

**ACADEMIC PERFORMANCE OF PUPILS IN MATHEMATICS IN
SECONDARY SCHOOLS IN MATUGA DIVISION, KWALE
DISTRICT, COASTAL PROVINCE, KENYA**

BY

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DECLARATION

I Doris Nthenya Kyengo declare that the material in this book has not been presented elsewhere for any academic award.

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APPROVAL

This research report is submitted for examination with my approval as a University Supervisor.

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DEDICATION

This report is dedicated to Julius Muithi Musyoki and Elisha Musyoki Muithi.

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First I thank the Almighty God for the gift of life, and peace prevailing in our country Kenya.

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Finally, I observe all the individuals and institutions mentioned for errors. The researcher remains solely responsible.

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ABSTRACT

The study focused on the impact of teacher's quality and teaching resources in teaching Mathematics in Secondary schools. Performance of the learners is a basic indicator of effective learning. Grade scored in internal examinations are normally used as measures of the subjects.

In this study, the researcher looked into qualifications, experience of teachers, teaching resources and the methods employed during instruction. The study further established that there are other factors that contribute to performance apart from the teacher's quality and teaching resources.

Simple random and strategic sampling techniques were used. The sampled candidates were given questionnaires to fill in. Descriptive and inferential statistics were used.

The researcher hopes that the findings of the study will be of great importance to the Mathematics learners, educators, parents and society at large.

CHAPTER ONE

INTRODUCTION

1.0 Overview

Although various researchers have carried out research on the causes of poor performance in science subjects, Mathematics has remained one of the poorly performed subjects in the National examinations.

According to Kenya Times (12th August 1993), observes “ a teacher with good qualifications, appropriate training and experience is the greatest asset a school can have” (pp14) a teacher who knows little will be severely handicapped when faced with teaching in class. Since Mathematics is seen as a hard nut to crack by a majority of students, a teacher should demonstrate great understanding and sympathy in the actual class room teaching process. This research will therefore help find out the impact of teacher quality and teaching resources and performance of Mathematics in secondary education.

1.1 Background of the Study

Mathematics is a science that deals with the study of numbers and their manipulations. The subject requires that learners be made aware of the numbers, related theories, concepts and rules. The teacher quality should be geared towards the students having a logical and systematic criterion of dealing with the said numbers. Since Mathematics is fundamental to many professional career schools should improve on the learning process of the subject in order to achieve the set objectives and goals of education.

A survey carried by the Third International Mathematics and Science Study (TIMMS, 2003), revealed that Iranian 4th and 8th graders understanding of Mathematics on average

ranked very poorly among participating countries and hence Iranian students performed poorly.

A similar survey carried out by the same organization in 1997 surprisingly revealed a large percentage of South African pupils performed worst in Mathematics and science, while Singapore, Hong Kong, Korea and Japan were top performers.

Kenya Certificate Secondary Examinations results released in 2005 in Kenya showed that performance in Mathematics in continuously declining (Daily Nation, March 2005).

1.2 Statement of the Problem

The main purpose of this study was to find out the impact of teachers' quality and teaching resources on students' performance in Mathematics. Although various researchers have carried out research in this area, Mathematics has remained one of poorly performed subjects in the National Examinations.

1.3 General Objectives

The purpose of this study was to examine the implications of the teaching resources and teacher's quality on the academic performance in Mathematics.

1.4.0 Specific Objectives

The following objectives guide the research.

- i. To determine the effect of teaching resources used in Mathematics on its performance in Kenya schools.
- ii. To analyze the relationship between teacher-pupil ratios in Matuga division, Kwale district, Coastal province.

- iii. To determine the effect of the teacher's quality on the performance of Mathematics in Matuga division, Kwale district, Coastal province.

1.4.1 Research Questions

The following questions were asked as a guide to the study;

- i. To what extent do the teaching resources affecting the performance of Mathematics?
- ii. What is the relationship between teacher-pupil ratios in Matuga division, Kwale district?
- iii. To what extent does the teacher's quality affect the performance of Mathematics?

1.5 Scope of the Study

The study focused on both boys and girls students from the selected schools of in Matuga division, Kwale district, Coastal province. Matuga is one of the divisions in Kwale district. Of late there has been insufficiency in food production due to a lot of land fragmentation and population explosions caused by the need for most families to have a baby boy and erect homes separate to the parental homes.

1.6 Significance of the Study

Technological advancement of any country greatly depends on the quality of its citizens and maximum utilization of the available resources. Mathematics is the basis of many technologies. Due to the ever-growing population, there is needed to advance so that the scarce resources can be effectively and efficiently used for optimum results.

In this study the researcher hoped to establish the impact of the teacher's quality and teaching resources performance of performance of Mathematics. The researcher hopes that, the findings will in turn assist the curriculum developers, administrators, teachers, students and society at large in both planning and implementation of the Mathematics curriculum in such a way that will optimally utilize the available resources for better results.

