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A STUDY OF THE RELATIONSHIP BETWEEN TEACHERS'  
ATTITUDES TOWARDS MATHEMATICS AND PUPILS'  
PERFORMANCE OF MOCK EXAMINATIONS AMONG  
STANDARD EIGHT PUPILS IN ELDORET  
MUNICIPALITY )

A RESEARCH PROJECT SUBMITTED IN PARTIAL  
FULFILMENT FOR THE DEGREE OF MASTER OF  
EDUCATION (P.T.E).

BY

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*A study of the  
relationship between*



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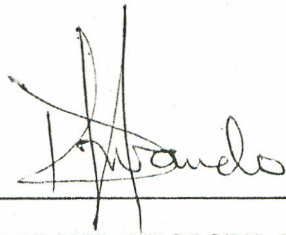
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DECLARATION

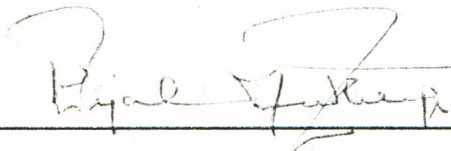
This Research Project is my original work and has not been presented for a degree in any other University.



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This Research Project has been submitted for Examination with my approval as a University Supervisor.



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DEDICATION

This project is dedicated to my beloved parents for their sincere guidance and advice.

To my beloved wife, Margaret, whose sacrifice, patience, understanding and encouragement were instrumental to its completion.

To Eunice and Sally who always missed my fatherly presence during the course of my study and when carrying out this Research Project.

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## ABSTRACT

The objective of the study was to investigate the nature of attitudes held by Standard Eight mathematics teachers and whether those attitudes affect their pupils' achievement in Mock Examinations. The study also aimed at finding out the influence of the teachers' background such as gender, grade, teaching experience, academic and professional qualification on their attitudes.

The sample used in the study consisted of twenty-six teachers (8 females and 18 males) selected from fifteen schools which were randomly selected among twenty-four schools in Eldoret Municipality.

The data was collected by use of the following; attitude test and mock examination results. For attitude test, a questionnaire was used where points were awarded depending on the type of feeling manifested. Mock Examination results were obtained from the municipal education office and headteachers.

Scores were analysed by the use of percentages, means and t-tests.

The main findings of the study were:

- (1) Primary school mathematics teachers in Eldoret Municipality had in general positive attitudes towards mathematics.

- (2) There was significant difference in performance between pupils taught by teachers with positive attitudes and those taught by teachers with negative attitudes.
- (3) There was no significant difference in mean scores between male and female teachers in the attitudes they hold towards mathematics.
- (4) There was no significant difference in mean scores between teachers with different backgrounds (grade, teaching experience, academic and professional qualification).

It was found that teachers' attitude has some influence on pupils' achievement. It is therefore suggested that

- (a) teachers must themselves develop positive attitudes in order to promote achievement amongst their pupils.
- (b) teachers should be provided with in-service courses so as to motivate them and provide positive attitude in mathematics.

It is further suggested that research be carried out to cover a wider area with more schools, pupils and teachers. It is also recommended that more research

be undertaken to investigate other possible factors such as pupils' attitudes, cultural norms, social interaction among teachers and pupils which are likely to affect the pupils' performance in mathematics.

## CHAPTER ONE

### BACKGROUND TO THE PROBLEM

#### 1.0 INTRODUCTION

Mathematics is one of the many subjects in the school curriculum. There is greater pressure however for children to succeed in mathematics than in many other subjects for example; Geography, History and Civics.

The importance of mathematics is expressed in the Cockroft Report of 1982, p.1 which observes:

"There is no doubt that there is general agreement that every child should study mathematics at school; indeed, the study of mathematics together with English is regarded by most people as being essential".

The usefulness of mathematics to the child and society can be perceived from many different perspectives. For many it is seen in terms of arithmetic skills which are needed for use at home, in the office or workshop. Others perceive mathematics as the basis of scientific and modern technology. Mathematics is therefore a strategic subject, because science and technology on which economic progress depend, always require a thorough grounding in mathematics, if they are to be thoroughly studied and successfully incorporated

in the overall development.

Due to the overall importance in the various aspects of life, mathematics is a basic requirement for study of several other subjects at secondary, in teacher training colleges, other training institutions and in several employment sectors. Therefore, mathematics, being a service subject to others, has some influence in the courses a student can taken at various institutions or employment opportunities. Poor performance in the subject implies that a large number of students are being examined for the purposes of selection for further studies or employment purposes where they may not excel.

However, inspite of its importance in the various aspects of development, performance in mathematics has not been impressive.

A lot of concern has been expressed by parents, teachers, politicians, educational administrators and the general public on the poor performance in mathematics.

Infact, Mango (1987) while addressing Parliament in Kenya called for a probe into mathematics due to poor performance of students in the national examina-

tions. Similar sentiments were expressed by Kiragu (1986, p.6.):

"Despite national efforts made in developing a curriculum that is appropriate to the needs of this country, coupled with teacher training efforts, performance in KCE has been relatively poor over the last ten or so years and particularly in mathematics".

This trend has continued as can be evidenced by the Kenya National Examinations Council (KNEC) Newsletter which shows that performance in mathematics has undergone a gradual decline with exception of 1990 when there was a slight improvement.

TABLE 1

National Raw Mean Mark from 1986 to 1990 KCPE:

Mean Scores for Mathematics

Year	1986	1987	1988	1989	1990
Mean Scores	23.57	20.32	22.15	19.15	24.23

SOURCE: Kenya National Examinations Council (KNEC), KCPE Newsletter 1990.

At the Municipal level, a similar trend can be observed. There has been a gradual decline in mathematics performance in KCPE from 1986 to 1990. With only a slight improvement in 1988 as shown in Table 2.

TABLE 2

KCPE Mean Scores for Eldoret Municipality

From 1986 to 1990

KCPE: Mean Scores for Mathematics

Year	1986	1987	1988	1989	1990
Mean Scores	27.39	27.11	28.35	23.94	23.12

SOURCE: Kenya National Examinations Council (KNEC), KCPE Newsletter 1989, 1990.

The performance in mathematics in the Municipality is better when compared to the national performance with the exception of 1990 when the performance was poor as compared to the national performance.

The causes of this relative poor performance to the subject has not been fully identified to allow for solutions to be found. Due to this situation we find that, at the beginning of every year, there is a tendency of parents, pupils, educational administrators and the general public to blame teachers.

Eshiwani (1983) notes that many of the primary school mathematics teachers are poor in the subject. As a consequence it is possible that mathematics is poorly taught and learned in primary schools. He says that as result, there would be poor performance in mathematics at all levels in primary school.

Maranga (1982): p.13) in support says:

"Most of the teachers in both primary and secondary schools are ill-equipped and are not capable of taking this country into the next century with sound education".

Teachers have also been accused of adopting a relaxed attitude towards their work. There are also complaints that some teachers regard teaching as a job which they simply do to earn a living and they have no real interest in it.

Onyango (1992) in a paper presented to a mathematics symposium observed that teachers who are not committed to their profession are unlikely to inspire their students.

Many educators agree that there are numerous factors which determine pupils' performance. Poor teaching method is one of the factors, in respect to this, the Kenya Government has placed a lot of effort in

the training of teachers so as to improve their teaching. Many of the primary school teachers are trained and of late new teachers' training colleges have been set-up to accommodate more teacher trainees.

With the introduction of cost sharing, facilities for teaching and learning have improved. The parents' concern on their children's achievement is reflected in the extent to which they go in search of schools and the amount of money they are willing to spend on school facilities.

A lot of emphasis is being placed on KCPE as a basis for evaluating the competency level of primary school graduate. However, less emphasis has been placed on the actual contribution of pupils' and teachers' attitudes.

In primary schools teachers are expected to be able to teach all the subjects offered. For many generalists, the paramount questions are interest in mathematics and the effect of past experience in school. It is generally believed that people will learn more effectively when they are interested in what they learn and that they will achieve better in mathematics when they like the subject. Therefore, continual attention should be directed towards

creating, developing, maintaining and reinforcing positive attitudes. For teachers to do so, they must have a positive attitude towards the subject. Since it is only then that they may be able to make use of the most effective methods of instructions with respect to syllabus, teaching aids and teaching techniques.

