

A STUDY OF THE RELATIONSHIP BETWEEN ACHIEVEMENT
AND ATTITUDES TOWARDS MATHEMATICS AMONG
STANDARD SEVEN PUPILS IN
KABAZI LOCATION OF
NAKURU DISTRICT,
KENYA

BY
MWANGI JOSPHAT R.K.

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TITLE: A STUDY OF THE RELATIONSHIP BETWEEN ACHIEVEMENT AND ATTITUDES TOWARDS MATHEMATICS AMONG STANDARD SEVEN PUPILS IN KABAZI LOCATION OF NAKURU DISTRICT: KENYA.

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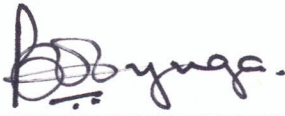
DECLARATION

This research project is my own original work and has not been presented for a degree in any other University.



MWANGI JOSPHAT R.K.

This research project paper has been submitted for examination with my approval as a University Supervisor.



MAJOR B.O. OYUGA (rtd.)
SUPERVISOR

(iii)

DEDICATION

To my loving wife and beloved children.

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To realise the successful completion of this research project, several individuals put in their contribution in various ways. I am therefore deeply indebted to a number of individuals and organizations.

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LIST OF ABBREVIATIONS

C.P.E.	Certificate of Primary Education
Ph.D.	Doctor of Philosophy
I.L.O.	International Labour Organization
H.O.	Null Hypothesis
S.A.	Strongly Agree
A	Agree
N	Neutral
D	Disagree
S.D	Strongly Disagree
r	Correlation Coefficient
t	Student 't' test (small sample's test)
P 0.05	Proportion below normal curve is 95%

ABSTRACT

A study of the Relationship Between Achievement and Attitudes Towards Mathematics Among Standard Seven Pupils in Kabazi Location of Nakuru District.

This is a study of the relationship between achievement and attitudes towards mathematics among standard seven pupils. It attempts to establish the importance of attitudes towards mathematics achievement. It also tries to measure the effect of another variable, sex, which is closely associated with performance in mathematics.

The sample of the study consisted of pupils from standard seven in Kabazi Educational Zone of Nakuru District. Four schools were drawn randomly from the eight schools in that location. The random selection was aimed at reducing the diversity in availability of learning facilities.

A stratified random sampling was carried out to select 10 pupils from each of the four schools. Each category, above average, average and below average in Mathematics was selected from. Thus, 40 pupils made the sample size of the study.

The data was collected by the use of the following instruments. An achievement test which took the form of K.C.P.E. examination format and an attitude test. The answer sheets contained a space for indicating the sex of the respondent.

The test items were scored manually, awarding points to correct responses and no point for incorrect responses in the achievement test. For attitude test, points were awarded depending on the type of feeling manifested. For example, positive feelings were awarded more points than negative feelings.

The scores were then analysed by use of some statistical techniques namely: the correlation coefficient t test, the percentages and mean. These helped in arriving at some conclusions from the study.

The correlation coefficient revealed that attitudes towards Mathematics and achievement in Mathematics were positively correlated. However the magnitude of the correlation was found to be statistically insignificant.

The correlation between attitudes and achievement for girls was found to be higher than for boys.

All the three hypotheses of the study were accepted.

From the above findings the researcher concluded that the positive correlation that exists indicate that attitudes have some influence on acheivement. Furthermore this influence is higher for girls than boys. Therefore, pupils should be encouraged in Mathematics so that they develop positive feelings

CHAPTER ONE

1.1 Background

This research study investigates the relationship between achievement in mathematics and the attitudes of standard seven pupils in Kabazi location towards Mathematics.

Kabazi location is in Bahati Division of Nakuru District. The population of the study were all standard seven pupils in that location; they were 890 in number. The sample group was randomly selected from four schools, to have forty pupils who made up the study group.

The sample group was treated to two test items, one to find out their attitudes towards mathematics and the second one, an achievement test to find out how their attitudes were related to their performance in mathematics. The major objective of the study was to find out the influence of attitude on performance in Mathematics.

Researchers and educators have all been concerned about the continued poor performance in Kenya in this very important subject. The researchers believe that attitudes held towards a particular subject will in-

fluence how one performs in that subject. If one likes a subject, he puts all his effort in it and often performs well. On the contrary, when one dislikes a subject, he spends little time in the subject and the outcome is poor performance. Attitudes held towards a subject like Mathematics, which is basically abstract in nature, may be one of the factors which contribute to poor performance in Mathematics.

The importance of Mathematics in the curriculum is demonstrated by its utilitarian value to the pupils after school and its use as a gateway to future employment and training opportunities. This illustrates clearly why everybody concerned should help our school pupils perform well in it.

The underlying question in the study is "Do low achievers' attitudes toward Mathematics differ from those of high achievers?"

1.2 The Problem

There is very poor performance in Mathematics in Kabazi location. This year's zonal mock examination shows an average mark of 27.79%, (July 1990, Bahati Division Mock Examination). This poor performance reflects previous years performance in Mathematics. This

subject continues to be the worst done in this location and in Kenya, yet it is one of the most important subject in the curriculum, besides being compulsory for all the pupils.

Parents have expressed their concern about this poor performance. The same concern has been expressed by school inspectors and politicians alike. It is because of this prevailing problem that the researcher tried to find out how the attitudes held by the pupils toward Mathematics influence their achievement.