- ✚ The findings of the study after completion, will assist the teachers and head teachers in different schools concerned with the challenges faced under science Education programmes, researchers and policy makers like, district councillors, District education Officers who play a fundamental role in promotion of science programmes in the district and other parts of the country that is when after completion of the study.
- ✚ To the government of Kenya, it will help policy makers like the parliamentarians, district councillors at both local and national levels in planning, monitoring and evaluation science based Education programmes especially to the Ministry of Education and Sports.
- ✚ As a student of education, the research findings will to a large extent enhance my career in researching and enable me to have a practical approach in solving science subjects related problems, as the course requires.
- ✚ The study will also be useful to other researchers in the field of education especially teachers and students pursuing bachelors of science in education who would wish to expound on the area of science subjects to obtain a foundation in the form of literature review like the department and other universities besides KIU.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Overview

Mathematics is a requirement for admission to very many tertiary institutions hence fundamental to many professional careers.

According to the Daily Nation (March,2005), students are avoiding Mathematics, therefore it calls for attention to carry out a study on the same because of the importance of the subject that leads to its professions such as engineering , architecture, medicine and surgery.

2.1 Conceptual Framework

According to the Human Science Research Councils (HSRC) research, conducted in 1995, the following factors were considered as possible reasons for poor performance:

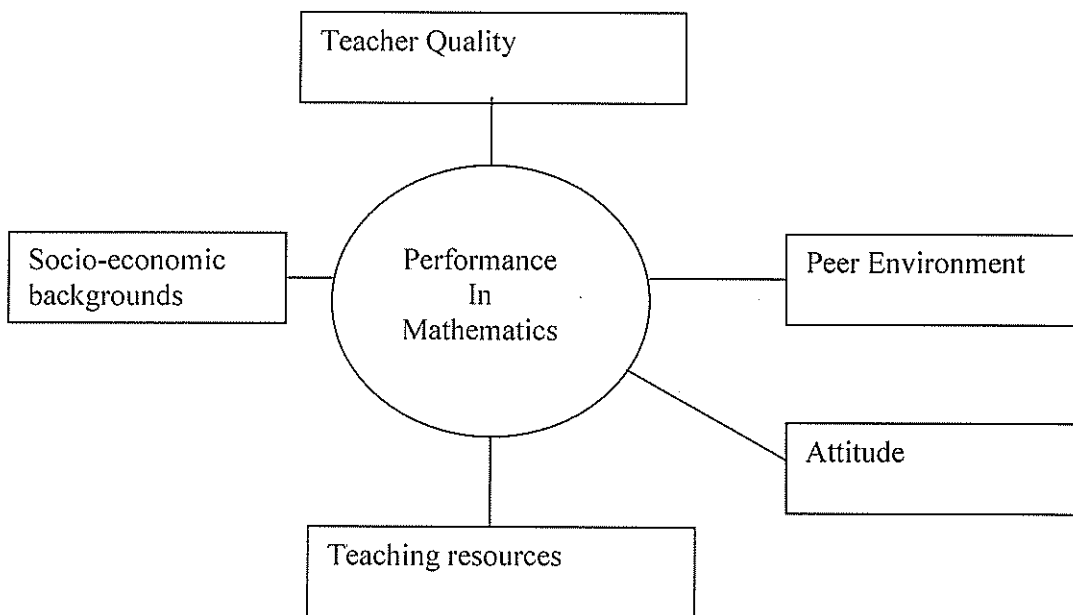
Many students come from socio economic deprived backgrounds. The parents of the generation that is presently at school often boost a basic primary education at best, therefore unable to assist their children with school work.

A great many schools are handicapped by inadequate facilities and text book shortages, and have suffered all kinds of disruption in recent years. Problems also rise from irregular attendance by both teachers and students.

There is a severe shortage of properly qualified Mathematics teachers at secondary level. Inadequate subject knowledge and poor motivation lead to lack of confidence and inspiration in the classroom.

The poor environment in many schools is not supportive of those students who wish to achieve academically.

Students' motivation to do well in Mathematics is also adversely affected by the fact that this subject is considered to be difficult.



2.2 Performance in Mathematics

A survey carried by Third International Mathematics and Science Study (TIMSS, 2003), revealed that contrary to the common belief that the K-12 education in Iran does a better job of teaching math and science than that of the developed countries (the United States being a frequently used basis of comparison among Iranian-Americans). It demonstrated a rather disappointing and troubling state of affairs. Briefly, Iranian 4th and 8th graders of Mathematics and science ranked very poorly among participating countries in 2003.

A similar survey carried in 1997, showed a surprisingly 76% of South African pupils who felt that good luck was major importance for doing well in Mathematics. The preliminary results of Grade 7 and 8 students, which were published, revealed that South African pupils performed worst in both Mathematics and science while Singapore, Hong Kong, Korea were top performers. From Singapore a top achieving country; 92% agreed that hard work was needed to do well in Mathematics.

The Daily Nation (August, 1995) stresses that Mathematics remains one of the most abnormally performed subject in Kenya schools. Every year, Mathematics takes the lion share in Grade E, which is the lowest grade in Kenya Certificate of Education (KCSE).

In the analysis done by the District Award Committee in the results released of 2004 in Matuga Division, over 80% of the students who sat for examination obtained a C-(minus) below in Mathematics.