According to Caldwell (1972) in Orton (1987) a neutral or negative attitude may influence the teachers in two ways:

- (i) Some teachers may simply avoid the teaching of the subject.
- (ii) Others may pass to the young students a negative attitude.

It is possible that there exists many complex factors which result in poor achievement in mathematics. One of the reasons for undertaking the study was therefore an attempt to find out whether teachers' attitudes towards mathematics is one of the factors which determine poor performance in mathematics.

#### 1.1 STATEMENT OF THE PROBLEM

Most educators do agree that attitudes play an important part in the learning process. They believe

that attitudes formed early in life persists throughout life. These attitudes can be learned or acquired through our cultural backgrounds, environment, peers, parents and teachers. Attitudes held towards mathematics from any of these areas, may determine how one performs in mathematics.

Since children grow up in the home and later move to schools, these two environments are built to inculcate attitudes in children.

At school, teachers are the pupils model and pupils copy them. It is from this copying that pupils acquire the teacher's attitude towards the subject, thus develop an attitude towards the subject which may be reflected in their achievement.

Therefore, the major responsibility of developing desirable attitudes towards mathematics, lies on the teacher.

For teachers to do so, they must have a positive attitude towards the subject. A positive attitude towards the subject by the teacher will enhance the teacher's commitment in the subject, thus motivate the children who eventually develop positive attitude towards mathematics and thus perform better in the subject.

The purpose of this study was to find out the relationship between teachers' attitudes and pupils' performance in mathematics.

The research topic was:

"A Study of the relationship Between Teachers' Attitudes Towards Mathematics and Pupils' Performance of Mock Examinations Among Standard Eight Pupils in Eldoret Municipality".

More specifically, the study investigated the following variables which were believed to be relevant:

- (i) Teachers' attitude towards mathematics (as measured by Likert type attitude scale).
- (ii) Teachers' grade, experience, gender, academic and professional qualification and subsequent attitudes towards mathematics.
- (iii) Pupils' achievement in mathematics (based on the score attained in mock examinations).

## 1.2 PURPOSE OF THE STUDY

The study focussed on the attitudes of Standard Eight teachers towards mathematics, as measured by a Likert type instrument and related those findings to the

actual results obtained by the pupils in Mock Examinations.

The investigator looked at the following:

- (i) The attitudes held by Standard Eight teachers towards mathematics.
- (ii) Whether such attitudes affect their pupils' achievement in mathematics Mock Examinations.

### 1.3 RESEARCH QUESTIONS

The study aimed at finding answers to the following questions:

- (a) Is there any relationship between teachers' attitudes towards mathematics and pupils' achievement in mathematics?
- (b) Is there any relationship between years of experience and teachers' attitude towards mathematics?
- (c) Is there any relationship between teachers' professional qualification and teachers' attitude towards mathematics?

- (d) Is there any relationship between teachers' attitudes towards mathematics and teachers' academic qualification and distinction in mathematics?
- (e) Is there any relationship between teachers' attitudes towards mathematics and the sex of the teacher?

#### 1.4 HYPOTHESES OF THE STUDY

The following hypothesis was generated:

HO: There is no significant difference between teachers' attitudes towards mathematics and their pupils' achievement in mathematics.

From this main hypothesis, the following sub-hypotheses were generated:

HO<sub>1</sub>: There is no significant difference in attitude towards mathematics between male and female teachers.

HO<sub>2</sub>: Teachers with different professional qualifications do not have different attitudes towards mathematics.

- HO<sub>3</sub>: Teachers years of experience does not influence their attitudes towards mathematics.
- HO<sub>4</sub>: Teachers with different academic qualifications do not have different attitudes towards mathematics.

### 1.5 ASSUMPTIONS OF THE STUDY

In this study, the following assumptions were made:

- (i) that all pupils sampled came from and lived within the municipality and therefore had similar environmental conditions.
- (ii) that all schools in the municipality are manned by trained staff.
- (iii) that Mock Examination at Standard Eight is set by a panel of teachers and therefore has some validity and reliability.
- (iv) that all schools in the municipality have had a uniform and adequate coverage of the syllabus which is examined by the mock examinations.

## 1.6 SIGNIFICANCE OF THE STUDY

The results of this study can be useful to parents, teachers, educational administrators and curriculum developers. The results could cause a review of the curriculum of teacher training colleges and perhaps modify their selection criteria so as to increase the mathematical expertise of primary teacher trainees.

Teachers may modify their teaching approach to foster positive attitudes. Teacher educators may as a result, strive to foster positive attitude and deepen students knowledge of mathematics.

## 1.7 LIMITATIONS OF THE STUDY

This study was limited by a number of factors. First, the sample used might have been too small only fifteen schools out of twenty-four in the municipality were used. Secondly, the findings obtained should not be generalized to other areas of the republic. Other factors such as geographical features, cultural traditions and historical developmental stages of learners are not likely to be the same elsewhere.

## 1.8 ORGANIZATION OF THE REST OF THE STUDY

Chapter Two is on review of literature related to the research.

Chapter Three outlines the methodology of the study which includes description of the sample, instruments used and the procedures used in this study.

Chapter four outlines the analysis and interpretation of data.

Chapter Five is on summary, conclusion and recommendations.

## 1.9 DEFINITIONS OF TERMS

### (a) Performance Criteria

Marks obtained from mathematics test as given in percentages.

### (b) Mock Examinations

An examination taken to prepare pupils for the main KCPE examination (which is certified).

It mimics the KCPE for it has the same format.

### (c) K.C.P.E.

Kenya Certificate of Primary Education is a national examination which pupils sit for at the end of eight years of education.

(d) Attitude

An individual's organized manner of thinking, feeling and reacting to people, objects or events in the environment.

(e) Positive Attitude

Are expressions of feelings which are more or less favourable. Any teacher who agrees with the statement such as mathematics is interesting is said to have a positive or favourable attitude.

(f) Negative Attitude

Are expressions of feelings which are more or less unfavourable. Any teacher who disagrees with the statement such as mathematics is interesting is said to have a negative attitude or unfavourable attitude.

(g) K.N.E.C. - (Kenya National Examination Council)

This is the body that sets and evaluates the national examinations.

(h) T.T.C's - (Teachers' Training Colleges)

Institutions which train Primary School Teachers.

(i) Teaching Experience

As used in the study refers to the number of years a teacher has taught primary school mathematics.

(j) Professional Grade

Refers to professional level of attainment or qualification. It also refers to teachers' professional certificate for example P1, P2, P3, S1.

(k) P1

This refers to 'Primary One' which is a professional grade attained after two years of training in a T.T.C. Other professional grades are

P2	-	'Primary Two'
P3	-	'Primary Three'.

(l) S1

This is a professional grade which refers to 'Secondary One'. It used to be attained after three years of training in a teachers' college. However, it is now a professional grade which a primary school teacher of P1 level may be promoted to.

(m) A.T.S.

This refers to Approved Teacher Status. It is the highest promotional grade for a primary school teacher. A teacher may be promoted from S1 to ATS.

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

#### 2.1 INTRODUCTION

In this chapter attempts were made to review literature related to attitudes and also to achievement.

The main areas covered in the review include:

- (1) Definitions of attitudes
- (2) Attitude Development and Attitude change.
- (3) Attitude and Achievement.
- (4) Academic and Professional Qualification.
- (5) Sex Differences and Attitude.
- (6) Teaching Experience.

Though much of the reference was expected from Kenya and East Africa, scarcity of literature related to the study has led to reviewing more studies from elsewhere.

#### 2.2 DEFINITION OF ATTITUDE

The concept of attitudes is so broad that various scholars have come out with a variety of definitions.

Allport (1935) in Bell (1980 p.80) defines attitude as;

"A mental and neural state of readiness, organised through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related".