Most educators do agree that attitudes play an important part in the learning process. They believe that attitudes formed early in life persist throughout life. These attitudes can be learned or acquired through our cultural backgrounds, environment, values, peers and parents. Attitudes held towards Mathematics from either of those areas, may determine how well or bad one performs in mathematics. The task of the researcher was to find out the relationship between attitudes of standard seven pupils towards mathematics and their achievement in it. There is poor perfor-

mance in Mathematics, that is generally attributed to poor attitudes towards the subject. By finding out the exact correlation between attitudes and achievement, the solution would be sought by initially tackling the attitude issue. Performance in Mathematics has not been satisfactory for many years. Evidence to this can be got from Kenya Examination Council C.P.E. Newsletter (1984) which indicates that from 1978 to 1983, performance has been below average, or those who pass are below 50%. The poor performance is common in both rural and urban schools. The poor performance in primary schools is also reflected again in secondary schools as shown by the following data obtained from Major B. Oyuga's Ph.D. proposal for 1990, which shows the Kenya National Examination Council report on performance in Mathematics in relation to other subjects.

TABLE 1

MATHEMATICS YEARLY 'O' LEVEL PERCENTAGE PASS							
SUBJECT	1981	1982	1983	1984	1985	1986	1987
Maths	25.5	27.5	33.5	32.5	34.5	32.5	30.9
Physics	64.0	66.9	66.7	66.3	65.3	66.8	67.0
Chemistry	71.6	72.1	74.1	74.3	74.4	73.0	71.7
Biology	55.7	52.9	52.8	62.2	66.6	47.9	40.5
Physical Science	65.1	65.3	59.4	71.5	71.1	71.9	71.7
Agriculture	68.3	76.7	78.6	87.5	89.7	90.4	89.0
Geography	44.0	46.0	44.3	49.3	64.3	66.0	63.4
Fine Art	65.9	84.9	82.8	88.7	69.5	84.1	77.1
History	44.0	46.0	55.4	59.9	68.7	74.8	70.7
CRE 227	72.8	67.4	65.3	67.6	68.2	75.0	78.3
CRE 228	60.7	70.9	73.4	71.4	72.8	72.8	72.5
Commerce	41.1	41.9	44.8	41.7	53.7	48.4	48.4
English Language	42.0	46.0	45.9	52.1	52.5	35.6	47.8
General Science	39.6	33.9	36.9	58.6	44.4	41.7	38.8

The above table shows very clearly that the performance of Mathematics in relation to other subjects is very poor. This poor performance is predominant in Kibazi location because their previous record in division examinations has rarely exceeded 30%. Another fact to be seen in this particular location is that, for the last 5 (five) years they have not been able to have more than 10(ten) pupils admitted to government aided secondary

schools.

1.3 Rationale

This study has been prompted by the investigators concern about the poor performance in mathematics in our primary schools. The researcher believes that among the several factors which affect good performance, attitude toward mathematics has its part to play. It is important to the teacher to determine to what extent attitudes influence performance so that during his teaching, the concern for the attitudes and provision of pure knowledge could be given their rightful emphasis. The importance of Mathematics is reflected in the curriculum; it is a compulsory subject, pupils need to pass it in order to enter various employment or continue with learning. It is assumed that under such circumstances, many pupils may strive to perform well in maths despite the negative attitude. It is also assumed that there are other factors like the nature of mathematics that contribute to poor performance, but this study will only look at the influence of attitudes only.

The investigator has chosen Kabazi location because no previous research has been carried in that

particular place. Similar researches have been carried out in urban set ups, for example Orora (1987) carried his in Machakos. Other researchers have done their studies in Nairobi. There was then a need to find the attitudes of rural children and see how it affect their achievement in Mathematics.

1.4 The Hyppothesis of the Study

The main objective of this study was to verify or nullify the null hypothesis: viz;

Ho: There is no significant difference in achievement between pupils with positive attitudes and pupils with negative attitudes towards Mathematics.

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

Ho₁: There is no correlation between attitudes of pupils toward Mathematics and acheive-ment in Mathematics.

Ho₂: There is no correlation between boys' attitudes towards Mathematics and their achievement in Mathematics.

Ho₃: There is no correlation between girls' attitudes towards Mathematics and their achievement in Mathematics.

1.5 Research Questions

During the study, the researcher tried to answer the following questions from the research findings:

- (a) How is attitude toward Mathematics related to achievement in Mathematics for:
 - (i) The whole group
 - (ii) Boys
 - (iii) Girls

- (b) How does correlation between attitudes and achievement compare in the above groups.

1.6 The Variables

1. The dependent variable in this study is Mathematical achievement as is revealed by the scores on the research instruments.
2. The independent variables in this study are:

- (a) Sex of the child, (there were equal number of boys and girls.)
- (b) Attitudes of the pupils.

3. Intervening variables: the uncontrollable variables that may have significant influence upon the dependent variables are:

- (a) Health and emotional state of the pupil at the time of the test.
- (b) Reading and comprehension abilities of the pupils.

The influence of these variables was assumed to be constant.

1.7 Assumptions of the Study

In a study of the relationship between attitudes and achievement, the researcher assumed that there existed individual differences.

Other assumptions include:

- (a) Reading and comprehension abilities of pupils is the same.