This result is indeed alarming; reason why the researcher has undertaken to carry out this research in Matuga Division.

2.3 The Relationship between Teacher and Pupil ratio Performance in Mathematics.

The Kenya's FPE/secondary pupil's enrolment rate has been on the rise since 1996 when the government eliminated fees in a bold attempt to achieve education for all children of school going age. But massive expansion has affected the quality of education and it was a major challenge to cope with post primary education.

In World Bank report of April 2001, Education notes on Africa, Kenya is praised for its "Big Bang Approach of Education". In the same report however the quantitative approach

taken by government is questioned. Notwithstanding government commitment on donor support, input ratio for text books, teachers, class rooms suffer FSE.

Pupils / teacher ratio rose from 1:40 to 160 by 1999. The increased teacher / pupil ratio may affect the quality of education.

The pupil population in FSE was estimated at 2.5million in 2003 of which 1.1 million were girls and 1.2 were boys. However, the basic inputs in education had not grown at the rate of enrolment growth. The World Bank report on education in Kenya indicated how the basic in puts (materials) had grown from 87% in 1997 to 11% in 2001. The basic input growth was far below the enrolment growth. The report identified another big challenge on how share of qualified teaches for FSE. While in service programs had been extended to handle the challenges of increase of school enrolment, the ratio of trained total teacher population had just risen from 75-83% implying no significant improvement in teacher management. The few available teachers were not armed with relevant teaching methods to cope with the raised pupil's ratio. From the adduced literature there is likely a significant relationship between increased pupils enrolment and declined quality of primary education.

Purposive education like FSE is meant to serve several functions; Lewis (1983) identifies such functions as those that are either economic or political and for the purpose of stabilizing the economy. The basic function however is that purposive education supplies the country with adequate labor force in terms of quality and quantity. It should be noted that Kenya is behind many countries in the effort to provide education for all. The government of Tanzania had by as early as 1967 committed its self to the programme of social development. The socialistic programme ensured and guaranteed primary education

for all population in Tanzania. In a course of the last twenty years, Cuba has achieved virtually universal adult literacy and provision of education for all children.

In Nigeria, education since independence has been recognized as vital and powerful tool for political, economic and social changes in the country, the federal military government in Nigeria formally introduced FSE though started in the north of the country but the scheme faced many challenges. Therefore, the experience of the challenges facing FSE in Kenya especially the issues relating to teacher / pupil ratio should not cause alarm. Government including that of Kenya seems to be pre-occupied and concerned about every one going to school and of quality seem to be in the periphery of the government agenda. The impact of the trend of high enrolment ratio that are seeming not matched with teacher enrolment need to be examined in an effort to assess their impact on the quality of education provides as earlier argued by Combs (1968) education commissions normally need to respond to crisis and that Kenya is not exceptional, the 2005 Francis education policy review commission was intended to make recommendations on how to rehabilitate the declined educational standards and structures in the country, after issuing this recommendations, the Ministry of Education issued raised a white paper in 1992 with major concern of addressing the key issues raised by the report. The government started with restructuring of University and Tertiary Institutions with introduction of fees and liberalization of education. The FSE which finally took control stage in 1997 coming as a political package with less or little reference to the guidelines provided by Francis report. This scenario could partially explain the mess on the quality and general management of FSE.

2.4 The Teaching Process

In teaching and learning, sight is the most powerful, sense of human communication, learners tend to understand and retain more of what is presented through other senses. Research has found the people learn 11% through hearing and 83% through sight, 20% of what is heard remained while 80% of what is seen and heard is retained.

“The demonstrative use of models will be more to the professional teacher of Mathematics. The corrective value of models is associated with Mathematics exhibition. A good Mathematics exhibition arouses interest....” (Curdy, Rollet, 1981)

The instructions materials are useful in teaching Mathematics because they bridge the gap between concrete and abstract. They actually influence performance of the subject in the examinations.

Resources are very important (Ayot, Patel. 1987). They point out that resource enhance practical experience of skills and concepts. They can come in handy in teaching mathematics, which require interest especially on the part of the learner.

2.4.1 Teacher Quality

The qualification, attitude and characteristics of a Mathematics teacher can influence students' performance a great deal. Depending on how he/she handles the subject and students they may either like or hate the subject.

Students usually observe their teacher when he /she come to class and they will assess him/her from all angles. His/ her appearance, clothing, personality and the way he/she uses language. After being taught for some time, they will have known the teacher well enough to judge him (Ayot et al 1987 pp 198). The teacher of Mathematics should design tasks that should do in order to discover Mathematics facts.

This can be done in small groups that accord a learner an opportunity to contribute. Group findings can be presented to the class and form the basis of discussion. These require great care and planning and time to design tasks for group activities.

(Otieno, Onditi, 1996), observe that, this is a technique many pupils appreciate and understand but which teachers find difficult to implement. Group work takes the act of doing for the teacher and places it where it belongs, on the learner. Textbooks should be mainly used as reference materials rather than courses of study” (pp 16).

