RELATIONSHIP BETWEEN AFFECTIVE FACTORS AND ACHIEVEMENT IN MATHEMATICS AMONG SECONDARY SCHOOL STUDENTS IN GANZE DISTRICT, KILIFI COUNTY KENYA.

BY

NICKSON TSOFA MWENI

E55/CE/24575/2012

DEPARTMENT OF EDUCATIONAL COMMUNICATION AND TECHNOLOGY

A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE DEGREE OF MASTER OF EDUCATION IN THE SCHOOL OF EDUCATION KENYATTA UNIVERSITY

DECEMBER 2015
DECLARATION.
I confirm that this research thesis is my original work and has not been presented in any other university/institution. The thesis has been complemented by referenced works duly acknowledged. Where text, data, graphics, pictures or tables have been borrowed from other works, including the internet, the sources are specifically accredited through referencing in accordance with anti-plagiarism regulations.

Signature…………………………………………………….....Date…………………………
Nickson Tsofa Mweni
E55/CE/24575/2012

We/I confirm that the work reported in this thesis was carried out by the candidate under my/our supervision as University Supervisor(s).

Signature…………………………………………………….....Date…………………………
Dr. M.K. Mihe-so-O’Connor
Department of Educational Communication & Technology

Signature…………………………………………………….....Date…………………………
Dr. W. Kerich
Department of Educational Communication & Technology
DEDICATION
To the Almighty God who has brought me this far. Second, to my wife Lydia Mweni and my son Noel Mweni who were great source of inspiration in my studies. To my parents Mr. Joseph Mweni and Mrs. Rachael Mweni as well as the rest of the family and friends for their understanding, psychological, emotional and financial support during the period of undertaking a study of this magnitude.
ACKNOWLEDGEMENT
The accomplishment of this work was partly due to the encouragement and advice of a number of scholars. I thank Dr. M.K. Miheso-O’Connor and Dr. W. Kerich of Department of Educational Communication and Technology, School of Education, Kenyatta University for giving me the benefits of insight through diligent supervision and constant encouragement.

Many thanks go to District Education Officer and Principals of Ganze District Kilifi County, for allowing me to carry out the research. I sincerely appreciate my family for understanding and encouragement they accorded me during the study period.

Thank you and God bless you all.
Table of Contents

DECLARATION ................................................................................................................................. ii
DEDICATION ................................................................................................................................. iii
ACKNOWLEDGEMENT ................................................................................................................ iv
LIST OF FIGURES ......................................................................................................................... viii
LIST OF TABLES ........................................................................................................................... ix
OPERATIONAL DEFINITION OF TERMS ................................................................................... x
ABBREVIATIONS AND ACRONYMS ........................................................................................ xi
ABSTRACT .................................................................................................................................... xii
CHAPTER ONE: ........................................................................................................................... 1
INTRODUCTION ............................................................................................................................ 1
  1.0 Introduction .......................................................................................................................... 1
  1.1 Background to the Study ...................................................................................................... 1
  1.2 Statement of the Problem ................................................................................................... 7
    1.2.1 Purpose of Study ........................................................................................................... 8
    1.2.2 Objectives .................................................................................................................... 8
    1.2.3 Research Hypothesis ................................................................................................... 8
    1.2.4 Research Questions ...................................................................................................... 8
  1.3 Significance of the Study (Rationale) .................................................................................. 9
  1.4 Delimitation and Limitations ............................................................................................... 9
    1.4.1 Delimitation ................................................................................................................ 9
    1.4.2 Limitations .................................................................................................................. 10
  1.5 Assumptions ....................................................................................................................... 10
  1.6 Theoretical and Conceptual Framework .......................................................................... 10
    1.6.1 Theoretical Framework ............................................................................................. 10
    1.6.2 Conceptual Framework ............................................................................................. 13
CHAPTER TWO: ........................................................................................................................ 16
LITERATURE REVIEW ............................................................................................................... 16
  2.0 Introduction ......................................................................................................................... 16
  2.1 Attitude and Mathematics Achievement ......................................................................... 16
  2.2 Anxiety and Mathematics Achievement ........................................................................... 19
  2.3 Confidence and Mathematics Achievement ...................................................................... 21
  2.4 Existing Knowledge Gaps in the Review of Related Literature .................................... 23
CHAPTER THREE: ..................................................................................................................................................25
RESEARCH METHODOLOGY ..............................................................................................................................25
3.0 Introduction .....................................................................................................................................................25
3.1 Research Design and Variables ....................................................................................................................25
   3.1.1 Research Design ....................................................................................................................................25
   3.1.2 Variables ..............................................................................................................................................25
3.2 Location of the Study ......................................................................................................................................26
3.3 Target Population ..........................................................................................................................................27
3.4 Sample Design (sampling technique) and Sample Size ..............................................................................27
3.5 Research Instruments ....................................................................................................................................29
3.6 Piloting the Instruments ...............................................................................................................................30
   3.6.1 Validity ..................................................................................................................................................30
   3.6.2 Reliability .............................................................................................................................................30
3.7 Instrumentation (data collection procedures) .............................................................................................31
3.8 Data Analysis ................................................................................................................................................31
3.9 Logistical and Ethical Consideration ............................................................................................................32
CHAPTER FOUR: .................................................................................................................................................33
DATA ANALYSIS, PRESENTATION AND DISCUSSION ..................................................................................33
4.0 Introduction .....................................................................................................................................................33
4.1 Questionnaire Return Rate ...........................................................................................................................33
4.2 Attitude and Mathematics Achievement ....................................................................................................34
4.3 Anxiety and Mathematics Achievement ....................................................................................................44
4.4 Confidence and Mathematics Achievement ...............................................................................................53
4.5 Summary .......................................................................................................................................................61
CHAPTER FIVE: ..................................................................................................................................................63
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS .............................................................................63
5.0 Introduction .....................................................................................................................................................63
5.1 Summary of the Study .................................................................................................................................63
5.2 Summary of Findings ...................................................................................................................................64
   5.2.1 Attitude and Mathematics Achievement .............................................................................................64
   5.2.2 Anxiety and Mathematics Achievement .............................................................................................64
   5.2.3 Confidence and Mathematics Achievement .......................................................................................65
5.3 Implication of the Findings for Practice .......................................................................................................65
5.4 Conclusion .....................................................................................................................................................66
5.5. Recommendations ...........................................................................................................68
  5.5.1 Policy Recommendations..............................................................................................68
  5.5.2 Recommendations for Further Research........................................................................68
REFERENCES ..................................................................................................................................69
APPENDICES: ...........................................................................................................................73
  APPENDIX I - RESEARCH INSTRUMENTS: ...........................................................................73
  APPENDIX II: AUTHORIZATION LETTER..................................................................................77
  APPENDIX III: RESEARCH PERMIT .....................................................................................78
  APPENDIX IV: MAP OF GANZE DISTRICT.............................................................................79
LIST OF FIGURES