- (b) The pupils come from the same environment.
- (c) There are external influence upon the pupils, cheating, impressing the researcher, and fear at the time of the test.

1.8 Limitations of the Study

- (i) Sample Size: Due to the limitation imposed by time and finance, only four schools out of all schools in Bahati Division were used in the study sample. Ten pupils were chosen from each school making a sample size of forty pupils. This sample may make generalization of result biased.
- (ii) No attempt was made to investigate other variables which may influence pupils achievement. They were assumed constant.
- (iii) A respondent might want to impress the researcher by showing positive attitude towards Mathematics when this is not the case. Such a response could lead the researcher to assume a positive attitude erroneously.

CHAPTER TWO

LITERATURE REVIEW

2.0 Background

Mathematics is a key subject in the primary and secondary schools in Kenya. It serves as a link and a service course to a number of subjects which include Geography, Chemistry, Economics among many others in secondary schools and other institutions of higher learning.

A good background must therefore be laid in Mathematics at the primary school level in order to facilitate a pupil's continuity with higher education in the Science as well as the arts subjects. The pupils should also be helped in the cultivation of the right attitude towards the subject.

Many factors have been found to influence performance in Mathematics. They range from teaching methods used by different teachers, availability of teaching resources, the school environment, home and cultural background, teachers and pupils attitudes and many more.

This study is intended to find out whether there exist a relationship between attitudes towards Mathe-

matics and achievement. In this chapter, we look at the literature on attitudes and achievement in mathematics.

2.1 Attitudes

Psychologist and most educators agree that attitudes play an important part in the learning process. Teachers and everybody concerned with the education of our children have a heavy responsibility in helping to create favourable attitudes towards Mathematics.

Johnson Donovan A. (1967) stated that:

"It is the attitudes that our students develop which are likely to stimulate or stop further study of Mathematics. It is the attitudes which we build that are highly involved in the learning and retention of our subject... and it is often the attitudes you build that are the basis for your rank as successful teachers."¹

Thus, if a student develops a positive attitude, then the chances of his liking the subject and at the same time performing well are increased. Johnson went on to stress his point by this example:

"If the attitude of appreciation of Mathematics is attained by a student, then he studies Mathematics because he enjoys it, he gets satisfaction from knowing Mathematical ideas, he feels rewarded when he attains mathematical competency."²

Aiken (1970), in his studies on attitudes towards Mathematics established that it can start early when the child enters lower primary. They either form a positive or negative attitude depending on the environment they have been exposed to. The selection of standard seven pupils as the sample group was in the belief that they have long been in school and have formed relatively stable attitudes.

Marilyn Syndom (1982) of Ohio University studied attitudes held towards Mathematics by elementary grade pupils, her findings were stated thus:

"Pupils of elementary grade have positive attitudes towards Mathematics".³

She found no significant difference between attitudes towards Mathematics, of elementary school girls and boys.

To support her findings, it is worth to note that if one made a visit to a standard one or standard two

Mathematics class in progress, you see that most of the pupils are excited to learn the subject. However, if a similar visit is made in the upper primary, it reveals that a few pupils in these classes have already developed negative attitudes towards Mathematics. These few pupils do not want anything to do with Mathematics and would rather find all sorts of reasons to miss the lesson.

Bell F.H. (1980) states:

"Home, school and the society all have their part to play in the inculcation of attitudes and interests."⁴

Pupils may acquire the parents', teachers' or peer group's attitudes, which may contribute very much to how they perform in Mathematics.

Johnson and Rising (1972) puts it that,

"Attitudes are fundamental to dynamics of behaviour, they largely determine what student learn ... the attitudes not only determine willingness to study Mathematics, but also the use of Mathematics. The development of positive attitudes towards Mathematics is of fundamental concern to the Mathematics teachers."⁵

Harold Hearch (1957) in his study of arithmetic instruction changes and their effects on attitudes towards arithmetic expressed his views in this way:

"Teachers have a big responsibility in designing instructional materials and strategies that would help promote positive attitudes in the classroom."⁶

It is important that the learning situations be made pleasant and friendly for Mathematics lessons to be enjoyed by the learners, otherwise negative attitudes may develop.

Robert F. Mager in Aiken (1970) pointed out that:

"It is not necessary that lessons be fun to create positive attitudes."⁷

But it is important that Mathematics be taught in a tension free environment, and more important, there should be freedom and confidence in teachers and pupils.

Research studies have not been conclusive as to what factors leads to positive or negative attitudes, but there is a general agreement by Johnson, Learch and Merger that there exist a relationship between

attitude and achievement in arithmetic.

Lyda and Morse (1962) concluded in their study on attitudes and achievement in Mathematics that:

"When meaningful methods of teaching arithmetic are used, changes in attitudes take place. Negative attitudes become positive and intensity of positive attitude become enhanced ... associated with meaningful methods of teaching arithmetic and changes in attitudes are significant gains in arithmetic achievement in computation and Reasoning."⁸

Kraup J. (1983) felt that there is more need for information concerning attitudes of children towards specific activities and procedures used in teaching arithmetic. The same feelings were expressed by Robert Fannie (1973) when he stated that the matter of attitudes towards Mathematics needs additional study.