On making assignments and exercises given in class, (Wilkins, 1975) observes that for effective evaluation, the teacher has to make the work, being attentive to the procedures followed by an individual students in problem solving. Marking assists the teacher to:

Identify the student’s mistakes and help to adopt the correct procedure of problem solving

Show the learner correct procedure and why the learner was unable to obtain expected solution.

2.4.2 Usefulness of Mathematics

Industrialization depends on having a workforce extremely skilled in many aspects of Mathematics. Ashworth, 1981 comments that “Mathematics is necessary in the study of most science subject.” (pp23) perhaps that’s why students are avoiding Mathematics. Only 26.98% of the total number of students who sat for KCSE in the year 2004 did Mathematics. Mathematics is useful as it is a requirement for most professional courses and also applicable in daily life.

“80% of secondary school leavers who fail in Mathematics are technically barred from entering many professions.” (Muya, 1996 pp 13).

2.4.3 Teaching Methodology

From an article carried in Daily Nation (Kanyandon'g, 2002) says, the can is used against pupils who do not do well in Mathematics. This in turn perpetuates hatred and students tend to lose interest. A teacher is supposed to be warm and understanding above all gives encouragement to his or her student.

Mathematics teachers sometimes use poor, methods of teaching such as lecturing; this method does not give a learner an opportunity to participate. Instead methods like group discussion and assignment should be adopted. Learners should be given a chance to go to the board to present their findings in class. This in turn can be another basis of a discussion for the whole class.

2.4.4 In-service Courses

College degree alone may not be a prerequisite to effective teaching. Teachers need to upgrade and come into realities with emerging issues so as to guide learners well. The fact that some other teachers are not trained is indeed an added advantage to effective teaching (SMASSE, 2002).

The most popular teaching methods in school are teacher-centered and include lecturing and note taking. Attending seminars such as SMASSE (Strengthening Mathematics and science in Secondary Education), may make the teachers to change his/her approaches.

It is also alarming to note that about 70% of those admitted to colleges to train as teachers in 2002 failed Mathematics at form four, with less than 5% having recorded B+ and above (SMASSE Survey: Teacher weekly June 2002)

The fact is that these are the teachers that are expected to give a foundation to students before joining secondary education. It is therefore very likely that incompetence or some

negative attitude may be noticed in them and this gives learners an impression that Mathematics is “a tough “subject.

2.4.5 The Learning Environment

Different environments affect learners in varied ways, it has been observed that they greatly affect and influence their attitude and performance in Mathematics.

Home environment may enhance positive esteem which may improve the academic performance especially the parents’ and not their status (Cooper, 1987).

Among children with good education capacity as estimated by intelligence tests those from better home conditions were more successful in school (Punset, 1989). It is possible for parents who are knowledgeable and are at the same time willing to boost the attitudes of their children, parental influence which is more in the home environment can greatly affect the attitude of learners towards any subject.

“We believe therefore, that it is more important for schools to make active efforts to enlist the help of explaining the approaches to Mathematics which they are using and the purpose of Mathematics activities which parents themselves may not have undertaken while in school (Co Kraft, 1981.pp 62).

In view of the above literature, it was therefore important to establish the impact of the said factors since Mathematics is very essential in day to day activities. It is therefore important to note that the researcher hope to establish findings that will enable both the curriculum developers, implementers and parents to adopt guidelines that will make Mathematics objective measurable and achievable.

CHAPTER THREE

METHODOLOGY

3.0 Overview

The purpose of this study was to establish the extents the teachers' quality and use of teaching resources can affect performance in Mathematics. This chapter deals with the methodology and procedures that was followed in carrying out this study.

3.1 Research Design

The research design in this study was both descriptive and analytical where by both quantitative and qualitative methods were used to analyze the research topic. Qualitative research involves emphasizing meanings, experiences and descriptions. The qualitative design was used to obtain depth information about the resources, quality of teachers and quality of education in relation to performance in mathematics. Quantitative design involved the use of questionnaires to obtain statistical data from the head teachers and teachers.

The sampling design selected three schools that participated in the study. Purposive sampling was used to select the schools, which represented the whole of Matuga division, Kwale district, Coastal province.

3.2 Population

The research study targeted a total of six hundred students and Mathematics teachers. From the students' population, only upper primary pupils were considered for the basis of this study.

3.3 Sample and Sampling Technique

A sample of 150 was considered for the purpose of the study. Simple random sampling was the major technique through strategic sampling technique was used where schools are mixed (boys and girls), followed by simple random sampling. This ensured gender balance in missed schools. Simple random sampling was chosen to be the major technique because it gave the chosen population an equal an opportunity to be included in the sample. The sample populations were required to fill in a questionnaire.

3.4 Research Instruments

Data was collected from both primary and secondary sources. Secondary data was got by extracting information regarding the student's attitudes towards the performance of science subjects in secondary school by reading newspapers, journals, text books plus the already existing work in the internet and magazines. Primary data was got from the field by the use of the following methods;

3.4.1 Interviews

This involved face to face interaction between the researcher and the participant through discussion. The interviews were of two ways, namely:

Structured interview in which the responses by the participants will be brief and specific.