Figure 1.1 Conceptual framework ................................................................. 14
LIST OF TABLES
Table 1.1: KCSE Ganze District Mathematics Performance 2012 to 2014 .................. 5
Table 1.2: Attributions of Success and Failure (from Weiner 1974) ......................... 12
Table 3.1: Sample Size ......................................................................................... 28
Table 4.1: Responses (%) for Mathematics Attitude Questionnaire ..................... 35
Table 4.2: Attitude and Mathematics Achievement .................................................. 36
Table 4.3: $r_{xy}$ for Attitudes and Mathematics Achievement ............................... 39
Table 4.4: Responses (%) for Mathematics Anxiety Questionnaire ....................... 45
Table 4.5: Anxiety and Mathematics Achievement .................................................. 46
Table 4.6: $r_{xy}$ for Anxiety and Mathematics Achievement .................................... 48
Table 4.7: Responses (%) for Mathematics Confidence Questionnaire ................ 54
Table 4.8: Confidence and Mathematics Achievement ........................................... 55
Table 4.9: $r_{xy}$ for Confidence and Mathematics Achievement ............................. 57
OPERATIONAL DEFINITION OF TERMS.

Affective - Are emotional behaviors or actions driven by feelings.

Attitude - Is consistent tendency to react in a certain way often positively or negatively toward any matter.

Anxiety - Is an unpleasant state of inner fear or turmoil often accompanied by nervous behavior.

Confidence - Refers the degree to which a person feels certain of his or her ability to do well.

Achievement - Is the final accomplishment of something noteworthy after much effort and overcoming challenges designated by a test.

Gender - Is a social description of a male as masculine and female as feminine with social responsibilities attached to them.

Attribution - Is a cause of an invent or behavior such as success and failure.

Indicator Variable - Is a value that changes either in a continuous or stepwise manner but not usually within an existing expression.
<table>
<thead>
<tr>
<th>ABBREVIATIONS AND ACRONYMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAT</td>
</tr>
<tr>
<td>DEO</td>
</tr>
<tr>
<td>FDSE</td>
</tr>
<tr>
<td>G/C</td>
</tr>
<tr>
<td>JAB</td>
</tr>
<tr>
<td>KCPE</td>
</tr>
<tr>
<td>KCSE</td>
</tr>
<tr>
<td>KESI</td>
</tr>
<tr>
<td>KIE</td>
</tr>
<tr>
<td>KNEC</td>
</tr>
<tr>
<td>MARS</td>
</tr>
<tr>
<td>MOE</td>
</tr>
<tr>
<td>NASSPE</td>
</tr>
<tr>
<td>SPSS</td>
</tr>
<tr>
<td>TIMSS</td>
</tr>
<tr>
<td>TSC</td>
</tr>
</tbody>
</table>
ABSTRACT