The above research which have been reviewed indicated that attitudes formed by the pupils, either in school or at home play an important part in determining how well or bad the pupil achieve in school especially in a subject like Mathematics, which is compulsory in primary school. This study is then aimed at finding out how much pupils' attitudes influence

achievement in Mathematics.

2.2 Achievement

Previous studies in Kenya in the last two decades have shown that school achievement bears the greatest direct relationship to occupational achievement (I.L.O. 1972). This direct relationship between school achievement and occupational opportunities have given certification a high value in Kenya.

Today public examinations like K.C.P.E. and their subsequent grading of children into qualitative categories are forcing parents to spend fortunes in schools, textbooks and private tuition for their children. One fundamental motive underlying this parental concern is that good learning environment has a potential influence on achievement.

Maritim (1980) puts it that:

"School achievement is a multidimensional concept. Besides being dependent on a child's social and economic background, school facilities, mental ability and personality, it is also dependent on pupils attitudes which may be contributed by many factors."⁹

Research have been carried out in various countries, which looked into different factors. Most recent researches in Kenya that have examined school achievement seem to assume that school achievement is manifest independently on psychological variables. Other researchers argue that, the relationship between attitudes and achievement is reciprocal. Neale (1963) in Aiken (1970) refers to this relationship as:

"... a dynamic interaction between feelings and the behaviour as observed in the performance."¹⁰

Bernstein (1964) in Aiken (1970) says:

"Experienced feelings lead to particular self image on the part of the pupil. The self image which is equivalent to attitude, will influence his expectation of future performance."¹¹

Kempler (1962) in Aiken (1970) in line with Bernstein suggests that lack of confidence in ones mathematical ability is associated with rigidity in mathematical tasks.

Shapiro (1962) relates attitudes toward Mathematics with perserverance toward solutions to arithmetic problems. His findings shows that elementary school

children who have a liking for Mathematics have a higher perserverance than those who dislike it. This is an indication that attitude influences perserverance, a good quality essential for mathematicians.

Alpert et. al, (1963) in Aiken (1970) analyse the relationship among attitude, expectations and performance. They came up with a view that the level of performance and expectation is a kind of self perpetuating cycle affecting a child's self concept, a concept related to attitudes and anxiety.

Brown and Abell (1965) in Aiken (1970) in their study of the correlation between attitude toward a subject and achievement in that subject find that this correlation is higher for Mathematics than any other subject. In this review by grade, Aiken (1970) reports these findings of several researchers.-

Lindgren et. al (1964) in their study of Brazilian elementary school children, reports significant positive correlation between problem solving attitudes and scores on arithmetic achievement test. At the junior high school level, Alpert et. al, finds a significant correlation between performance in Mathematics and measures of attitudes towards Mathematics.

It is then necessary to relate these findings to the Kenyan rural context, and find out whether the above research findings do correlate.

2.3 Summary

A considerable amount of data support the dislike of Mathematics by school pupils. This has resulted in low achievement in Mathematics. While no completely satisfactory explanation have been proposed for discrepancies in mathematical achievement between males and females, several factors appear related.

Studies of attitudes held towards Mathematics, though not exhaustive, have indicated a reciprocal and mutually reinforcing relationship between attitudes and achievement. The feelings have been shown to have a lot of influence on pupils performance and participation in Mathematics. The social as well as physical environment should be so tailored as to minimize the formation of negative attitudes which would negatively influence performance and achievement in Mathematics.

CHAPTER THREE

DESIGN OF THE STUDY

This chapter is divided into four sections. The first section describes the research instruments which were used to measure the variables which were studied.

The second section describes the sample used in the study and how it was selected. Reasons why a particular method was used is given in this section.

The third section describes the methods and procedure for test administration.

The last section describes the way the different tests were scored.

In particular, the scores on the attitude test are interpreted to reflect the feeling of the tests toward Mathematics.

3.1 Research Instruments

The investigator used questionnaire a test as the tools of the study. The first questionnaire was a measure on an attitude scale. It was made of twenty items which seeked the pupils' opinions or feelings about Mathematics. This attitude test was designed using the

Likert five point scale method. To obtain the attitude scores the pupils were required to respond to items of a written questionnaire indicating whether they strongly agree, agree, neutral, disagree or strongly disagree.

The questionnaire was in the form of multiple choice, half of which did compose statements indicating favourable attitudes towards Mathematics and the remaining half the reverse. These items were arranged in an order which introduced an in-build check for serious and genuine responses. Opposite statements did not necessarily follow each other consecutively.

The second instrument - the maths achievement test - consisted of 20 items of multiple choice. This test was designed in the K.C.P.E. style, and did cover as much as possible, areas on arithmetic reasoning, problem solving, arithmetic computation, mathematical application and interpretation.

The mathematical problems were set from standard seven textbook, to cover first and second term work

3.2 Research Sample and its Selection

The objective of the study was to find out the relationship between attitudes and achievement in Mathematics. In other words the underlying question is "do poor achievers' attitude towards Mathematics differ from those of good achievers in Mathematics

It was necessary that the sampling had to be a stratified one. The progress reports were used to categorize pupils into above average, average and below average in Mathematics.

First, four schools to form the sample schools for the study were randomly chosen from the list of all schools in Bahati Division. This means that the population of this study was all standard seven pupils in the division. To obtain the sample of the study from each of the four schools, the researcher used standard seven class lists to produce two different lists, one for boys and another for girls. A random sample for 5 boys and 5 girls were selected.