According to Ball (1977, p.117):

"An attitude is consistent and organised manner of thinking, feeling and reacting to people, objects and events in the environment".

Cook and Seltiz (1964) in Summers (1969, p.1) describes attitudes as:

"...underlying disposition which enter along with other influences into the determination of a variety of (individual) behaviour toward an object or class of objects including statements of beliefs or feelings about an object and approach-avoidance actions with respect to it".

Kartz (1960) in Dawes (1970, p.16) defines attitudes as:

"the pre-disposition of the individual to evaluate some symbol or object or aspect of his world in favourable or unfavourable manner .... Attitude include the affective or feeling core of liking or disliking and the cognitive or belief element which describes the effects of the attitudes, its characteristics and its relation to the object".

Thurstone in Summers (1969, p.1) considers attitude to be synonymous with opinions as he says that an individual's opinion symbolizes his attitude.

Keil (1985, p.352) defines attitudes as:

"Positive or negative feelings that an individual holds about objects, persons or ideas".

In the above definitions a linkage between attitudes and behaviours among individual is expressed. For example a person who expresses that mathematics is an important and useful subject which should be taught in school is in effect expressing a relationship between mathematics and how people regard it as a school subject.

This is explicit in Evans (1972) where he emphasises on the influence of attitudes in the lives of people.

He goes on to argue that attitudes determine what a person will say or do in particular situations, what he will enjoy or dislike, his approach to other people and his reactions to various events in his own life and in the world around him.

The essential components of attitudes are thoughts, beliefs, feelings or emotions and tendencies to react. When these components are inter-related such that specific feeling and reaction tendencies become consistently associated with a certain object, we say an attitude has been formed towards that object.

Attitudes are not necessarily immutable on the other hand, they are amenable to change though the alteration of an attitude especially that which is strongly held, requires substantial pressure and conviction through demonstration.

### 2.3 ATTITUDE DEVELOPMENT AND ATTITUDE CHANGE

Attitudes develop in a variety of ways; they can be passed on to the learner by parents, teachers, or peer groups. Learners, however could also acquire attitudes on their own. According to Evans (1972, p.3):

"... Attitudes and interests can be and are learned, what form they take is not determined at birth or earlier, but depends on the environment in which the child grows up and the treatment he receives".

Bell (1980, p.8) supports this assestion:

"home, school and a wider society all have their part to play in the inculcation of attitudes".

Since children grow up in the home and later move to schools, these two environments are built to inculcate attitudes in children.

Our attitudes develop in the course of coping with and adjusting to our environment. We form and develop attitudes in order to protect our self-esteem and to express our fundamental values.

Once attitudes are developed they give regularity to our modes of reacting and they facilitate our social adjustment. In the early stages of attitude development the thoughts, beliefs, feeling and emotions can be modified by new experiences. However, later their organization may become inflexible and stereotyped, usually because we have been encouraged over long periods of time to react in standard ways to particular events and groups.

During early years, a child's attitude is largely influenced by the members of his family especially the parents.

In several studies on attitude Bath and Lewis (1982), Glassey (1945) all in Evans (!972) have showed that there exists similarities between attitude of parents and that of their children towards a majority of objects or events.

Thus a parent's influence has profound effect on attitude acquisition by children. Therefore parental attitude towards a subject may be taken over by children and made their own and this is one way in which their influence may be exerted.

Attitudes are learned rather than innate and they can be changed even long after they have been acquired and developed by an individual. The development and modification of any attitude will largely depend on participation in the activities of groups holding a particular attitude.

The environmental influence on attitude development and attitude change has been specially confirmed by Newcomb and Svehla (1937) in Evans (1972). They noted in their study that as children grow older there was a slight but consistent decline in agreement between their attitudes and those of their parents. This possibly reflects the wider contacts children are able to make as they grow old enough to spend more time outside their homes.

As the child's world widens he comes into contact with other groups, school, church, peer and mass media and by participation in their life he acquires their current attitude.

Such environmental contacts results in changes of some of the previously held attitude as well as acquisition and development of new ones.

Further reports in support of this are advanced by Siegel and Siegel in Ball (1977) saying that individuals will change their attitude in order to conform with those that the environment holds as the norm.

Scott and Brinkley (1960) in Evans (1972) provided an example of how the attitude of student-teachers toward their work could be improve by working in schools under teachers whose attitudes were more positive to their own towards particular objects.

This is a clear indication of how the environment exerts its influence upon individuals leading them to modify their attitudes in the direction of conformity to the norm, thereby resulting in homogeneity of attitudes.

At schools the child meets teachers and other children. The child spends more time with the teachers than the parents and in the process of interaction children can take up the attitude held by their teachers.

In several studies on attitude Aiken (1972) found out that when a teacher has a negative attitude towards mathematics his pupils also tend to copy the teacher, when this happens the chances are that the child will pick up the teacher's attitudes. Phillips (1973) published results of his study that teachers' attitude toward arithmetic is significantly related to the students attitude and development.

Phillips (1970) in Bell (1980, p.80) found out that the students with highest attitude were in classes of teachers with highly positive attitude towards mathematics. Since attitude can be learned then a teacher can pass negative attitudes to the pupils about mathematics.

Attitudes develop and change throughout life and helping in this process is an important part of the work of teachers, parents and society at large.

It is therefore important for any one involved in education to know how attitude can be modified and ways in which attitudes can be inculcated.

#### 2.4 SEX DIFFERENCES AND ATTITUDE

Primary school teachers are all trained to teach all subjects, including mathematics irrespective of their sex. Both female and male teachers are expected to be competent enough to teach mathematics at all levels. However, a considerable amount of data supports the dislike of mathematics and as a result under-achievement, by women. This pattern is evident among school girls and continues into adulthood and employment where females are under represented in mathematics related fields.

Doutherty (1975, p.1) reported that this phenomenon had generally been explained on the women's mathematics anxiety:

"an unspecified fear based on projected feeling of inadequacy vis-a-vis some contemptuous experience with mathematics".

Torsten (1967) in a study of mathematics achievement found out that, in a study of thirteen countries, boys were more interested in mathematics than girls at all levels of education. In a number of these

studies girls tended to indicate their wish to cease studying the subject while boys tended to indicate their plans to continue.

This could be a possible reason for the diminished participation in mathematics by women at higher levels.

It is also possible that the differences in attitude can be attributed to the role expectation for girls and boys and to the common view in many countries that mathematics is a male subject.

In a study carried out by Fennema and Sherman (1981), on sex related differences in mathematics, they noted that starting in the early grades and continuing through high school, fathers were perceived as the family authority in mathematics and females therefore started being socialised to the image that mathematics was for male.

Further research by Russel (1983) in Orton (1987) has shown that teachers tend to interact in the classroom much more with boys than with girls, and have paid more attention to boys and given more encouragement to boys and have allowed boys to gain their attention. Hence the teacher can contribute a lot to the attitude formation in the pupils towards the subject.

The teachers attitudes towards girls as concerns mathematics are bound to influence the kind of interaction between female pupils and mathematics teachers.

Weiner (1980) in Cockroft (1982, p.283) maintains that:

"mathematics is regarded by pupils of of all ages both primary and secondary schools and by teachers as a subject in which boys excell".

Russel (1983) in Orton (1987) found that mathematics was considered a high status subject particularly by boys. The attitude of many girls appeared to deteriorate steadily through the years of secondary schooling alongside the growth of self-consciousness about errors and difficulties.

Amelia (1983) seems to confirm this preposition with the findings that many teachers believe that there is a difference in performance between the sexes.

Cockroft (1982, p.283) says that the difference in attitude could be attributed to the fact that

"mathematics teachers in secondary schools tend to be men and in primary

schools men teachers tend to teach the older classes, where mathematics is more advanced, while women teachers are concentrated in younger age groups where the emphasis on language and reading is greater".

This is further confirmed by Kingori (1983) in his study of primary school teachers in respect to their distribution among classes, areas of interest, qualification and experience. He found out that male teachers preferred teaching at upper primary to teaching at lower primary.

Sheikh Omar (1971) in his research on sex differences among Form Three students in Kenya found out that girls had a significantly more unfavourable attitude towards mathematics than boys.