Learning mathematics is a cognitive as well as affective endeavor with the affective factors playing major role in student achievement. The main purpose of this study was to examine the relationship between affective factors and students’ achievement in Mathematics in Ganze District, Kilifi County Kenya. Study was motivated by underrepresentation of females in advanced mathematics levels and related careers. The study was guided by the following three specific objectives: to establish the relationship between student attitude and mathematics achievement, to establish the relationship between student anxiety and mathematics achievement, and to assess the effect of confidence on mathematics achievement. This study employed descriptive survey research design. Target population comprised of both male and female students from secondary schools in Ganze District. The district had 4 zones with a total of 1620 male students and 1080 female students within the 20 schools among which 12 were mixed day secondary schools, 4 boarding schools and 4 single sex schools. Proportional stratified random sampling was done to ensure at least 50% of the schools were sampled from every zone. The study had a stratified sampled size of 250 students; mainly form 4 and 3 students of which 150 were male and 100 female. The affective factors (attitude, anxiety, confidence) formed the independent variables, learning factors in mathematics class room as intervening variables and mathematics achievement as the dependent variable. The valid and reliable research instruments included mathematics attitude questionnaire, mathematics anxiety rating scale, mathematics confidence questionnair and mathematics test. Data were analyzed using SPSS program of IBM 2015 American version and presented in text and tabular forms. The mode of analysis mainly involved Correlational Analysis of Pearson Product moment correlation coefficient ($r_{xy}$) indicating the statistical significant correlation value for either accepting or rejecting the null hypothesis, “there is no statistical significant relationship between affective factors and students’ achievement in mathematics”. The findings revealed females outweigh males at higher positive attitude; males outweigh females in lower anxiety; but no disparity in confidence. The researcher concluded attitude and confidence are directly proportional to mathematics achievement but anxiety is indirectly proportional. The relationship between affective factors and students’ achievement in mathematics is beyond gender differences and academic abilities; for females outweigh males in mixed day, males outweigh females in mixed boarding but no disparity in single sex boarding secondary schools. The following recommendations are made from the study: a) Mathematics teachers have to inculcate positive attitude classroom environment for better achievement since attitude is direct to achievement. b) Anxiety is indirect to achievement therefore mathematics teachers have to create friendly learning environment that avoid students being anxious toward mathematics. c) Mathematics teachers need to guide students through solving mathematics problems in order they develop self-confidence since confidence is direct to achievement. Lastly, the researcher suggested further research to be done on the impact of special teaching methods for students with negative attitudes, high anxiety and low confidence towards mathematics; effect of group discussion for female students with positive attitudes, low anxiety and high confidence towards mathematics under guidance; and effect of teachers’ affective factors towards teaching and achievement in mathematics among students.
CHAPTER ONE:

INTRODUCTION

1.0 Introduction.
This chapter presents the background to the study; Statement of the problem; Purpose and objectives of the study; Research hypothesis; Significance of the study; Delimitation and limitations; Assumptions; Theoretical and Conceptual framework; and Operational definition of terms.

1.1 Background to the Study.
Learning Mathematics is a cognitive endeavor. Yet, in mathematics, as in other cognitive fields, affect can play an important role in students’ decisions about how much mathematics they will need in the future and how they approach the mathematical content they do study. In this study, affective referred to emotional behaviors or actions driven by students’ feelings about mathematics, aspects of classroom, or about themselves as learners of mathematics. The definition was not intended to limit the affective domain to general feelings such as liking/disliking of mathematics, nor was it meant to exclude perceptions of the difficulty, usefulness, and appropriateness of mathematics as a school subject (Asheraft, 2001).

In fact, a major reason for studying affective factors in mathematics education is to find ways to help students learn more mathematics (Andrej’s, 2015). Another reason to study affective variables is that a positive attitude toward mathematics is an important educational outcome, regardless of achievement level. However, this study did not advocate on positive attitude per se but how attitude, anxiety and confidence affects the students’ achievement in mathematics (Papanastatsiou, 2000). These affective variables are important in influencing the learning environment in a classroom. Students’ willingness to work on a variety of mathematics tasks and
their persistence in dealing with these tasks might make a difference in the degree to which a class is task-oriented and easy to motivate. Decisions about how many and which mathematics courses to take in middle school, high school, and college can be influenced by student affective characteristics developed over a period of many years (Ma & Kishor, 1997). Therefore course background plus these same affective factors can affect mathematics career related choice (Hyde, 2006; Saha, 1994).