In all, the sample was made up of 20 boys and 20 girls, all selected from these categories, above average, average and below average, from respective

school performance lists.

3.3 Test Administration

The investigator administered the questionnaire and test to the respondents in the selected schools. First the investigator explained the purpose of the questionnaire and test to the respondents and used the class teachers to help administer the questionnaires and test to the pupils.

First, the student were treated to an attitude test, which took 20 minutes. They were to circle the appropriate point on the scale to mark their opinion about each item.

After a break of 10 minutes, an achievement test was administered on the pupils. It was supposed to take 40 minutes. On the questionnaire, the pupils were to provide information about their school and sex for ease of matching their scores to their attitudes.

3.4 Test Scoring

The tests were scored manually and the test scores expressed as percentages.

The following procedure was followed when scoring the responses on attitude scale- for statements showing the attitudes towards maths, the responses scored the points as indicated:

'SA'	-	5 points
'A'	-	4 points
'N'	-	3 points
'D'	-	2 points
'SD'	-	1 point

for statements advocating negative attitude towards maths, the responses scored as below:

'SA'	-	1 point
'A'	-	2 points
'N'	-	3 points
'D'	-	4 points
'SD'	-	5 points.

To obtain an indication of the type of attitude a pupil has, his or her total scores were computed by adding together the points scored in each item. This total is to be divided by the number of items. The result of this division will be an indicator of whether the child has positive, neutral or negative attitude toward Mathematics. A quotient of 3 will indicate

neutral, above 3 will indicate a negative attitude.

To convert the scores into percentage, the following procedure was used:

Total number of items	=	20
Maximum possible score	=	100 (since each item has maximum score of 5).
Minimum possible score	=	20
Total score for the 20 items	=	X

(x is the number of marks)

The total score of the individual pupil will be expressed as a fraction of 100 i.e. $\frac{20x}{100}$, then multiplied one hundred to express it as percentage i.e. $\frac{x}{100} \times 100$

The minimum scores as percentage will be 20%. To obtain the pupils level of performance on achievement test, each question carried a maximum of 5 marks so that the scores were marked out of 100.

CHAPTER FOUR

ANALYSIS OF THE FINDINGS

4.0 Introduction

This chapter discusses the research findings as measured by the instruments in chapter 3.

The main aim of the research was to investigate the relationship between attitudes towards Mathematics and achievement in Mathematics. The procedure outlined below will help in computing correlation coefficients. Hoel (1971) says correlation is a measure of the relationship between a pair of variables. It is a useful measure of the strength of the relationship between two variables, except that the variables have to be linearly related. Thus as the correlation approaches +1 or -1 the degree of linear relationship increases or decreases.

A correlation of 0 magnitude may therefore mean two things: either an existence of close relationship but not linear or no relationship at all between the pair variables.

4.0 Distribution of Scores

The respondents were coded 1, 2 ... 40 in descending order in accordance with their scores on achieve-

ment test, and correlation coefficients computed by the help of Pearson-product coefficient formula.

$$(r) = \frac{N \sum XY - \sum X \cdot Y}{\sqrt{N \sum X^2 - (\sum X)^2 \quad N \sum Y^2 - (\sum Y)^2}}$$

Note: X represents total achievement scores
 Y represents total attitude scores
 N represents number of students

TABLE 2
Achievement, Attitude Score Distribution
of Whole Group

<u>SERIAL NO.</u>	<u>ACHIEVEMENT</u>	<u>ATTITUDE</u>
1	95	80
2	90	85
3	90	79
4	85	91
5	80	96
6	80	74
7	80	55
8	80	82
9	75	85
10	75	72
11	70	73
12	70	51
13	65	75
14	65	76
15	65	88
16	65	68
17	60	85

<u>SERIAL NO.</u>	<u>ACHIEVEMENT</u>	<u>ATTITUDE</u>
18	60	74
19	55	68
20	55	69
21	50	75
22	50	70
23	50	77
24	50	73
25	45	64
26	45	68
27	45	72
28	45	78
29	40	85
30	40	57
31	40	68
32	40	72
33	40	90
34	35	62
35	35	72
36	30	71
37	30	55
38	20	77
39	15	82
40	15	64
	<hr/>	<hr/>
	2220	2958
	<hr/>	<hr/>

Computed correlation coefficient (r) is 0.418.

TABLE 3
ACHIEVEMENT, ATTITUDE SCORES FOR BOYS

<u>SERIAL NO.</u>	<u>ACHIEVEMENT</u> <u>SCORES</u>	<u>ATTITUDE</u> <u>SCORES</u>
1	90	79
2	85	91
3	80	74
4	80	55
5	75	72
6	70	73
7	65	75
8	65	68
9	60	85
10	60	74
11	55	68
12	55	69
13	50	73
14	50	70
15	45	72
16	45	68
17	35	62
18	30	55
19	30	71
20	15	82
	<u>1140</u>	<u>1436</u>

The computed correlation coefficient (r) is 0.248.