McGough in Orton (1987) gives the reason for the notable differences in attitude. He said that it was the perception of the usefulness of mathematics and liking the subject that determined the attitude towards the subject but not the difficulty of the subject.

This is supported by Maritim (1979) who found out that the difference in attitude of boys and girls lies in the difference in academic self-perception.

He goes on to say that the females normally view themselves as being incapable of doing mathematics and therefore a negative attitude towards the subject.

Our view of mathematics is therefore important, if learners perceive it as an abstract subject that has no relevance to their day to day problems, they are bound to ignore it.

However a survey by Herman (1963) Aiken (1972) seems to differ with the general trend of differences in attitude towards mathematics.

Eshiwani (1975) reported a superior positive attitude towards mathematics in favour of boys but pointed out that this difference is not significant. ✓

In Kenyan schools, it is common observation that most of students opting for mathematics and also teachers teaching mathematics are mainly males. This suggests that there could be a difference in attitude towards the subject with more female preferring to opt for other subjects.

In this study an attempt was made to confirm or negate the findings of others on attitudes towards mathematics by female and male teachers.

## 2.5 ATTITUDE AND ACHIEVEMENT IN MATHEMATICS

Teachers' attitudes are believed to be an important factor in determining the teaching and learning of mathematics. If a teacher's attitude is negative towards mathematics it may in turn affect pupils' learning and hence their performance.

Cockroft (1982, p.188) noted that:

"There is no area of knowledge where a teacher has more influence over attitude as well as understanding of his pupils than he does in mathematics. During his professional life, a teacher of mathematics may influence for good or ill the attitudes to mathematics of several thousand young people and decisively affect many of their career choices".

This indicates that teachers' attitudes towards mathematics have a great impact on mathematics than any other area of knowledge.

Catanzano (1977, p.5) giving his experience with prospective teachers noted that during his first few days of classes, prospective teachers had a tendency to make one or more of the following comments: "Mathematics has always been my poorest subject", or "I will never pass this course". Such comments indicate to some degree the feelings and

emotions of many of our prospective teachers towards mathematics. Unless these prospective teachers' attitudes are changed, then the pupils taught by teachers with these feelings are likely to reflect the same attitude and to achieve accordingly.

Johnson (1967, p.113) notes that:

"...it is the attitudes which we build that are highly involved in the learning and retention of our subject... and it is often the attitude you (teacher) build that are the basis for your rank as a successful teacher".

This indicates that if a pupil develops a positive attitude then the chances of liking a subject and at the same time performing well are increased.

Aiken (1970, p.558) studied the relationship between attitude and performance and concluded that:

"The relationship between attitude and performance is certainly the consequence of a reciprocal influence in that attitude affects achievement and it in turns affects attitudes".

Looft (1971), Parker (1974), Wamani (1980) and Thuo (1984) found a strong relationship between achievement in mathematics and attitude towards mathematics.

Munguti (1984) in a study of factors affecting the teaching and learning of mathematics in Mbooni division found out that teachers' attitude towards mathematics was a factor that may affect the teaching of mathematics.

Alken (1972) revealed that teachers' attitude and effectiveness are determinants of students' attitude and performance in mathematics.

Okech (1986) reporting the findings of Philips (1973) found that teachers' attitudes towards arithmetic is significantly related to the student's attitude and achievement.

Mwangi (1986) had similar findings when he found out that teachers' attitude was being reflected in the students' poor performance.

Haan (1961) in Philips (1973, p.50) found out that the students' attitude towards arithmetic is significantly related to the type of teacher attitude towards arithmetic encountered by the student. He went further and noted that the students' achievement in arithmetic is more strongly related to the type of teacher attitude towards arithmetic encountered by the student.

Therefore, if teachers' attitudes are negative it will affect the pupils learning of a subject and hence their performance.

Snydam (1972) studied teachers as a possible source of pupils' attitude towards mathematics. She found out no evidence to the effect that teachers' attitude affect pupils' attitude towards the subject.

Peskin (1964) in Okech (1986) found no significant relation between teacher attitude and student achievement in a study of 7th grade teachers and students in New York City.

Eshiwani (1986) suggests that student who are positively motivated work harder than those who are negatively motivated and this helps them to achieve higher.

The weight of expert opinion seems to overwhelmingly favour the view that teachers' attitude towards mathematics is an important factor in learning mathematics. The problem of attitude towards mathematics and how it influences performance is more critical at the primary level. At this level no specialization has taken place and therefore the aim of the teacher should be to make most of his pupils have favourable attitude towards mathematics.

In this study an attempt was made to confirm or reject the findings of others on the effect of teachers' attitude towards mathematics on pupils' performance in mathematics.

## 2.6 TEACHING EXPERIENCE AND ATTITUDE

Teaching experiences as used in the study refers to the number of years a teacher has taught primary schools mathematics.

Teaching experience is frequently included as a variable in educational research, but no clear picture of its effect seems to emerge.

Sidhu (1982, p.195) notes that:

"...successful teaching experience is a valuable asset. It will enable the person (teacher) to acquire certain commendable characteristics such as promptness, adaptability, efficiency, the knack of arousing and maintaining interest, adequate command of instructional material and the ability to face the class with confidence".

Thus teachers with successful teaching experience may develop positive attitude towards a subject and hence choose appropriate instructional material which will arouse and maintain interest among his pupils.

Barnes (1985) observed that in longitudinal studies conducted by Fuller and Fielder which documented stages in the development of teachers and focussed particularly on their concerns, suggests that teacher effectiveness, while it may increase through the early years of teaching career, probably does not continue to do so. He notes that as suggested in substantial proportion of studies, increases in teaching experience, at least after the early years in classroom are associated with a tendency for teachers to reject innovations and alterations in educational policy.

In other studies, Callis, (1950), Cook, Hoyt and Eikass in Kim (1977) notes that a majority of attitudes that teachers hold are not affected by experience.

These findings conflict with those reported by Habinowitz and Rosenbaum (1960) in Kim (1977) and Lomax (1972) all of whom found that teaching experience promoted changes in teachers' attitudes.

Onyango (1988) in a study of teachers' attitudes and pupils' performance in Kisumu District, found a significant difference between new teachers and medium term teachers' attitudes towards mathematics. In his study, he found out that the new serving

teachers have a more negative attitude towards mathematics than other categories of teachers by years of experience. In this study, attempts were made to confirm or negate the findings of others as to the effect of teaching experience on attitude of teachers towards mathematics.

## 2.7 TEACHERS' ACADEMIC DISTINCTION AND PROFESSIONAL QUALIFICATIONS

One of the most important resources for good mathematics teaching is an adequate supply of competent teachers. Normally the competency of teachers is classified in terms of their academic and professional qualification.

Rising et. al. (1972, p.5) argues that:

"Most people are agreed that a first requirement for success in teaching mathematics is knowing mathematics. If we are to teach mathematics so that it is understood, so that it makes sense, so that it can be applied, we must have an adequate background in the mathematical content".

Bell (1978, p.3) hold the same view:

"Although it is a fact that there are many people who have an excellent knowledge of mathematics but who are not good teachers of mathematics, there are few if any good mathematics teachers who do not know mathematics".

Among the many characteristics of a good mathematics teacher, the primary requisite is a sound knowledge and understanding of mathematics. Thus a teacher of mathematics has to have a sound knowledge and understanding of mathematics. If the teacher lacks this then he may well deliver the little he has which might be clouded by misinformation.

Ryan and Cooper (1975) disagrees with the above. They claim that knowing something does not guarantee the ability to act on that knowledge. They further stress that there is a profound difference between knowing and doing. Knowing in this case refers to academic qualification and doing refer to teaching ability. In effect they are stating that one may be highly academically qualified but this is not an indicator of teaching ability.

Eshiwani (1983) asserts that many of the primary school teachers are poor in the subject. As consequence of this point it is possible that mathematics is poorly taught and learned in primary schools. And as a result there would be poor performance in mathematics at almost all levels in primary education.