Studies have stated causes of the gender differences in mathematics attitude were found to be multifaceted. Researchers have identified parental and societal attitudes (Papanastasiou, 2000; Wong, 1992), and students` classroom experiences (Fisher and Rickards, 1998; Forgasz and Leder, 1996) as being influential in making female students internalize the feeling that they are inferior to boys in mathematics. Also the studies have considered that the behaviors of the teachers in the classroom environments is a factor associated with the attitudes of the students. Fisher and Rickards (1998) found that students` attitudes towards mathematics tended to be more positive in classrooms where students perceived greater leadership and helping or friendly behaviors in their teachers, and more negative in classrooms where students perceived their teachers as admonishing and enforcing strict behaviors.

In Jamaica, poor attitude to mathematics as a subject evident and view the subject as being little or no use outside schools as according to the Ministry of Education, Youth & Culture (2003). In South Africa, Mji and Makgato (2006) pointed out that those who take mathematics do not perform well because they are not motivated. Yega (2002): teachers, students and parents have negative attitude towards teaching and learning of mathematics. Chiriswa (2003) agreed with the above view and recommended that mathematics teachers and students be given incentives to raise their moral for better grades in mathematics.
Nigeria has not yet able to identify a single direction of difference in achievement in mathematics between female and male students (Kadiri, 2004). Although most studies have found boys performing better (Fennema & Sherman, 1978); a few others saw girls out-performing boys while others established no significant difference. Supported by Alao & Adeleke (2000) that girl’s recorded low performance than boys in mathematical activities in Nigeria Secondary School. This was supported by Manger (1996) in Norway who had same view, but observed that the difference was small. For New Zealand, Blith, Forbes, Clerk and Robinson (1994) reported a consistent difference in performance in favor of boys while Armstrong (1981) noted that sex difference existed at high level and not at the junior level in mathematics achievement, thus a problem to be studied.

For traditional African systems, informal education tended to be more of gender disparities rather than of affective considerations. The co-opting of girls into boys schools (Knight, 1999) was adopted over time due to civil pressure and advocacy for the recognition of equal rights of the girl child in education. This was evidenced by the general results of study for year 1999 to 2001 of a sample of 1489 candidates in 4 secondary schools in Nakuru District, Kenya indicated that streaming based on gender improved overall student achievement in mathematics and especially that of girls.

With Costello (1991) view that boys are impulsive, holistic in approach, field independent, have convergent attributes and are confident. While girls are reflective, serials, field dependent, divergent in thinking and cautious in the process of dealing with matters (Mondoh, 2001). These different cognitive attributes affect boys and girls differently, especially with regard to confidence levels, attitudes, anxiety, ability to take risks, interaction and intellectual dexterity. However, not all but only some of these attributes favor boys more compared to girls with
respect to learning and understanding mathematics (Fawe, 1998; Changeiywo, 2000). This explains why, given a similar age cohort of students, boys are more likely to be good in science and mathematics compared to girls. However, separation of classes based on gender may not be a viable option to effective management of curriculum implementation at the school level as regard to mathematics teaching and examination. This area is still a rich ground for in-depth studies and investigation as a policy option.

Furthermore, the public secondary schools in Ganze District, Kilifi County Kenya, have been performing poorly in mathematics for the last three years as shown in Table 1.1 below.

**Key:** Mixed Day (MD), Mixed Boarding (MB), Boarding Boys (BB), Boarding Girls (BG), Boys (B), Girls (G).
### Table 1.1: KCSE Ganze District Mathematics Performance 2012 to 2014

<table>
<thead>
<tr>
<th>S/NO</th>
<th>SCHOOL</th>
<th>ENTRY</th>
<th>2014 GRADE DISTRIBUTION &amp; MEAN SCORE</th>
<th>MEANS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>A</td>
<td>B+</td>
</tr>
<tr>
<td>1</td>
<td>Godoma</td>
<td>M</td>
<td>71B</td>
<td>47G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Sokoke</td>
<td>B</td>
<td>87</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Ganze</td>
<td>B</td>
<td>16B</td>
<td>11G</td>
</tr>
<tr>
<td>4</td>
<td>Jila</td>
<td>M</td>
<td>52G</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Ganze</td>
<td>B</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>Jaribuni</td>
<td>M</td>
<td>64B</td>
<td>42G</td>
</tr>
<tr>
<td>7</td>
<td>Vitenge-</td>
<td>M</td>
<td>78B</td>
<td>52G</td>
</tr>
<tr>
<td></td>
<td>ni</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Dungicha</td>
<td>M</td>
<td>10B</td>
<td>6G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Bale</td>
<td>M</td>
<td>15B</td>
<td>10G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Kachoro-</td>
<td>M</td>
<td>20B</td>
<td>13G</td>
</tr>
<tr>
<td></td>
<td>roni</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Mwange-</td>
<td>B</td>
<td>38</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>a</td>
<td>G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Mitanga</td>
<td>M</td>
<td>26B</td>
<td>17G</td>
</tr>
<tr>
<td></td>
<td>ni</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Bandari</td>
<td>M</td>
<td>13B</td>
<td>8G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Magogo-</td>
<td>M</td>
<td>19B</td>
<td>12G</td>
</tr>
<tr>
<td></td>
<td>ni</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Shangw-</td>
<td>M</td>
<td>11B</td>
<td>7G</td>
</tr>
<tr>
<td></td>
<td>eni</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Sosoni</td>
<td>M</td>
<td>9B</td>
<td>4G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Vyamba-</td>
<td>M</td>
<td>13B</td>
<td>10G</td>
</tr>
<tr>
<td></td>
<td>ni</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Palakumi</td>
<td>M</td>
<td>11B</td>
<td>7G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Petanguo</td>
<td>M</td>
<td>11B</td>
<td>8G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Mayowe</td>
<td>M</td>
<td>23B</td>
<td>15G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTALS</td>
<td></td>
<td>934</td>
<td>7</td>
</tr>
</tbody>
</table>