TABLE 4
SCORES FOR GIRLS

<u>SERIAL NO.</u>	<u>ACHIEVEMENT</u> <u>SCORES</u>	<u>ATTITUDE</u> <u>SCORES</u>
1	95	80
2	90	85
3	80	96
4	80	82
5	75	85
6	70	51
7	65	76
8	65	88
9	50	77
10	50	75
11	45	64
12	45	78
13	40	85
14	40	57
15	40	68
16	40	72
17	40	90
18	35	72
19	20	77
20	15	64
	<u>1080</u>	<u>1522</u>

The computed correlation coefficient (r) for the above data is 0.307

RESULTSTABLE 5CORRELATION COEFFICIENT FOR ATTITUDES
VERSUS ACHIEVEMENT

SAMPLE	SAMPLE SIZE	ATTITUDE/ACHIEVEMENT
Whole Group	40	0.418
Boys	20	0.248
Girls	20	0.307

The results of the computed coefficients displayed on Table 5 were used to test the three hypotheses of the research namely:-

H_{0_1} : There is no correlation between attitudes and achievement in Mathematics .

H_{0_2} : There is no correlation between boys attitudes toward Mathematics and their achievement in Mathematics.

H_{o3} : There is no correlation between girls attitudes towards Mathematics and their achievement in Mathematics.

COMPARISON OF COEFFICIENT

To answer the research question: "How does the correlations between attitudes and achievement compare in the three groups, a table '6' was drawn as shown below to show:

TABLE 6
CORRELATION COEFFICIENT FOR ATTITUDES
VERSUS ACHIEVEMENT AND RESIDUAL FACTORS

SAMPLE	CORRELAITON COEFF. (r)	$1-r^2$
Whole Group	0.418	0.825
Boys	0.248	0.939
Girls	0.307	0.906

$1 - r^2$ is the residual factors (unexplained factors).

TABLE 7TOTAL MEAN SCORES AND t VALUES

	BOYS	GIRLS	t VALUE	d.f	c.v
Sample Size	20	20	-	-	-
Mean Achievement	57	54	0.059	38	1.684
Mean Attitude	71.8	76.1	0.745	38	1.684

$$t = \frac{X - u}{S} \sqrt{N - 1} \quad (\text{small sample test})$$

where X is mean of sample

u is the population mean

S = standard deviation of sample

N is the sample size

d.f. = N - 2

C. V = 0.05

CHAPTER FIVE

CONCLUSIONS, SUMMARY, IMPLICATIONS AND RECOMMENDATIONS

5.0 Introduction

In this chapter, the researcher summarizes the research study. The summary gives the purpose of the study, the reviewed literature as well as a brief description of the sample of the study.

Conclusions based on the analysis in chapter four are also drawn in this chapter. They are drawn considering each research question and hypothesis at a time.

The conclusions drawn from the research findings then lead to the implications of the study results. The implications are discussed as they relate to attitude formation and achievement in Mathematics.

Finally, recommendations for further research are given.

5.1 Summary, Conclusion

The purpose of this study was to investigate how attitudes formed by standard seven pupils related

to achievement in Mathematics. It sought to answer the following questions:

- (a) How is attitude towards Mathematics related to achievement for the whole group, boys and girls separately?
- (b) How does correlation between attitudes and achievement compare in the above groups?

It was hoped that the study would be of great interest to teachers and parents because it would give the relative importance between attitudes towards Mathematics and how they influence achievement in Mathematics. A review of literature related to attitudes and achievement in Mathematics showed that boys have superior attitudes toward Mathematics than girls. But the researchers were not of the same opinion that the differences in the feelings were significant.

On the attitude formation and performance in Mathematics, generally the study findings reports a positive correlation. This means that as attitude increases, then performance improves and vice-versa.

It should be noted that not all the findings were found by these researchers to be of significant correlation. The subject selected consisted of standard seven pupils in Kabazi location. Four schools were randomly selected to make a sample of 40 students. The statistics used in this research did include:

the mean, correlation coefficient, 't' test and percentages.

5.2.1 Findings Based on Attitude and Achievement

1. There was a positive correlation between attitudes towards Mathematics and achievement in Mathematics for:

- (i) the whole group studied
- (ii) the boys and
- (iii) the girls.

All the correlations were however not significant at $p < 0.05$ level of significant when the coefficient for attitudes versus achievement were squared, and the square subtracted from one to find the residual factors. It was found that other factors, a part from attitudes, were responsible for 93.9% of

the points scored in achievement test in boys and 90.6% in girls.

The correlation between attitudes towards Mathematics and achievement in Mathematics for girls was higher than for boys.

Thus, the null hypotheses, of no correlation between attitudes towards Mathematics and achievement in Mathematics for:

- i) the whole group
- ii) boys
- iii) girls.

were accepted at 0.05 level of significance.

2. The correlation between attitudes and achievement in Mathematics was much higher for the whole group. Correlation for girls was much higher than that one for boys. Infact it was twice as high as the correlation for boys.

5.2.2 General Conclusions

Three general conclusions can be made from this study. First, all cases where attitudes were compared

with the other variable, achievement, a positive correlation was found.

However, the correlations were not large enough for the hypotheses to be statistically rejected.

Secondly, pupils realize the importance of Mathematics therefore, generally have positive feelings. However, they lack the ability in the subject to enable them achieve optimally.

5.3 Implications of the Study

1. The positive correlations found between attitudes towards Mathematics and achievement imply that both boys and girls must be helped to develop positive feelings towards Mathematics.
2. Comparison of the correlations in the three groups, whole group, boys and girls indicate that the pupils are not performing to their expectation because of lack of the ability in the subject. Facilities and proper approaches to teaching Mathematics should be adopted so that pupils develop concepts

in Mathematics to enhance their abilities in the subject.