Sifuna (1982) supports this view, in observing the quality of students recruited for primary teacher education, it was seen that though the profession

is increasingly beginning to attract students who generally perform well in K.C.E. their performance in key subjects like Mathematics, English and Science was poor.

Lijembe (1978, p.73) in his report says:

"It is the constant contention of college tutors that students' academic background on entering college is weak in all subjects. This is particularly evident in the case of mathematics where inspite of the new entry requirement, approximately fifty percent enter college with a grade nine in the subject".

Nyangayo (1986), in a study of the factors that affect prospective primary school teachers' achievement in mathematics, found out that a large number of trainees in his sample only got a pass at K.C.E., K.C.S.E., and as many as 71 out of 220 had failed. Gitonga (1990) in a similar study noted that those recruited were mainly third division holders who had failed in mathematics at Form Four level.

Dutton (1962), in a study of attitude change of prospective elementary school teachers towards arithmetic, found out that student who had a grade "C" had a poor attitude towards arithmetic. He also found out that there was an equally large group of students who made "B" grade who disliked arithmetic

as much as "C" grade students.

From the above we may imply that high achievement does not ensure the development of positive attitude towards mathematics.

However, Weiner (1971) maintains that if the teacher performs poorly in mathematics in his formal schooling then there are chances that this will affect his self-concept and he will accept failure every time in the subject.

Cornelius (1982, p.2) supports this:

"An image of oneself as being poor in mathematics could well spread into a more general assessment of oneself as a failure. As they grow older, students and adults who have failed in mathematics learn to preserve their self-image by devaluing the importance of the subject or even taking positive satisfaction in belonging to groups with 'anti' mathematics opinion".

It is therefore expected that such teachers who had failed in mathematics have developed fear and hatred of mathematics.

In Kenya, student teachers are normally selected to join teacher training colleges on the basis of grades achieved in various examinations. The selection is usually done after other higher institutions are satisfied.

One implication is that those who go to colleges of education do so because they cannot obtain places in university or other institutions of higher learning.

Similar sentiments are expressed in the report of the Presidential Working Party on education, manpower development (1988, p.61). This report indicates that a great majority of those who join teacher training colleges normally do so as a last resort and may therefore lack interest and commitment to the profession.

Weiner (1971) notes that:

"If a trainee hates or dislikes the profession and that he joined as a last resort, this dislike will affect his performance in training and his weakness will be more revealed in the subject he dislikes".

Our teachers are expected to teach all the subjects at all levels in the primary schools. This has been one of the current problems confronting primary school teachers education. At teacher training colleges the trainees have continued to learn all subjects in the primary school curriculum and their different methodologies. This has over-burdened the trainees and the qualified teachers in the field because they are forced to learn and to teach subjects that have very little appeal to them.

Preparing the teacher trainee to teach all the thirteen subjects while he is required to pass in eight to be certified has brought complications as far as the trainees commitment to some subjects is concerned. Because mathematics is compulsory for all trainees an attitude of defiance is therefore likely to characterise a learner who is forced to do a subject than one who chooses voluntary.

Buxton (1981) in Conerlius (1982, p.62) states that:

"panic is not too strong a word to describe the reactions that people can have when confronted with having to do some mathematics".

Some of the people he selected described how they associated mathematics with trembling, fear, panic and despair, cold sweats, clammy palms and a lump in the throat - feeling that you could get some release if you could but cry.

Trainees have therefore earned themselves P1, P2 or P3 certificates after failing in a number of subjects. These certificates are therefore not indicators that the holders can teach all the subjects in our primary schools at all levels.

The poor performance of the trainees while in colleges and when they finally graduate may indicate that

they have developed a negative attitude towards the subject. Since a teacher reflects his attitude towards a subject as he teaches it. A teacher who feels insecure in mathematics for who mathematics is mostly rote manipulation with little understanding transmits these feelings to his students. On the other hand a teacher who has confidence, understanding, interest and enthusiasm in mathematics also transmits these feelings to his students.

The attitude one holds towards a subject will therefore affect the teaching and learning of the subject and hence their pupils' performance.

Onyango (1982), in a study of the relationship between teacher attitude towards mathematics and pupils achievement in mathematics in Kisumu Municipality, found no significant difference between teachers' grade and teachers' attitude towards mathematics. In comparison the attitudes of P1 and P2 teachers he found out that both grades scored positive attitude towards mathematics.

Stright (1960) in a study of attitude towards arithmetic of students and teachers in third, fourth and sixth grades noted that the teachers educational background, training and years of experience seem not to have significant difference in teachers'

attitude towards the teaching of arithmetic.

Kiragu (1986) reporting Husen (1978) observed that in the developing world research evidence shows that trained teachers do make a difference and in particular she adds teachers' qualification, experience, amount of education are positively related to student achievement.

Teachers in our primary schools are expected to teach all the subjects offered in the school and since we can assume that it is the same teachers teaching the rest of the subjects, we can therefore ask ourselves why mathematics is performed poorly.

Since teachers in primary schools in Kenya are of different academic and professional qualifications, it is necessary to find out the effect of these differences on the teachers' attitude.

## CHAPTER THREE

### RESEARCH DESIGN AND METHODOLOGY

#### 3.1 INTRODUCTION

The data for this study was collected from primary schools in Eldoret Municipality. The subjects of the study were Standard Eight mathematics teachers. The data for the attitudes was obtained from teachers using a questionnaire.

This chapter is divided into five sections. The first section describes the sample that was used in the research and how it was selected. The second section describes the instruments that were used to measure the variables of the study. The third part describes the pre-testing procedure that was followed. The fourth part describes the scoring method used in the attitude scales. The last section describes the procedures used for data collection.

#### 3.2 SAMPLE

Eldoret Municipality has a total of 24 primary schools, geographically distributed within the town under three zones, namely Central, Northern and Southern. The sample used in this study consisted of 15 schools, each with more than two streams of Standard Eight classes. All the schools used in the sample were

those run through the Municipal Education Office. The schools were drawn from all the three zones. To select schools from each zone a random sample was taken. The researcher folded pieces of paper with school names properly hidden. These pieces of paper were placed inside three separate boxes which were labelled C for Central, N for Northern and S for Southern. Six pieces were picked from box C, five from box N and four from box S, this was done to ensure that the schools picked from each zone were in the same proportion. From the selected schools, two streams were randomly selected and an attitude scale was administered to twenty-six teachers teaching the selected classes.

### 3.3 RESEARCH INSTRUMENTS

The main research instruments used were a questionnaire for Standard Eight mathematics teachers and the mock examination results in mathematics.

The questionnaire for teachers was in two parts; part one sought general information on the teachers. This part required information such as teachers' sex, number of years of teaching, academic and professional qualification. The second part consisted of twenty items (20) on attitudes towards mathematics. This part sought information about teachers' opinion

on statements regarding mathematics.

A five point Likert type scale method was applied whereby for every statement written (made) a teacher responded using structured words such as "Strongly Agree" (SA), "Agree" (A), "Undecided" (U), "Disagree" (D), "Strongly Disagree" (SD). The respondent chose the appropriate responses by putting a tick inside the relevant box. The Likert type scale used is shown in Appendix A.

Mock examinations results were used to measure pupils' performance in mathematics. The mock examinations are organized by the Municipal Education Office and it was done and marked in July 1992.

#### 3.4 PRE-TESTING OF INSTRUMENT

The teachers' questionnaire was pre-tested with six Standard Eight mathematics teachers. The teachers were drawn from three schools within the municipality. These teachers did not form part of the sample for the study. The pre-test helped the researcher to redesign some of the items that were in the questionnaire, after which the final draft of the instrument was written .

### 3.5 SCORING OF THE QUESTIONNAIRE

All the twenty-six (26) teachers in the sample selected gave responses to the twenty (20) items on the questionnaire. A marking scheme for scoring was prepared as shown in Appendix B. In scoring, positive statements scored five (5) each for "Strongly Agree" down to one (1) for "Strongly Disagree". The table below shows the procedure for scoring.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
5	4	3	2	1

The negative statements were scored in the reverse order.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1	2	3	4	5

It was noted that those who scored 4 or 5 in an item were said to have a positive attitude towards the item while those who scored 1 or 2 in an item were said to have a negative attitude. The total for all the items, showed the attitudes of the respondents.

