant data in your school. If allowed, I promise to abide by your school rules and regulations. Attached herewith are copies of questionnaires, research abstract and permit.

Thanking you in advance for your cooperation.

Yours faithfully,

OLE CHOKY M. ABRAHAM.

APPENDIX II: A QUESTIONNAIRE FOR MATHEMATICS TEACHERS

Dear Sir/Madam,

RE: INVESTIGATING FACTORS THAT CONTRIBUTE TOWARDS POOR PERFORMANCE IN MATHEMATICS IN KENYA CERTIFICATE OF SECONDARY EXAMINATION (KCSE)

I am a graduate student in the School of Education at Moi University researching on the above mentioned subject. You are kindly requested to spare some of your important time to provide the information asked for as sincerely as possible. Your cooperation will be highly appreciated. Note that the information is purely for the purpose of this research and it will be treated with utmost confidence. Please do not indicate your name anywhere in this questionnaire.

Please tick in the appropriate brackets or write in the spaces provided.

GENERAL INFORMATION

Name of School _____

Number of mathematics teachers in your school_____

Number of Streams in Your School_____

PART 1: Teacher characteristics

1. Sex Male [ ] Female [ ]

2. Professional and academic qualification.

(i) S1, ATS [ ]

(ii) Dip in Education [ ]

(iii) Trained graduate teacher [ ]

(iv) Untrained graduate teacher [ ]

(v) BA, PGDE [ ]

3. Teaching experience in years.

(i) Less than 1 year [ ]

(ii) Between (2-5) years [ ]

(iii) Between (6-10) years [ ]

(iv) Over 10 years [ ]

4. (i) For low long have you taught mathematics in your present school

_____

(ii) How many lessons do you teach per week?_____

5. (a) Have you attended any in-service course?

(i) Yes [ ] (ii) No [ ]

(b) If you have attended how useful it is as far as mathematics

Instruction is concerned_____

_____

6. (a) Which other subject (s) do you teach besides mathematics?

_____

_____

(b) How many lessons do you teach in these other subjects?

Part 2: Information on KCSE performance in mathematics.

1(a) How do you rate student's performance in KCSE in mathematics in relation to other compulsory subjects in group 1 as subjects cluster in your school.

(i) Well performed [ ]

(ii) Poorly performed [ ]

(iii) No opinion [ ]

(b) Give reasons why you think so?_____

_____

2(a) How do you rate student's performance in mathematics in KCSE in relation to the rest of the subjects offered in KCSE by KNEC?

(i) Well performed [ ]

(ii) Poorly performed [ ]

(iii) No opinion [ ]

Part 3: Information on learning mathematics.

1. (a) How do you compare the learning of mathematics in relation to other subjects in the 8-4-4 curriculum?

   (i) Very difficult [ ]

   (ii) Fairly difficult [ ]

   (iii) Easy [ ]

   (iv) Very easy [ ]

(b) Give reason to support your choice in (a) above _____

Part 4: Information on instructional materials and facilities.

1 (a) Does your school have

(i) Adequate materials for teaching mathematics? [ ]

(ii) Inadequate materials for teaching mathematics [ ]

(iii) Can not tell [ ]

(b) Why do you think so _____

_____

2(a) What would you say about the extent to which the supply of text book on mathematics is adequate in your school?

(i) Adequate [ ]

(ii) Fairly adequate [ ]

(iii) Inadequate [ ]

(b) What has been the influence of this state of adequacy of textbook?

_____

_____

_____

3. List the textbooks that you commonly use in the teaching of mathematics in your school.

4. What do you think of the Ministry of Education's recommended textbooks on the teaching of mathematics at the secondary school level?

   (i) Suitable [ ]

   (ii) Fairly suitable [ ]

   (iii) Not suitable [ ]

   (iv) Do not know [ ]

5. In your own opinion, which textbooks would you recommend for use as class texts.

6. Apart from textbooks, which other instructional materials do you use in preparing students in mathematics for the KCSE examinations?

1._____

2._____

3._____

4._____

5._____

7. How do you obtain materials you normally use for teaching mathematics?

(i) Students make them [ ]

(ii) I make them [ ]

(iii) The Ministry of Education supplies [ ]

(iv) The school buys them [ ]

(v) Other sources [ ]

Specify _____

8. (a) Does the school have a library ?

(i) Yes [ ]

(ii) No [ ]

(b) If yes, which reference books for mathematics are available in library?