Source: DEO, Ganze 2014
The trend above indicates poor mathematics achievements among students. Most mixed day girls performed higher than boys at minimal range due to their low enrollment. For mixed boarding girls outweigh boys at wide range as are taught in separated classes based on their gender. Boys indicated higher achievement in mathematics than girls in single sex boarding schools. Researches within Ganze District identified problem of the students’ poor achievement in mathematics was attributed to gender differences, academic abilities, school management committees and teacher motivation. DEO (2012) and other educational stakeholders addressed the problem by improving decision making, recognition, working conditions and supervision such as transferring and re-distributing 54 teachers within Ganze District based on their genders and abilities but yet low mathematics trends.

Unfortunately little research in this area has been carried out in Ganze district one of poorest districts located in semi-arid part of Kenya. Researches done in Ganze have only so far focused on constraints in the implementation of free primary education, biological differences, school management committees and teacher motivation to explain the poor mathematics achievement in Ganze but neglecting affective factors and mathematics achievement. This study area has not yet been carried out in the larger Kilifi County in which Ganze district lies. On the bases of such, this study sought to establish the relationship between affective factors and students' achievement in mathematics in Ganze District, Kilifi County.
1.2 Statement of the Problem.
A meta-analysis of gender comparisons of mathematics attitudes and affect, published on 28th July 2006 by the Department of Psychology, Curriculum and Instruction in University of Wisconsin-Madison, WI53706, USA, revealed that the diminishing of male domain stereotyped attitudes of -0.90 effect size proves mathematics is no longer a male domain subject. This indicates we cannot relate on gender differences and academic abilities in explaining the substantial underrepresentation of females in advanced mathematics classrooms and mathematics related careers. Furthermore, studies posit that separation of classes based on gender may not be a viable option to effective management of curriculum implementation at school level as regard to mathematics teaching and examination.

Researches about affective influence on student achievement failed to explain the underrepresentation of females in advanced mathematics classroom and related careers but focused on, “classroom environments to infer that teachers’ classroom behavior is a factor associated with students` attitudes. The studies found that students’ attitudes towards mathematics tended to be more positive in classrooms where students perceived greater leadership and helping or friendly behaviors in their teachers, and more negative in classrooms where students perceived their teachers as admonishing and enforcing strict behaviors”.

This study was carried out in Ganze one of the poorest and semi-arid regions of Kenya neglected in terms of research and developments. The region holds strong negative view on the advancement of females which is not the case in this study of affective factors and mathematics achievement. Even Ganze District educational stakeholders have continuously addressed the problem of performing poorly in mathematics based on their genders and abilities. This study has not been done in Ganze District that why the need to study on the relationship between affective
factors (attitude, anxiety and confidence) and students` achievement in mathematics in Ganze District, Kilifi County.

1.2.1 Purpose of Study.
The purpose of this study was to establish the relationship between affective factors and achievement in mathematics among secondary school students in Ganze District, Kilifi County Kenya. It aimed at establishing the relationship of attitude, anxiety and confidence with mathematics achievement beyond gender differences and academic abilities. This is because the study was motivated by the underrepresentation of females in advanced mathematics levels such as in higher education and related careers.

1.2.2 Objectives.
Specifically the purpose of this study was:

i. To establish the relationship between student attitude and mathematics achievement.

ii. To establish the relationship between student anxiety and mathematics achievement.

iii. To assess the effect of confidence on mathematics achievement.

1.2.3 Research Hypothesis.
The null hypothesis of this study was, “There is no statistical significant relationship between affective factors and students` achievement in mathematics”.