Unstructured interviews, where the responses were long, elaborated and not specific, the interviews were conducted in group, individual.

The researcher carried out interviews with teachers and head teachers, using the interview guide because it is the most appropriate method which can be used to study the attitudes,

values, beliefs and motives of people. It also has an element of flexibility. These persons were interviewed individually so as to get independent answers.

3.4.2 Observation

This involved the use of personal intuition based on different body senses, for example seeing (eye) hearing (ear) touching (hand) smelling (nose). Observation can be used in three main ways, namely (i) Naturalistic observation. Here, the presence of the researcher is not known. He will hide himself (ii) Passive observation. The presence of the researcher was known but his role in the activity was hidden. He did not participate at all. (iii) An active observation. The presence of the researcher was known to the participants. The observer played a leading role to bring out information.

3.4.3 Questionnaires

This is the discussion in written form whereby the responses of the participants are put on paper provided by the researcher, the questionnaire was also be in two forms, namely: Open-ended questionnaire in which the responses by the participants are free according to their understanding.

The close-ended questionnaires in which responses are provided by the researcher and the participants one of them accordingly, for example strongly agree, agree or strongly disagree.

The researcher left out questionnaires to mainly the literate group. These included; staff members and some students. These had guiding questionnaires which the researcher gave to individual respondents to fill. The researcher gave some two days to respondents to

study and fill the questionnaires. He requested the respondents to ask for clarification where they did not understand.

The main instrument used by researcher was the questionnaire, one for the Mathematics teachers and the other for students. Those questionnaires are included in the appendix.

- ☒ The student's questionnaire was intended to provide information about their interests, experiences, attitude and their source of motivation.
- ☒ The teacher's questionnaire was intended to provide information about their qualification, teaching methodology and resources, working experiences and personal opinion.

3.5 Procedure

To ensure that the research instrument was valid and consistent, the researcher administered nine questionnaires to students and three questionnaires; they were collected and analyzed statistically. For direct observations, the researcher requested for permission to attend randomly selected lessons in some schools to observe teaching methodology and use of resource material.

3.6 Data Analysis

The data filled in the questionnaires was copied and analyzed by tallying it and tabling it in frequency tables identifying how often certain responses occurred and later evaluation will be done. The information was later be recorded in terms of percentages.

The recorded data was later edited and interpreted which ensure uniformity, legibility and consistence. Also, interview results were coded on frequency tables and be calculated in terms of percentages and presented in this study.

This was done to ensure that all answers obtained from various respondents are given codes and classified into meaningful forms for better analysis, as they were be later entered in a computer package MS-Excel for analysis.

3.7 Limitation of the Study

In conducting this study, a number of challenges were encountered such as;

- ❑ Attitude towards the exercise- some respondents were unwilling to freely share the information (especially negative information). This is mainly true at the local level because of fear not knowing whether the information could go to their superiors with repercussions.
- ❑ There was problem with self expression especially below average students. This forced the researcher to use Swahili language.
- ❑ Due to other responsibilities, the researcher had inadequate time.

CHAPTER FOUR

PRESENTATION, INTERPRETATION AND ANALYSIS OF DATA

4.0 Overview

This chapter presents the findings from the field work. It gives clear solutions to the research objectives stated earlier to guide the study.

4.1 Back ground characteristics of respondents

Table 4.1 Distribution of Respondents by age in years

Class (years)	x	f	fx
18 – 25	21.5	7	150.5
26 – 34	30.0	30	900.0
35 – 44	39.5	13	513.5
Total		$\sum f = 50$	$\sum fx = 1564.0$

Mean of the distribution of ages

$$\text{mean} = \frac{\sum fx}{\sum f} = \frac{1564.0}{50} = 31.28$$

$$= 31.28 \text{ years}$$

Table 4.2 Distribution of respondents by teaching experience in years

Class (years)	x	f	fx
0 – 5	2.5	32	80
6 – 10	8.0	8	64
11 – 15	13	10	130
16 >	0	0	0
Total		$\sum f = 50$	$\sum fx = 274$

Mean of the distribution of teaching experience

$$\text{mean of experience} = \frac{\sum fx}{\sum f} = \frac{274}{50} = 5.48$$

$$= 5.48 \text{ years}$$

4.2 Teacher Quality

Table 4.3: Academic/Professional Qualifications of Teachers

Academic/Professional Qualification	Number	%
KCSE/KACE	-	-
DIPLOMA	2	20
BSC/BA	2	20
BED	6	60
TOTAL	10	100

Source: primary data 2009

From table 4.3, it suggests that the majority of the teachers teaching Mathematics in Matuga Division are trained (i.e. 70%) however; all the teachers trained are acquainted with the teaching of current 8-4-4 Mathematics syllabus. From analysis, it is realized that only 40% of the teachers are trained to teach the current Mathematics syllabus of the 8 -4 - 4 system of education. This is shown in table 4.4.