Maximum Score

Total Number of statements	=	20
Maximum Score for each Item	=	5
Maximum Total Score	=	100

Minimum Score

Total Number of statements	=	20
Minimum Score for each Item	=	1
Minimum Total score	=	20

$$\text{Average Score} = \frac{\text{Maximum Total Score} + \text{Minimum Total Score}}{2}$$

$$= \frac{100 + 20}{2} = 60$$

From above the lowest possible score was twenty (20) and the Maximum possible score was one hundred (100). A score of sixty (60) was taken as the dividing line between maximum and minimum. Hence respondents who scored sixty and below were considered to have a negative attitude towards mathematics while those who scored above sixty (60) were considered to have a positive attitude towards mathematics. The statements which imply favourable attitudes are numbered, 1, 4, 5, 7, 11, 15, 16, 17, 18 and 20.

Those statements which imply unfavourable attitudes are numbered; 2, 3, 6, 8, 9, 10, 12, 13, 14 and 19.

### 3.6 PROCEDURE FOR DATA COLLECTION

The researcher administered the questionnaire personally to the selected teachers in their respective schools. The purpose of the questionnaire and the instructions to be followed were explained to the respondents.

The mock examination results were collected from the Municipal Educations Office. The results of each school were based on index number system and therefore the researcher sought the assistance of the headteachers in identifying the streams of each candidate.

## CHAPTER FOUR

### DATA ANALYSIS AND INTERPRETATIONS

#### 4.1 INTRODUCTION

This chapter contains findings, analysis and interpretation of the findings. The first section presents analysis of the teachers' attitudes towards mathematics. The other sections present the results of testing the hypotheses.

To facilitate presentation and analysis of data, tabular layouts have been used.

Harper (1989) observes that the use of tabular layouts would enable any desired figure to be located more quickly and it would also help in comparison between two different categories to be made more easily. For comparisons and further computations, frequencies, percentages, means, standard deviation and variance were used.

The t-test was used to test for the significance of the hypotheses set for this study. The students t-test is given by the formula on the Appendix C. The researcher set the confidence interval at 95% and 'P' at 0.05 to find out the relationship in all the hypotheses set in the study.

#### 4.2 TEACHERS' ATTITUDES TOWARDS MATHEMATICS

There were a total of twenty-six (26) teachers who responded to the attitude test. Out of the 26 teachers, eight (8) were female while eighteen (18) were male. The table below shows the attitude scores of the teachers.

TABLE 3  
Results of Attitudes

Teacher	1	2	3	4	5	6	7	8	9	10	11	12	13
Attitude Score	80	59	78	74	78	62	80	79	79	79	59	84	80

Teacher	14	15	16	17	18	19	20	21	22	23	24	25	26
Attitude Score	78	80	88	57	58	87	82	74	78	80	81	56	71

The table below was extracted from Table 3. it shows the number of teachers who scored above 60 and those who scored below 60.

TABLE 4

Number of Teachers Scoring Above Sixty and  
below Sixty in Attitude Scale

	Scores above 60 (Positive Attitude)	Scores of 60 and below (Negative Attitude)	Total
No. of Teachers	21	5	26
Percentages	(81)	(19)	100

The table shows that majority of teachers, twenty-one or 81% scored above sixty (60) in the attitude scale, while five or 19% were found to have attitude scores below sixty (60).

The attitude scale had twenty items out of which 10 had positive attitude statements. The items on the scale were rated as follows: Strongly Agree (SA) and Agree (A) which were combined to read Agree; Undecided was left alone while Strongly Disagree (SD) and Disagree (D) were combined to read Disagree.

The percentages of the three cases were computed and comparisons made.

TABLE 5

Response to Positive Statements

	Agree	Undecided	Disagree
Total Number	203	12	45
Mean ( $\bar{x}$ )	20.3	1.2	4.5
Percentages	78	5	17

In the above table 78% agreed with the statements while 17% disagreed with them but 5% were undecided. It was noted that 78% had a positive attitude towards mathematics as compared to the 17% who disagreed with the statements.

TABLE 6

Response to Negative Statements

	Agree	Undecided	Disagree
Total Number	68	12	180
Mean ( $\bar{x}$ )	6.8	1.2	18
Percentage	26	5	69

From the table, 69% of the teachers disagreed with statements, while 26% agreed and 5% were undecided.

From this analysis it was concluded that majority of teachers have a positive attitude towards mathematics. However, as can be seen from Table 3 teachers varied in their attitudes and so the researcher determined the effect of these attitudes on the pupils' performance in mathematics.

#### 4.3.0 HYPOTHESES

The main hypothesis stated: there is no significant difference between teachers' attitudes towards mathematics and their pupils' performance in mathematics.

From this main hypothesis, the following sub-hypotheses were generated.

- (i)  $HO_1$ : There is no significant difference in attitudes towards mathematics between male and female teachers.
- (ii)  $HO_2$ : Teachers with different professional qualifications do not have different attitudes towards mathematics.
- (iii)  $HO_3$ : Teachers' years of experience do not influence their attitudes towards mathematics.
- (iv)  $HO_4$ : Teachers with different academic qualifications do not have different attitudes towards mathematics.

#### 4.3.1 MAIN HYPOTHESIS: $HO$

There is no significant difference between teachers' attitudes towards mathematics and their pupils' performance in mock examinations.

For the purpose of analysis, teachers were categorised into two groups. The first category (A) were those teachers who scored 60 and below in the attitude

scale and the second category (B) were those teachers who scored above 60. For each category their pupils' mean scores were calculated.

The table below shows the summary of the mean scores for each category.

TABLE 7

Pupils' Mean Scores of Mock Examination  
for Category A and B Teachers

Catagory	A	B	Total
Number of Teachers	5	21	26
Mean Scores	29.14	38.92	
Standard Deviation	2.32	6.12	
Variance	11.02	37.45	

Out of the twenty-six (26) teachers 21 had positive attitude towards mathematics while five (5) had negative attitude.

The mean scores for category A pupils in mock examinations was 29.14, while the mean scores for category B pupils was 38.92. Thus, pupils taught by teachers

with positive attitudes had higher mean scores in mathematics. It was concluded that teachers' attitude towards mathematics has an influence on pupils' achievement in mathematics.

To find whether, there was a significant difference, a student t-test was used. The computed t value was 4.457 and the critical value was 2.06 at  $df=24$ . The computed value is greater than the critical value and hence the null hypothesis was rejected. This meant that there is a significant difference between achievement of pupils taught by Group A and Group B teachers. The findings reveal that pupils taught by teachers with negative attitudes towards mathematics scored low in mathematics. Thus teachers' attitude has a significant role in pupils achievement in examinations in mathematics.

#### 4.3.2 SUB-HYPOTHESIS - Part One

The sub-hypothesis stated: There is no significant difference in attitude towards mathematics between male and female teachers. There were 8 female and 18 male teachers who responded to the attitude scale.

The table below shows the number of male and female teachers in each category.

TABLE 8

Percentage of: Male and Female teachers  
in each Category

Category Sex	Negative Attitude (A)		Positive Attitude (B)	
	Number of Teachers	Percentage Whole	Number of Teachers	Percentage Whole
Female	2	25	6	75
Male	3	17	15	83
Total	5	19	21	81

The table shows that although female teachers were a minority, 6 or 75% having scored above sixty, while fifteen or 83.3% of the males scored above sixty.

The table below shows the summary of the mean attitude scores for male and female teachers.

TABLE 9

Mean Attitude Scores for Male  
and Female Teachers

Sex	Male	Female
Number of Teachers	18	8
Mean	75.06	73.75
Variance	86.12	126.34
Standard Deviation	9.28	11.24

The mean attitude scores for the females was 73.75 while for males was 75.06. The computed t value was 0.273 and the critical t value equalled 2.06 at 0.05 and 24 degrees of freedom. The computed t values is less than the critical value and hence the null hypothesis was accepted. This meant that there was no sex difference in attitudes towards mathematics.