3. The correlation for girls was higher than for boys. This implies that attitudes as a variable is more important in influencing achievement for girls than for boys. This means that girls need more encouragement to form healthy feelings than boys do.

5.4 Recommendations

For students to build a positive attitude towards Mathematics, the teacher should attempt to:

- provide a good atmosphere for learning Mathematics.
- show appreciation of Mathematics subjects as it relates to other subjects. Mathematical ideas should be approached from many directions and through various media.
- show attitudes which are sympathetic especially to the weaker students.
- show enthusiasm in teaching those students who are sincere and show respect to those

students so that the student will be supportive. This requires an added good personality from the teacher to aid in communication, motivation and tolerance on the slower and uncompromising answers from some of the students.

5.5 Recommendations for Further Research

1. There is need to replicate the study using a bigger sample. The sample size of 40 pupils used in the study was chosen due to the limitation of time and finances. This size cannot be conclusively said to be a proper representation of Bahati Primary school children of standard seven population.
2. The study should be replicated by taking care of the reading and comprehension abilities of the respondents. These variables were assumed constant, an assumption which was not necessarily true.
3. There is need for more research on other factors which influence achievement in Mathematics a part from the attitudes. The

residual factors were found to be responsible for the points scored in achievement test more than attitudes as a factor. In particular, research should be done on ability and its relation to achievement.

5.6 General Summary

Attitude of students toward the subject of Mathematics is affected generally by the class-teacher's method and challenges in the handling and operation of the subject. Aside from this it could be dented by the students' peer groups, parental discouragement, school environment and learning conditions. For some success in promotion of positive attitudes, the teaching must involve examples familiar to the students. The teaching must be done in good atmosphere and both appreciation for Mathematics and show of good attitudes which are sympathetic to the weaker students must be fostered.

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APPENDIX I

ATTITUDE TEST

Read these instruction carefully then answer the following questions below:

You have been given some questions to fill on what you think about Mathematics.

There is no correct answer or wrong answer to any question.

Just choose one and circle the letter in front of the answer which seems best to you from:

- 'A' Strongly agree
- 'B₁' Agree
- 'C' Do not know
- 'D' Disagree
- 'F' Strongly Agree.

Provide the following information before you start the test, by putting a tick in the appropriate box yourself.

SCHOOL	SEX	
	Boy	
	Girls	

1. I like story books more than Arithmetic books:

- A. Strongly agree
- B. Agree
- C. Do not know
- D. Disagree
- E. Strongly disagree.

2. I like doing Mathematics more than doing anything else:

- A. Strongly agree
- B. Agree
- C. Do not know
- D. Disagree
- F. Strongly Disagree.

3. The subject I hate most is Mathematics:

- A. Strongly agree
- B. Agree
- C. Do not know
- D. Disagree

E Strongly disagree.

4. Mathematics is enjoyable:

A. Strongly agree

B. Agree

C. Do not know

D. Disagree

E Strongly disagree.

5. Mathematics is not enjoyable:

A. Strongly Agree

B. Agree

C. Do not know

D. Disagree

E. Strongly disagree.

6. Arithmetic is a subject which is more difficult to understand than any other subject:

A. Strongly agree

B. Agree

C. Disagree

D. Strongly disagree

E. Strongly disagree.

7. No matter how hard I try I cannot understand Mathematics:

- A. Strongly agree
- B. Agree
- C. Do not know
- D. Disagree
- E. Strongly disagree.

8. Mathematics is useful in life:

- A. Strongly agree
- B. Agree
- C. Do not know
- D. Disagree
- E. Strongly disagree

9. Mathematics is easier for me than any other subject:

- A. Strongly agree
- B. Agree
- C. Do not know
- D. Disagree
- E. Strongly disagree.

10 I can get along perfectly well in everyday life without Mathematics:

- A. Strongly agree
- B. Agree.

- C. Do not know
- D. Disagree
- E. Strongly disagree.

11. I cannot understand how some people think
Mathematics is enjoyable:

- A. Strongly agree
- B. Agree
- C. Do not know
- D. Disagree
- E. Strongly disagree.

12. I wish I could do better in Mathematics:

- A. Strongly agree
- B. Agree
- C. Do not know
- D. Disagree
- E. Strongly disagree.

13. I try to do the very best I can in Mathematics:

- A. Strongly agree
- B. Agree
- C. Do not know
- D. Disagree
- E. Strongly disagree.

14. I am very proud of my Mathematics school work:
- A. Strongly agree
 - B. Agree
 - C. Do not know
 - D. Disagree
 - E. Strongly disagree.
15. Pupils really enjoy Mathematics lessons:
- A. Strongly agree
 - B. Agree
 - C. Do not know
 - D. Disagree
 - E. Strongly disagree
16. Mathematics lessons should be reduced to be less than what they are:
- A. Strongly agree
 - B. Agree
 - C. Do not know
 - E. Strongly disagree
17. Mathematic is more of a game than it is hard-work:
- A. Strongly agree
 - B. Agree

- C. Do not know
- D. Disagree
- E. Strongly disagree.