1.2.4 Research Questions.
The following questions were used in this research:

i. How is attitude as an affective factor influence mathematics achievement?

ii. To what extend is anxiety relevant in mathematics achievement as an affective factor?

iii. What are the determinants of confidence as an affective factor in mathematics achievement?
1.3 Significance of the Study (Rationale).
The findings of this study are important to all stakeholders in education such as Ministry of Education (MOE), Teacher Service Commission (TSC), policy makers, school management, teachers and students. It is hoped that this study would inform correctly the students’ achievement on mathematics basing on affective factors rather than biological differences which is outdated. The study findings are of great help to the education system, supervisors, quality assurance officers, serving principals, teachers, students, community and teaching fraternity in general. This would form a base of addressing the trending low mathematics achievement successful basing on affective factors. For the improvement of teaching-learning practice and development of knowledge is hoped to be contributed much by the affective factors on the attributes of ability, task difficulty, effort and luck towards high mathematics achievement.

1.4 Delimitation and Limitations.

1.4.1 Delimitation.
This study addressed the relationship between affective factors and achievement in mathematics among secondary school students in Ganze District, Kilifi County Kenya. This study targeted mainly the mixed day secondary schools in the above mentioned locality. It also included some boarding and single sex schools for comparison of findings to enrich the discussion. The study involved Correlation Analysis to quantify the data collected. The computational formula of Pearson Product moment correlation coefficient (r\text{xy}) indicated the statistical significant correlation value for either accepting or rejecting the null hypothesis. It did not use interview schedules nor observation forms; because already in-depth study on gender differences has been done basing on knowledgeable expertise but excluding affective factors in the secondary schools through questionnaires on students. The implication of narrowing the scope was to specifically address the actual gap of not being able to explain and manage the problem posed by
underrepresentation of females in advanced mathematics careers, other subjects and levels of education without considering gender differences and academic abilities.

1.4.2 Limitations.
The limitations of this study include high transport costs due to remoteness, inadequate funding of the research and limited time due to other school activities. Through sponsorship and adequate time a larger sample size was covered.

1.5 Assumptions.
The study assumed that:

i. The respondents provided accurate and honest responses to the questionnaires.

ii. The students in Form Three had learned the same amount of content of mathematics as prescribed by KIE syllabus for mathematics.

iii. Among all other factors that influence learning of mathematics among secondary school students; attitude, anxiety and confidence played major role in students’ achievement in mathematics.

These issues were assumed to be constant in all sampled schools thus taken for granted in the conduct of this study.

1.6 Theoretical and Conceptual Framework.

1.6.1 Theoretical Framework.
This study considered the Attribution theory developed by Weiner (1974). Within social psychology, attribution theory is a large, quickly growing area of research that deals with what a person perceives as the cause of certain events. In the educational research literature these attributions are concerned with causes of success and failure in school-related tasks. The theoretical underpinnings for attributions of academic success and failure are found both in the
general attribution theory literature and the achievement motivation literature. Mathematics education research concerning attributions deals with students’ and teachers’ perceptions of the causes of student success or failure on mathematics tasks. This was developed mainly to help understand gender-related differences in mathematics achievement and course selection.

Attribution Theory attempts to explain the world and to determine the cause of an event or behavior (e.g. why people do what they do) originated by Bernard Weiner (1935- ) with Key terms: Attribution, locus of control, stability, and controllability. Attribution Theory (Weiner) indicated that Weiner developed a theoretical framework that has become very influential in social psychology today. Attribution theory assumes that people try to determine why people do what they do, that is, interpret causes to an event or behavior. A three-stage process underlies an attribution:

i. behavior must be observed/perceived

ii. behavior must be determined to be intentional

iii. behavior attributed to internal or external causes

Weiner’s attribution theory is mainly about achievement. According to him, the most important factors affecting attributions are ability, effort, task difficulty, and luck. Attributions are classified along three causal dimensions:

i. Locus of control (two poles: internal vs. external)

ii. Stability (do causes change over time or not?)

iii. Controllability (causes one can control such as skills vs. causes one cannot control such as luck, others’ actions, etc.)
When one succeeds, one attributes successes internally (“my own skill”). When a rival succeeds, one tends to credit external (e.g. luck). When one fails or makes mistakes, we will more likely use external attribution, attributing causes to situational factors rather than blaming ourselves. When others fail or make mistakes, internal attribution is often used, saying it is due to their internal personality factors.

Mathematics education attribution research as developed by Weiner (1974) uses a formulation of attribution of academic success and failure. Weiner proposes a two-dimensional model with four major causes of success and failure (ability, effort, task difficulty, and luck) organized in a 2×2 matrix table 1.2 below:

**Table 1.2 Attributions of Success and Failure (from Weiner 1974).**

<table>
<thead>
<tr>
<th>Stability</th>
<th>Locus of control</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Internal</td>
<td>External</td>
</tr>
<tr>
<td>Stable</td>
<td>ability</td>
<td>task difficulty</td>
</tr>
<tr>
<td>Unstable</td>
<td>effort</td>
<td>luck</td>
</tr>
</tbody>
</table>

The two dimensions are locus of control and stability. Locus of control relates to whether the cause of success or failure is perceived to result from some factor within or outside of the individual; stability is concerned with whether the cause can change for an individual from one time to another. Since ability is the same from one time to another and is due to a factor within a person, it is categorized as stable and internal. Effort is internal and unstable because the individual has control over effort and may vary the effort expended in different situations. Task difficulty is stable, because a given task does not change in difficulty from one situation to another. Task difficulty is also external, since a person has no control over it. Luck changes from
time to time and is independent of the individual; therefore, it is classified as unstable and external.