Table 4.4: Teachers Trained To Teach Current 8-4-4 Mathematics Syllabus

Training	Number	%
Trained to teach the current 8-4-4 Mathematics syllabus	4	40
Not trained to teach 8-4-4 syllabus	6	60
TOTAL	10	100

Source: primary data 2009

Table 4.5: Teaching Methodology

Method	Hardly ever		Neutral		Occasionally		Regularly		Much Regularly	
	NO	%	NO	%	NO	%	NO	%	NO	%
Lecture Method	-	-	-	-	2	20	3	30	5	50
Inquiry/Delivery	8	80%	1	10%	10	10%	-	-	-	-
Group discussion	5	50%	-	-	4	40%	1	10%	-	-
Questions/Answer, Method and reinforcement	-	-	-	-	-	-	1	10%	9	90%
Set induction	7	70%	3	30%	-	-	-	-	-	-
Verbal exposition	6	50%	4	40%	-	-	-	-	-	-
Using examples and illustrations	-	-	-	-	-	-	-	-	10%	100%

Source: primary data 2009

From table 4.5, it indicates that the methods are teacher centered as opposed to student centered. Teaching methodology in which a student discovers are given little references simply because they may take time and are quite involving.

As a result teachers use methods that are easier but not appropriate in teaching a particular topic. It is evident that most teachers each using examples and illustrations.

Table 4.6 Teaching Methodology and Use of Teaching Resources

Key: S/A – Strongly Agree, D – Disagree, N- Neutral, A – Agree, & D- Strongly disagree

Statement	S/D		Disagree		Neutral		Agree		S/A	
	No	%	No	%	No	%	No	%	No	%
Teacher encourages discussion in small groups during math lesson	18	15	60	50	20	16 ² / ₃	18	15	4	3 ½

Teachers allows you to solve problems on the board during math lesson	-	-	18	15	30	25	48	40	24	2
Teachers encourage you to go for consultation	20	16 ² / ₃	42	35	18	15	18	15	15	12
It is easy to understand during consultation than lesson time	-	-	-	-	15	12	21	17 ¹ / ₂	84	70
Teachers use models, charts graphs when teaching	60	50	30	25	12	10	18	15	-	-
Teachers guidance is essential for easy understanding of Mathematics	-	-	-	-	-	-	48	40	72	60
I have group activities	20	16 ² / ₃	40	33 ½	18	15	42	15	-	-

Source: primary data 2009

From table 4.6, it seems to suggest that students strongly feel that they understand concepts easier during consultation time. 100% of the students feel the students felt that the teacher's guidance is very essential. On a close examination, 80% of the students feel that the teaching resources are not used during the mathematics lesson. A group activity in which a learner has total control has been given priority.

It is therefore important to note that for effective consultation, the quality of the teacher is important. It is also alarming to note that 80% of the teachers do not use teaching process.

Table 4.7 Guidance in teaching Mathematics

Key: S/A – Strongly Agree, D – Disagree, N- Neutral, A – Agree, & D- Strongly disagree

Aspects	S/A		S/D		D		N		A	
	No.	%	No.	%	No.	%	No.	%	No.	%
Teacher method	-	-	3	30	-	-	6	70	1	10
Depth of coverage	-	-	-	-	-	-	8	80	2	20
Scope of coverage	-	-	-	-	2	20	5	50	3	30
Area of emphasis	-	-	4	20	2	20	2	20	2	20
Recommended textbooks	-	-	4	40	2	20	2	20	2	20

Source: primary data 2009

From the table 4.7, suggest that in most schools of Matuga Division, emphasis has been laid on recommended textbooks. This means that, teacher do not get a chance to get varied approaches in the teaching of the subject. It also indicates that most schools emphasize on the depth of coverage but have done little in the area of emphasis; this means that students don't get to know and prepare for areas which are mostly tested.

Table 4. 8: Teaching and Personal Opinion

Statement	S/agree		Agree		Neutral		Disagree		S/Disagree	
The school has enough text books for teaching Mathematics	-	-	-	-	-	-	8	80	2	20
The school has enough models and charts for teaching Mathematics	-	-	-	-	-	-	9	90	1	10
Students should be assessed at the end of every topic	3	70	8	80	-	-	-	-	-	-
There are some Mathematics topics in the syllabus that are difficult to understand	2	20	7	70	1	10	-	-	-	-

The head teacher encourages and provides for use of teaching resources	-	-	6	60	2	20	2	20	-	-
There is team teaching among the Mathematics teachers	-	-	1	10	4	40	-	-	5	50

Source: primary data 2009

From Table 4.8, it suggests that text books for teaching are not adequate. 100% of the teachers felt that it's a reason why they do not give enough homework. All teachers seemed to concur with the fact that there are no models and charts for teaching. They felt that it makes their teaching very abstract and that it could be much easier if these resources were availed. Although most teachers agreed that it is important to give assessment for every topic, in reality this was not confirmed to take place. Otherwise they felt it could be another burden if they did so. Although 60% of the teachers agreed that their head teacher encouraged the use of teaching resources, little was done to avail them, otherwise the stressed on improvisation. There is a controversy in team teaching. 50% felt it was important through they stressed that with the workload, this was impossible. Most of them could wish it was done but because of the situation they found it better for each teacher to handle his or her own class.