4.3.3 SUB-HYPOTHESIS - Part Two

This stated: Teachers with different professional qualification do not have different attitudes towards mathematics.

Out of the twenty-six teachers seventeen were P1, six P2, two S1 and one A.T.S.

The table below shows the percentage of teachers with positive and negative attitudes as related to professional qualification.

TABLE 10

Percentage of: Teachers' Attitudes as they Relate to Professional Qualification

Professional Qualification	% with Positive Attitude	% with Negative Attitude
P2	67	33
P1	82	18
S1	100	0
ATS	100	0

The table above shows that 67% of P2 teachers had positive attitude towards mathematics while the other 33% had negative attitude. For P1 teachers, 82% had positive attitudes with only 18% having negative attitude.

The table below shows the summary of the mean attitude scores of each category.

TABLE 11

Teachers' Grade and Mean  
Attitude Scores

	P2	P1	S1	ATS
Number of Teachers	6	17	2	1
Mean	74.17	74.24	77	80
Variance	175.82	88.55	9	0
Standard Deviation	13.26	9.41	3	0

As there was only one ATS and two S1's who showed positive attitude towards mathematics. The researcher only compared the P1s' and P2s' attitudes towards mathematics.

The mean attitude score for P1 teachers was 74.24 while for P2 was 74.17. The computed t value equalled 0.011 while the critical value equalled 2.08 with 21 degrees of freedom. The computed t value was found to be less than the critical value and hence the null hypothesis was accepted. The findings reveal that the professional grade has no effect on attitudes. This could imply that attitudes are developed early in life so the effect of training teachers as P1 or P2 has no influence on the teachers' attitudes which may have been formed earlier.

#### 4.3.4 SUB-HYPOTHESIS - Part Three

This stated: Teachers' years of experience do not influence their attitude towards mathematics. Teachers were placed into three categories namely: New-N (0-4), Medium (4-9) and Old (Over 9). Out of the total number of teachers sampled, 8 had taught for between 4 and 9 years and 18 had taught for more than 9 years.

The table below shows the percentages of teachers with positive and negative attitudes as related to their teaching experience.

TABLE 12

Percentage of: Teachers' Attitude as  
they Relate to Teaching Experience

Teaching Experience	% Positive	% Negative
Between 4 & 9 years	78	22
More than 9 years	82	18

Out of the teachers who had taught for between four and nine years, 78% had positive attitude while 22% had negative attitude. For those teachers who had taught for over nine years, 82% had positive attitude while 18% had negative attitude.

The table below shows the summary of the mean attitude scores for each category as indicated in separate columns.

TABLE 13

Teachers' Experience and Mean  
Attitude Score

Experience	N(0-4)	M(4-9)	O(Over 9)
Number	-	8	18
Mean	-	73.63	75.11
Variance	-	131.78	83.72
Standard Deviation	-	11.48	9.15

The mean attitude score for medium experience was 73.63 and the mean attitude score of teachers of over 9 years experience was 75.11. The computed t-value was 0.304 and the critical value was 2.06 at P equals to 0.05 and 24 degrees of freedom. The computed value was found to be less than the critical value at 0.05 significance level and hence the null hypothesis was accepted. This meant that the number of years a teacher has taught does not influence his or her attitude. This finding reveals that the attitude that teachers hold are not affected by experience.

#### 4.3.5 SUB-HYPOTHESIS - Part Four

The hypothesis stated: Teachers with defferent academic qualifications do not have different attitude towards mathematics. Teachers were categorised into four groups those with KCPE/CPE, KCE/EACE, KACE/EAACE, KJSE. There were no teachers with KJSE or KCPE/CPE certificate among the sampled teachers. There were 19 or 73% of teachers with KCE/EACE certificate and 7 or 24% with KACE/EAACE certificate.

The table below shows the percentage of teachers with positive and negative attitudes as related to their academic qualification.

TABLE 14

Percentages: Teachers' Academic Qualification  
as they Relate to Attitude

Academic Qualifications	% with Positive Attitude	% with Negative Attitude
KCE/EACE	79	21
EAACE/KACE	86	14

86% of teachers holding EAACE/KACE certificate had positive attitudes, while 14% had negative attitude. 79% of those holding KCE/EACE certificates had positive attitudes while 21% had negative attitudes.

The table below shows the summary of the mean attitude scores of each group.

TABLE 15

Teachers' Academic Qualification and  
Mean Attitude Score

	KCE/EACE	EAACE/KACE
Number of Teachers	19	7
(Mean)	75.11	73.43
(Variance)	99.65	91.62
(Standard Deviation)	9.98	9.57

Teachers who had KCE/EACE certificates had a mean attitude score of 75.11 while those who had EAACE/KACE certificate had a mean attitude score of 73.43. The computed t-value was 0.446 and the critical value was 2.06. The computed t-value is less than the critical value and hence the null hypothesis was accepted. This meant, that there was no significant difference in attitude between holders of KCE/EACE certificates and those holding KACE/EAACE certificates. This findings is in line with that of stright (1960), who noted that the teachers' educational background

seem not to have significant difference in teachers' attitudes towards the teaching of mathematics.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 INTRODUCTION

The data for this study was collected from twenty-six (26) Standard Eight mathematics teachers in Eldoret Municipality. The teachers' characteristics that were considered included, teachers' attitudes towards mathematics, gender, teaching experience, academic distinction and professional qualifications. The performance of pupils in mathematics mock examination were considered. The study was intended to determine whether there is significant difference between teachers' attitudes towards mathematics and their pupils' performance in the subject.

#### 5.2.0 SUMMARY OF THE FINDINGS

From the analysis of the data collected, the researcher came up with the following findings;

#### 5.2.1 TEACHERS' ATTITUDES TOWARDS MATHEMATICS

Majority of the teachers (81%) scored above 60 in the attitude scale. Only 19% were found to have attitude scores below 60. It was concluded that in general, teachers have a positive attitude

towards mathematics.

### 5.2.2 TEACHERS' ATTITUDES TOWARDS MATHEMATICS AND THEIR PUPILS' PERFORMANCE IN THE SUBJECT

One of the variables under study was whether the teachers' attitude has an influence on their pupils' performance. From the analysed data, it was found that pupils taught by teachers with positive attitude had higher scores in the mock examination than those taught by teachers with negative attitude. It was therefore concluded that the attitude of the teacher towards a subject has an influence on pupils' achievement in mathematics. This difference was found to be significant.

### 5.2.3 ATTITUDES TOWARDS MATHEMATICS AS THEY RELATE TO GENDER

It was found that 75% of women teachers had positive attitudes, while 25% had negative attitudes towards mathematics. Out of the 18 men teachers sampled, 83% had positive attitude while the rest 17% had negative attitude towards mathematics. In general, it was found that both male and female teachers had positive attitudes towards mathematics. There was a superior positive attitude towards mathematics

in favour of male teachers. However, it was noted that the difference is not significant.

#### 5.2.4 ATTITUDES TOWARDS MATHEMATICS AS THEY RELATE TO PROFESSIONAL QUALIFICATION

From the analysed data, it was found that 82% of P1 teachers in the sample had positive attitude towards mathematics. The other 18% had negative attitude towards the subject. In the case of P2 teachers, 67% were found to have a positive attitude while 33% had negative attitude towards the subject. It was found possible to conclude that P1 teachers had a more favourable attitude towards mathematics than P2 teachers. However, it should be pointed out that this difference is not significant.

#### 5.2.5 ATTITUDES TOWARDS MATHEMATICS AS THEY RELATE TO TEACHING EXPERIENCE

From the analysed data, it was found that out of the 8 teachers who had taught for between 4 and 9 years (medium), 78% had positive attitude towards mathematics and 22% had negative attitude towards the subject. For the old serving teachers (teaching experience of more than 9 years), 82% had positive attitude while only 18% had negative attitude. It was found possible to conclude that teaching experience had no effect

on the teachers' attitude. It was also noted that teachers who had taught for more than 9 years had a more favourable attitude towards mathematics than those who had taught for a shorter period. However, this difference was not significant.