Title	Author
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____

9. How often do your students make use of the school library?

(i) Regularly [ ]

(ii) Not regularly [ ]

(iii) Not at all [ ]

Part 5: Information on the syllabus coverage.

1(a) What is your teaching load in periods per week?

(i) Less than 20 [ ]

(ii) Between 20-25 [ ]

(iii) Between 26-30 [ ]

(b) What is your opinion on this teaching load.

_____

_____

_____

2 (a) In your opinion, is the present teaching class.

(i) Too large [ ]

(ii) Large [ ]

(iii) Manageable size [ ]

(iv) Small [ ]

(b) Does the class size you have indicated above hinder the effectiveness of teaching and learning of mathematics?

(i) Yes [ ]

(ii) No [ ]

(c) If yes, how does it hinder?

_____

_____

_____

3(a) In your view, what do you think of the number of periods per week allocated for teaching mathematics?

(b) Give your own view on the choice above?

_____

_____

_____

4. How do you prepare your students for the KCSE examinations in mathematics? _____

_____

_____

Part 6: Information on instructional methods attendant to mathematics education.

1.(a) Which of the methods below do you find suitable for mathematics instruction?

(i) Student centered [ ]

(ii) Group [ ]

(iii) Demonstration [ ]

(iv) Programmed learning [ ]

(v) Problem solving [ ]

(vi) Discovery [ ]

(vii) Others [ ]

(b) Why do you think so?

_____

_____

_____

Thanks you for your cooperation

Ole Choky M. Abraham

APPENDIX III: STUDENT'S QUESTIONNAIRE

Dear student,

Below are some questions on investigating factors that contribute towards poor performance in mathematics in Kenya Certificate of Secondary Examination (KCSE). This is not a test and there is no right or wrong answer, you are kindly requested to respond to them as genuinely as possible by either ticking in the bracket provided or by writing in the space provided. Note that the responses you give will be kept confidential and they will be used for the purpose of this research only.

Name of your school _____

Your Adm. No. _____

Part 1: Student characteristics and background.

1. Sex: Male [ ] Female [ ]

2. What grade did you obtain in mathematics in your KCPE examination?

_____

3. Give your mean mark in mathematics for the last three consecutive terms_____

Part 2: Student attitudes towards mathematics.

1. Read the following statements and indicate the extent you think are true from your experience by ticking the relevant boxes.

   Key

   SA – Strongly Agree

   A- Agree

   D- Disagree

   SD- Strongly

   U- Undecided

2. (a) In your own opinion, is the supply of books in the school.

   (i) Adequate [ ]

   (ii) Inadequate [ ]

   (iii) Others [ ]

   Specify _____

   (b) What do you say of adequacy of mathematics textbooks in your school?

   (i) Adequate [ ]

   (ii) Inadequate [ ]

   (iii) Others [ ]

   Specify _____

3. (a) Which textbooks do you normally use when learning mathematics? (Please list in the spaces provided below)

   (a) _____

   (b) _____

   (b) _____

   (c) _____

   (d) _____

(b) Which problems do you encounter when using these mathematics textbooks?

_____

_____

4. A part from the textbooks which other instructional materials do you use when learning mathematics?

_____

_____

5. Does your school have a library?

   Yes [ ]

   No [ ]

6. Read the statements below and indicate the extent you think are true from your experience by ticking in

Statement	**Frequency**	**When need arises**	**Rarely**	**Never**
A. If you indicated Yes in 5 above how frequently do you visit your library to read other supplementary materials on mathematics?				
B. How frequently do you utilize any of the following instructional methods of learning? (i) Group (ii) Discovery (iii) Symposiums (iv) Individualized study (v) Problem solving		`		
C. How frequently does your school receive guest speakers on mathematics themes?				
D. How frequently do you sit for continuously Assessment Tests (CATS)				

7. (a) What is your opinion about mathematics syllabus?

   (i) Very wide [ ]

   (ii) Fairly wide [ ]

(iii) Short [ ]

(iv) Cannot [ ]

(v) Cannot say anything [ ]

8. What problems do you encounter when learning mathematics?

   1. _____

   2. _____

   3. _____

   4. _____

9. What suggestions can you give on how to improve the learning of mathematics?

   (a) _____

   (b) _____ (c) _____

   (d) _____

Thank you for your cooperation

Ole Choky M. Abraham