4.3 Learning Resources

Table 4.9: Average Number of Students per Mathematics Textbook.

Average number of copy	No	%
2	1	25
3	2	5
None	1	25
Total	4	100

From Table 4.9, it suggests that there is a serious lack of Mathematics textbooks in most of the schools in the district. There is a case where students are not allocated completely. It is also evident from the responses that most of the classes are above forty surprising the recommended ratio.

Table 4.10 Mean Score for Mathematics for the past 5 years at KCSE level of 4 studied schools.

YEAR	A	B	C	D
2002	3.15	3.79	4.98	7.77
2003	2.94	3.97	4.98	7.16
2004	3.18	3.52	5.00	6.01
2005	3.20	3.75	5.68	6.40
2006	2.98	3.78	5.44	6.77
2007	2.35	2.65	5.68	5.60
2008	3.78	3.98	5.52	5.10

From table 4.10, indicates that there has been poor performance in Mathematics in the Matuga Division schools. It is even worse to note that performance is declining year after year. Apart from school C performance seems to be constant, other schools shows a great disparity.

Table 4.9 below shows the type of schools and the number of students who gave responses to the questionnaires. It also shows the gender consisted in the sample group.

Table 4.11: Type of School and Number of Students and Teachers Used.

Type of School	No of students		No of Teachers		Total
	Boys	Girls	Male	Female	
Boys boarding	28	-	2	1	31
Girls Boarding	-	28	1	2	31
Mixed day	15	15	1	1	32
Mixed day and boarding	12	12	2	-	26
Totals	55	55	6	4	120

4.4 Relationship between Teachers –Pupil Ratio (TPR)

Table 4.12 provides details of the teacher pupil ratio in the sample schools. Poor performance (84%), large teacher pupil ratio (64%) and automatic assessment of pupils were among the most cited reasons for poor performance in relation to TPR. On average, PTR was 70:1 in Matuga Division, prohibiting teachers from giving children individual attention or helping those learners that needed special help. Attention in overcrowded classrooms was mostly given to the brighter students, while those that were weaker were left behind.

Table 4.12 Relationship between teacher pupil ratios

Respondents	1	2	3	4	5	Total
Large teacher pupil ratio	32	14	1	1	0	50
	64%	28%	2%	2%	0%	100%
Poor performance	42	4	4	0	0	50
	84%	8%	8%	0%	0%	100%
Automatic assessment	20	8	0	6	18	50
	40%	16%	0%	12%	36%	100%
Increased teaching	0	0	0	5	45	50
	0%	0%	0%	10%	90%	100%
Total	94	26	5	12	63	189
	49.74%	13.76%	2.65%	6.35%	33.33%	100%

Note the rating scale:

1. Strongly agree
2. Agree
3. Not sure
4. Disagree
5. Strongly disagree

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 *Overview*

This chapter concentrates more on the summary, conclusions and recommendations. It also shades light on the areas which need more attention in the face of the same study.

5.1 **Discussion**

The following objectives were studied:

(i) To examine the effect of teaching resources used in Mathematics on its performance at KCSE level (ii) To analyze the relationship between teacher-pupil ratios Matuga Division (iii) To examine the effect of the teacher quality on the performance of Mathematics.

From the results discussed in chapter four, it indicates that very few schools use teaching resources in their Mathematics lessons. And indeed some of these schools have recorded an improved performance. Most teachers are trained but are not very conversant with the requirements of the new syllabus, and these seem to affect the result. In schools where in-service courses have been given priority, an improved performance has been recorded.

The second objective was to analyze the teacher pupil ratio in the selected schools in Matuga Division. The findings showed that there is a great need of additional teachers into this programme of FSE for it to succeed since the teacher pupil ratio is alarming.

5.2 Conclusion

In this study, the finding is that there is a strong relationship between the quality of teachers and use of teaching resources and the general performance in Mathematics

Therefore, these factors should be given priority if performance has to be improved in the Matuga Division Schools; it thus indicates that school administrators should pump resources to ensure that the researched factors are addressed. In addition: Investment in post primary education a must (expansion and quality improvement); Investment in programs that bridge the gap between academics, policy makers and implementers; Investment in research, publications, effective dissemination, experience sharing and Promotion of solutions that are more locally oriented.

5.3 Recommendations

- ❑ Curriculum developers should reduce the work volume so as to avoid cases whereby teachers rush through the syllabus.
- ❑ All teachers teaching Mathematics should attend year to year in-service courses so as to 'keep abreast with emerging challenges in the teaching of Mathematics.
- ❑ School administrators should ensure that necessary resources for smooth teaching of Mathematics are put in place.
- ❑ Teachers should ensure that, their methodologies are interesting to the learner so as to make lessons enjoyable rather than the normal boring sessions as witnessed in this study.

5.4 Areas for Further Research

- ✘ Apart from teaching resources and teacher quality, other factors that need to be researched so as to come up with better results include: Student teacher ratio. Socio economic backgrounds; Student environment; Student's attitude
- ✘ Face to face interviews should be intensified and actual classroom teaching should be encouraged to enable the research to get relevant data.
- ✘ The research should be conducted for a longer period, at least two years and if possible have a control experiment.