#### 5.2.6 ATTITUDES TOWARDS MATHEMATICS AS THEY RELATE TO ACADEMIC QUALIFICATIONS

There were 7 teachers with KACE/EAACE certificates and 19 teachers with EACE/KCE certificate. It was found that 86% of those holding KACE/EAACE certificate had positive attitude towards mathematics, while 14% had negative attitude towards the subject. 79% of those holding KCE/EACE certificate had positive attitude while 21% had negative attitude. It was noted that KACE/EAACE certificate holders had a more favourable attitude than KCE/EACE certificate holders. However, this difference was not significant.

### 5.3 CONCLUSIONS

The following are the main findings of this study:

- (a) It was found that teachers' attitudes had significant effect on pupils' performance in mathematics.
- (b) It was found that, there was no significant

difference in attitude towards mathematics between male and female teachers.

- (c) It was found that, there was no significant difference in attitude between teachers with different professional qualifications.
- (d) It was found that, there was no significant difference in attitude between teachers of different years of experience.
- (e) It was found that, there was no significant difference in attitudes between teachers with different academic qualifications.

#### 5.4 RECOMMENDATIONS FROM THE RESULTS OF THE STUDY

Attitudes are learned in the process of interaction with the environment. Since there is more interaction between pupils and teachers than there is between pupils and parents, the attitudes acquired to a subject are more of teacher origin than parent origin. A teacher reflects his attitude towards a subject in the cause of teaching. A teacher who feels insecure in mathematics and has a negative attitude towards the subject may either transmit these feelings to his pupils or may simply avoid teaching the subject. As a consequence it is possible that

mathematics may be poorly taught and learned in the primary schools. As a result there would be poor performance in the subject at all levels in the primary schools.

The following recommendations were derived from the summary of the findings.

- (a) For teachers to create, develop, maintain and reinforce positive attitudes and also for teachers to promote achievement amongst their pupils in mathematics, they must themselves have developed positive attitude towards mathematics.
- (b) Teachers should be in-serviced regularly to keep them abreast with new reforms in mathematics content and methodology, so as to motivate them and provide positive attitude in mathematics.
- (c) Teachers should choose subjects of interest to teach in primary schools, instead of being assigned subject which may not appeal to them.
- (d) The teachers' academic distinction in any subject should be taken into consideration when assigning teachers subjects.

### 5.5. RECOMMENDATIONS FOR FURTHER RESEARCH

- (1) There is need to replicate this study to include a bigger sample of schools, classes and teachers in primary schools to ratify the findings of this study.
- (2) There is need to study parental contribution towards pupils' achievement in mathematics.
- (3) Further research needs to be done as a follow-up of teachers before and after qualifying from college to find whether there is a change of attitude towards the subject after some experience.
- (4) The same study can be done among teachers of other classes, say Standard Four, Five and Six so as to find whether there are differences in attitudes.
- (5) Further research needs to be done as a follow-up to find out the attitude of teachers towards mathematics and possibly relate to students' attitudes and achievement in mathematics.

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APPENDIX AQUESTIONNAIRE FOR PRIMARY SCHOOL TEACHERSInstruction

- (i) The questionnaire is divided into two parts Part one and Parttwo. Part one requires general information about yourself and school. Part two requires information on what you think about mathematics.
- (ii) You are requested to answer all the questions.
- (iii) You are also requested to be honest.
- (iv) The information you will give be treated confidentially.

PART ONEInstructions

Please indicate by writing or putting a tick (✓) the information required in each item.

1. School: ..... [ ]
2. Gender:
- Male: ..... [ ]
- Female: ..... [ ]

3. The class you teach mathematics: ..... [ ]

4. The number of years of teaching as a  
trained teacher.

(i) 0-4 years [ ]

(ii) 5-8 years [ ]

(iii) 9-12 years [ ]

(iv) 13 and above [ ]

5. The highest academic qualification that  
you have attained is.

(i) KCPE/CPE/KAPE [ ]

(ii) KJSE [ ]

(iii) EACE/KCE/GCE [ ]

(iv) EAACE/KACE [ ]

(v) Other(s) [ ]

Specify: -----

6. What grade did you attain in mathematics  
as related to your academic qualification?  
e.g. principal A,B or C, credit 3,  
grade C.

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

7. The highest professional grade that you have achieved.

- (i) P<sub>3</sub> [ ]
- (ii) P<sub>2</sub> [ ]
- (iii) P<sub>1</sub> [ ]
- (iv) S<sub>1</sub> [ ]
- (vi) Approved Teacher Status [ ]
- (vii) Other(s) [ ]

Specify: .....

.....

.....

PART TWO

Instructions

(i) Please indicate how you feel about mathematics by showing your extent of agreement using the words:

Strongly Agree (SA), Agree (A), Undecided (U)  
Disagree (D) and Strongly Disagree (SD)

(ii) Put a tick inside the box of your choice.

(iii) Note that there is no correct or wrong answers in this section.

	SA	A	U	D	SD
1. Mathematics is a subject which develops reasoning and it is quite stimulating					
2. Girls are on the whole incapable of becoming good mathematicians.					
3. School mathematics is too abstract for application in the real world.					
4. Mathematics is an easy subject to each.					
5. Mathematics is particularly suited to develop independent and self reliant habits of mind.					
6. Pupils who fail in mathematics should be punished.					
7. Girls are as good as boys in mathematics.					
8. There is little scope for creativity in mathematics.					
9. Mathematics should not be taught to all pupils in primary schools.					
10 Group work and discovery methods are too demanding and time wasting to be of					

	SA	A	U	D	SD
any practical use in primary schools.					
11 Mathematics is quite interesting and enjoyable to teach.					
12 It is always important that pupils memorise definitions, formulae and facts before doing any problems.					
13 I always lose confidence when I make a mistake while teaching mathematics.					
14 The study of mathematics tends to dull the imagination of pupils.					
15. Mathematics is applicable to our daily life.					
16 Mathematics is one of the important subjects in primary school curriculum					
17 I never punish the pupils when they get the wrong answers or low mark in mathematics.					

	SA	A	U	D	SD
18 It is always important that pupils understand facts, concepts and procedures before they do any problems in mathematics.					
19 Mathematics teacher should only solve difficult problems in class.					
20 The teaching of mathematics should be more practically oriented than it is today.					

APPENDIX BMARKING SCHEME

Marks Statement Number	SA	A	U	D	SD
<del>1</del>	5	4	3	2	1
2	1	2	3	4	5
3	1	2	3	4	5
<del>4</del>	5	4	3	2	1
<del>5</del>	5	4	3	2	1
6	1	2	3	4	5
<del>7</del>	5	4	3	2	1
8	1	2	3	4	5
9	1	2	3	4	5
10	1	2	3	4	5
<del>11</del>	5	4	3	2	1
12	1	2	3	4	5
13	1	2	3	4	5
14	1	2	3	4	5
<del>15</del>	5	4	3	2	1
<del>16</del>	5	4	3	2	1
<del>17</del>	5	4	3	2	1
<del>18</del>	5	4	3	2	1
19	1	2	3	4	5
<del>20</del>	5	4	3	2	1

APPENDIX CSTUDENTS "t" FORMULA

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S_{\bar{x}_1 - \bar{x}_2}}$$

$$= \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{S_{\bar{x}_1}^2 + S_{\bar{x}_2}^2}}$$

Where  $S_{\bar{x}_1} = \frac{S_1}{\sqrt{n_1 - 1}}$  and  $S_{\bar{x}_2} = \frac{S_2}{\sqrt{n_2 - 1}}$

$$S_{\bar{x}_1 - \bar{x}_2} = \sqrt{S_{\bar{x}_1}^2 + S_{\bar{x}_2}^2}$$

$x_i$  Mean score of the variable being compared with the other.

$S_{x_i}$  Standard deviation of the variable being compared with the other.

$n_i$  The number of items in the variables being compared.

CI Confidence interval 95%.

P Critical value at 0.05.