Therefore the theory is much relevant to this study because affective factors (attitude, anxiety and confidence) roots on person’s perception about his/her success and failure. When a person perceives the cause of success and failure as stable (ability or task difficulty), the change in expectations will be greater than when unstable factors (effort or luck) are seen as the cause. For example, when success is attributed to ability or ease of the task, the increase in expectancy for future success in that situation will be larger than if the success had been attributed to good luck. Similarly, when failure is seen as caused by low ability, the drop in expectancy for future performance is greater than when failure is attributed to lack of effort or bad luck. On the average, females and males seem to differ in their patterns of attribution of success and failure. In academic achievement situations, girls are more likely to see success as caused by effort and less likely to see success as caused by ability than are boys. In failure situations, girls are more likely than boys to attribute their failure to lack of ability than lack of effort. However, these gender differences in attributions are not large and will be more pronounced when the task is gender-stereotyped.

1.6.2 Conceptual Framework.
The graphic presentation of this study as shown in the figure below have independent variable: affective factors – mathematics attitude, mathematics anxiety and mathematics confidence; with dependent variable: mathematics achievement.
Independent variables | intervening variables | dependent variable  
---|---|---  
(Affective factors) | (learning factors in mathematics classroom) | (Mathematics achievement)  
  
- Attitude  
- Anxiety  
- Confidence  

- Entry behavior  
- Attributes (effort, ability, task difficulty, luck)  
- Resources  
- Teaching techniques  
- Subject assessment.  

Student’s achievement in mathematics  

**Figure 1.1** Conceptual Framework, Source: Adapted from Fennema & Sherman (1977).

From the conceptual framework, Figure 1.1, the students’ achievement in the mathematics test depends on the independent and intervening variables. This is because the independent variables are the influencing factors which include the affective factors (attitude, anxiety and confidence) that were being explored in this study while relating their impact on the students’ achievement of the mathematics test subjected to them. Therefore since it involved the mathematics classroom context, then intervening variables such as teaching techniques, individual differences, competition and indiscipline were put in consideration during the study.

Therefore since attribution is a three stage process: (1) behavior is observed, (2) behavior is determined to be deliberate, and (3) behavior is attributed to internal or external causes; then it can be relatively inferred that attitude, anxiety and confidence are behavioral too. As
achievement can be attributed to (1) effort, (2) ability, (3) level of task difficulty, or (4) luck; as well as intervened by other learning factors such as entry behavior, resources, teaching techniques and subject assessment.
CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction.
According to the TIMSS in Australia showed that students` background variables influence differences in achievement in mathematics. However, little consensus existed among researchers regarding the influence of affective variables on mathematics achievement. Some studies reported statistically significant effects of affective variables and mathematics achievement, while others indicated no relationship between attitude variables and mathematics achievement. Thus there was still a controversy regarding the educational implications of the results needing further study. On such basis, this chapter entails how attitude, anxiety and confidence influence mathematics achievement as well as the existing knowledge gaps in the review of related literature.

2.1 Attitude and Mathematics Achievement.
Attitude could be defined as a consistent tendency to react in a certain way often positively or negatively toward any matter. Attitude possesses both emotional and cognitive components. Fazio and Roskes (1994) says, “attitudes are important to educational psychology because they strongly influence social thought, the way an individual thinks about and process social information”. Studies revealed that nearly in all the comparisons, students in the high-performing schools expressed more positive attitudes towards mathematics than the students in the low performing schools. Students in high performing schools showed higher achievement in mathematics problem solving than the students in the low performing schools. A significant gender difference was found in attitudes towards mathematics in favor of males. But no significant difference in achievement of mathematics problem solving between the sexes were found (Nathan, 2016).
Cockcroft (1982) refers briefly to theories indicating that different attitudes could be as a result of genetic factors or hormonal influences or even differences in brain lateralization. Despite the report being credible, this assertion may not exactly be verified as to how a student, either a girl or a boy may be pre-disposed to like something or dislike it. Twoli (1986) agrees that there is no clear-cut evidence that a learner is pre-disposed genetically. But Twoli (1986) cited cases of documented differences in cognitive ability between girls and boys which in one way or another, the learner may form attitudes towards learning a particular subject.