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APPENDICES

APPENDIX A

Students Questionnaire

You are kindly requested to attempt out the questions in this questionnaire. You are not required to write your name and your identity will be kept anonymous.

Please Attempt all questions

Tick where applicable.

i. Gender and form

Male () female ()

Which form are you?

Form Three () Form four ()

ii. Teaching Methodology and use of teaching resources

Below is a list of statements relating teaching methodology and use of resources. Use the suggested scale to rate the name according to your opinion.

Circle the appropriate score

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

STATEMENT

SCORE

a) Teacher encourages discussion in small groups during math lesson	1 2 3 4 5
b) Teacher allows you to solve problems on the board during math lesson.	1 2 3 4 5
c) Teacher encourages you to go for consultation	1 2 3 4 5
d) It is easy to understand during consultation than lesson time.	1 2 3 4 5
e) Teacher uses models, charts, or graphs when teaching	1 2 3 4 5
f) Teacher's guidance is essential for easy understanding of Mathematics	1 2 3 4 5

- g) You have group activities 1 2 3 4 5
- h) Mathematics textbooks are adequate in school library 1 2 3 4 5

iii. Attitude and motivation

Below is a list of statements relating to attitude and motivation, use the suggested scale to rate them according to your opinion, circle the appropriate score.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

<u>STATEMENT</u>	<u>SCORE</u>
a) Some topics are difficult to understand in Mathematics syllabus.	1 2 3 4 5
b) I like math assessment.	1 2 3 4 5
c) I like mats because my parents encouraged me to do it.	1 2 3 4 5
d) I do Mathematics because I would like to pursue a course in Mathematics after school.	1 2 3 4 5
e) I do Mathematics because it is a compulsory subject.	1 2 3 4 5
f) I like Mathematics than other subjects	1 2 3 4 5
g) Explanations given by my teacher on some Mathematics concept are really motivating.	1 2 3 4 5
h) I only like some topics in Mathematics that are simple and interesting	1 2 3 4 5
i) Mathematics is a hard subject to understand	1 2 3 4 5
j) Mathematics assessments should be given more frequently	1 2 3 4 5

APPENDIX B

Teachers Questionnaire

The following is a questionnaire that intends to establish the learning conditions and learning of Mathematics in your school. The identity of the respondent to the questionnaire is assured anonymity.

Please Attempt all questions.

Tick where applicable

I.) 1. Gender

Male ()

Female ()

2. What is your academic/ profession qualification?

K.C.S.E/K.A.C.E ()

DIPLOMA ()

BSC/BA ()

BED ()

Any other-----

3. Are you trained to teach the current 8-4-4 Mathematics syllabus

YES ()

NO ()

II. Teaching methodology

Below is a list of methodology that can be used in the teaching of Mathematics in your school. Use the suggested scale to rate them according to your opinion.

Circle the appropriate score.

1. Hardly ever

2. Neutral

3. Occasionally

4. Regularly

5. Much Regularly

STATEMENT

SCORE

a) Lecture method

1 2 3 4 5

b) Inquiry/discovery method

1 2 3 4 5

c) Group discussion

1 2 3 4 5

- | | |
|--|-----------|
| d) Questions/Answer method and reinforcement skill | 1 2 3 4 5 |
| e) Set induction | 1 2 3 4 5 |
| f) Verbal exposition | 1 2 3 4 5 |
| g) Using examples and illustration | 1 2 3 4 5 |

III. Issued Guideline

Below is a list of statements regarding the guidelines that can be issued in your school for the purpose of teaching Mathematics use the suggested scale to rate them according to your own opinion. Circle the appropriate score.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

STATEMENT	SCORE
a) Teaching method	(1) (2) (3) (4)(5)
b) Depth of courage is stressed	(1) (2) (3) (4)(5)
c) Scope of courage is stressed	(1) (2) (3) (4)(5)
d) Area of emphasis is given	(1) (2) (3) (4)(5)
e) There are recommended textbooks for teaching	(1) (2) (3) (4)(5)

IV. Tick where applicable regarding the following questions.

- a) How many textbooks have been recommended for us in your schools?

Only one () Two () Three () None ()

- b) How many students have you allocated per Mathematics textbook?

Only one () Two () Three () None ()

- c) How many students do you have in your class?

Less than 25 () Less than 40 () Above 40 ()

V. Teaching \resources and personal opinion

Below is a set of statements regarding teaching resources and your personal opinion use the suggested scale to rate them according to your opinion.

Circle the appropriate score.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

a) The school has enough textbooks for teaching (1) (2) (3) (4) (5)

b) The school has enough models and charts for teaching
Mathematics (1) (2) (3) (4) (5)

c) Students should be assessed at the end of every topic (1) (2) (3) (4) (5)

d) There are some Mathematics topics in the syllabus that are
difficult for students to understand. (1) (2) (3) (4) (5)

e) The head teacher encourages and provides for use of
teaching resources. (1) (2) (3) (4) (5)

f) There is team teaching among the Mathematics teachers (1) (2) (3) (4) (5)