18 My parents think Mathematics is the most important subject:

- A. Strongly agree
- B. Agree
- C. Do not know
- D. Disagree
- E. Strongly disagree

19 There is so much hard work in Mathematics that it takes the fun out of it:

- A. Strongly agree
- B. Agree
- C. Do not know
- D. Disagree
- E. Strongly disagree.

20. I would not like to do Mathematics after standard eight:

- A. Strongly agree
- B. Agree
- C. Do not know

D. Disagree

E Strongly disagree.

APPENDIX II

ACHIEVEMENT TEST

Read the instructions carefully, then answer the questions below:

1. The test is for research purposes.
2. Do not write your name on the answer sheet.
3. This test will not reflect on your examination results.
4. Feel free and do your best.
5. Work fast and be accurate.
6. Choose the correct answer and put a tick in the correct box to the answer.
7. Provide the following information before you start the test, by putting a tick in the appropriate box:

SCHOOL	SEX	
	Boy	
	Girl	

Now answer ALL questions below:

Put a tick in the box corresponding to the correct answer.

Do all your work in the rough paper provided.

Time 40 Minutes

1. A rectangular plot measures 86.75m by 63.25m
what is the perimeter of the plot?
 - A. 54.86.94
 - B. 300.00
 - C. 150.00
 - D. 2743.47

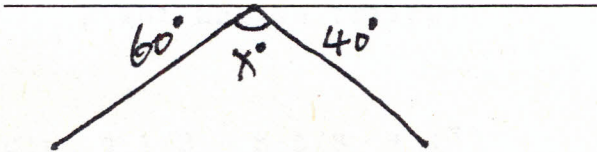
2. Find X if: $2x + 5x = 56$
 - A. 7
 - B. 9
 - C. 8
 - D. 6

3. A number is divisible by 9 if the sum of its digits is divisible by 9, which of these numbers is divisible by 9?
 - A. 3264
 - B. 4576128
 - C. 3024
 - D. 51232

4. Solve $\frac{5}{7} + \frac{2}{3} + \frac{1}{14}$.

- A. $\frac{30}{40}$
- B. $\frac{61}{42}$
- C. $8/21$
- D. $8/28$

5. Find angle X in the figure below:



- A. 40
 - B. 50
 - C. 60
 - D. 80
6. Find K if: $K \div 9 = 2$

- A 18
- B $2/9$
- C 9
- D $1/9$

7. $1/4W + 3 = 5$

What is the value of W?

- A 2
- B 8

C 32

D $1/2$

8. What name do we give a triangle whose sides are all equal?

A. Isosceles triangle

B. Quadrilateral triangle

C. Equilateral triangle

D. Right angled triangle

9. Solve $4 \frac{1}{2} - 5 \frac{5}{8} + 1\frac{3}{16}$

A. $15/16$

B. $19/16$

C. $1/16$

D. 0

10 By how much is $3/4$ greater than $2/3$?

A. $1/2$

B. $8/12$

C. $9/12$

D. $1/12$

11 Write in words: - 7,00,053.

A. Seven million, six hundred thousand, fifty three.

- B. Seven hundred, six thousand, fifty three.
 C. Seven million, six thousand and fifty three.
 D. Seven million, six hundred thousand and fifty three.

12. Add:

$$\begin{array}{r}
 239742 \\
 160728 \\
 314526 \\
 \hline
 603425 \\
 \hline
 \end{array}$$

- A. 1,308,322
 B. 1,318,322
 C. 1,318,402
 D. 1,318,422

- 13 531 farmers sold 25 bags of rice each. Each bag weighed 80 kgs. What was the total weight of rice sold?

- A. 13275 Kgs.
 B. 106,200 Kgs.
 C. 42480 Kgs.
 D. 44480 Kgs.

- 14 A school has enough beans for nine days, if there are 540 Kgs. of beans in the school's store, how many kilograms of beans does the school con-

sume each day?

- A. 4,860 Kgs.
- B. 70 Kgs.
- C. 540 Kgs.
- D. 60 Kgs.

15 Solve $\frac{5}{12} - \frac{3}{8}$.

- A. $\frac{2}{4}$
- B. $\frac{1}{2}$
- C. $\frac{1}{24}$
- D. $\frac{1}{12}$

16. How long will a lorry travelling at an average speed of 45 Km per hour take to cover 198 Km? (Give your answer in hours).

- A. 0.44 hours
- B. 4.4 hours
- C. 4.04 hours
- D. 4.0 horus.

17 Otieno gave three-eighths of his land to his eldest son, and then gave one-sixth to his second son. What fraction of the land did he give away?

- A. $\frac{13}{24}$

- B. $43/48$
- C. $5/48$
- D. $5/24$

18 Find the G.C.D. of 45 and 60.

- A. 180
- B. 4
- C. 9
- D. 5

19 Kamau lives $2 \frac{1}{4}$ Km away from school. If he goes to school in the morning and comes back in the evening, how many kilometres does he cover in 10 days.

- A. $20 \frac{1}{2}$
- B. $22 \frac{1}{2}$
- C. 45 Km
- D. 50 Km

20 Find the value of M, given that $5m + 7 - 2m = 28$.

- A. 14
- B. 3
- C. 21
- D. 7

APPENDIX III

ANSWERS:

1.	B	2.	C
3.	C	4	B
5.	D	6	A
7	B	8	C
9	C	10	D
11	C	12	D
13	B	14	D
15	C	16	B
17	A	18	D
19	C	20	D

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