Orton (1987) agrees with the view that ability especially in mathematics is not innate, and he qualifies his assertion by stating that: “Mathematics abilities are not innate, but are properties acquired in life that are formed on the basis of certain inclination… some have inborn characteristics in structure and functional features to the development of mathematics abilities… anyone can become an ordinary mathematician, (but) one must be born an outstandingly talented one” (p. 111). While he is not completely dismissing the genetic factor, he agrees that other pertinent factors come into play. This researcher’s interaction with some of the high school students has shown that there are students who do well in other subjects but not in mathematics. Some openly resisted learning mathematics but in internal and external examinations, they posted above average results in other subjects while performing dismally in mathematics. Orton (1987) in his research indicates that males excelled in spatial ability whilst females excelled in verbal ability. These differences may predispose the students to view mathematics learning differently. But (Ying, 1991) disagreed that the difference in ability may not necessarily be genetic but could be due to other factors.

Researchers have shown that the negative attitude is revealed in preteens caused by hormones and identity issues. This is due to many students start puberty during their preteen years, where
their bodies produce high levels of sex hormones such as estrogen and progesterone or testosterone which can lead to conflict and negative responses resulting in an inconsistent teaching-learning process during mathematics class. Also the researchers to an extent revealed that students with negative attitudes can acquire positive attitudes by adopting a positive one through constant chanting with positive people who can show the good in everything (Gordon Allport, 2002).

Attitudes formed by students when learning mathematics tend to remain for a long time and these attitudes may help him/her to learn mathematics better (Evans, 1965). This is so if the attitudes were favorable. But this may not always be the case. Students also form unfavorable attitudes as they learn mathematics in secondary schools. Findings of Orora (1986) indicate that pupils in primary schools who have very positive attitudes towards learning mathematics have interest to do more mathematics later. Most students join Form One with positive attitudes, only to change their attitudes towards learning mathematics later in secondary school. KNEC Report (2007) indicated that the most glaring weakness in students’ mathematics attainment in KCSE is the students’ lack of knowledge of elementary techniques and their ignorance of simple algorithms and processes. This could have resulted from students’ failure to learn these techniques, algorithms and processes while being taught in class. The Ministry of Education, in collaboration with JICA, KIE and KESI has initiated in-service training courses for mathematics teachers in secondary schools. This was in an effort to improve teacher`s teaching techniques. Despite these efforts, students still did not learn mathematics adequately to enable them perform better in KCSE, mathematics examinations. Failure to learn is an indication that there could be other factors such as inappropriate teaching methods, lack of resources and students` negative attitudes among others hinder effective learning of mathematics Costello (1991). There could be
other factors such as students` attitudes which may hinder them to adequately learn mathematics that had not been fully studied in Kenya generally and Ganze district in particular. This study attempted to establish the relationship between attitudes and students` mathematics achievement in secondary schools in Ganze district beyond gender differences and academic abilities.

2.2 Anxiety and Mathematics Achievement.
Anxiety or fear of mathematics is quite common similar to stage fright. In addition anxiety is an unpleasant state of inner turmoil, often accompanied by nervous behavior, such as pacing back and forth, somatic complaints and rumination. Though an extensive foundation of theory and research exists on anxiety, relatively little research about specific mathematics anxiety has been done. There seems to be some connection between mathematics anxiety and general anxiety; however, this relationship has not been studied in depth. So students possessing mathematics anxiety feel unease such as worry or fear. Anxiety can be mild or severe in that it contributes to their low achievement in mathematics. In general, most of the studies reported that compared with boys, female students had debilitating causal attribution patterns, perceived mathematics as a male domain, and were anxious about mathematics (Hyde 1990; Ma and Kishor, N, 1997; Sayers, 1994). However, none of these studies demonstrates a clear cause-effect relationship between mathematics anxiety and achievement in mathematics thus the need of in-depth discovery study.

According to Basavanna, (2000), anxiety is a highly unpleasant affective state similar to intense fear which can include feelings of threat, vague objectless fear, a state of uneasiness and tension, and a generalized feeling of apprehension. Borrowing from Freud, Basavanna identifies three types of anxiety; Reality anxiety (an emotional reaction to perception of danger in the external world); Neurotic anxiety (an affective reaction to threat from the internal world; and Moral
anxiety (an emotional reaction to perception of danger from the superego. Anxiety thus occurs to the body system after one has experienced a threatening situation. An automatic physiological response is triggered to prepare to protect him/her self, or escape from the source of threat. If the activity is carried out, then the changes are reversed, however, if no activity is done, the body continues to remain in the “charged state” for longer than normal, and the resulting changes become a disturbing source of anxiety. This leads to further activation of the flight or fight response and the whole cycle is continued, (Galvin, 1994). Muola, Kithuka, Ndirangu and Nassiuma (2009) carried out a study on the relationship between test anxiety and academic performance in secondary schools in Nyeri district, Kenya. They used a correlation study design and selected their research participants from among form 4 students and their teachers. 83,000 students and 600 teachers formed the target population. The results showed that there was no significant relationship between test anxiety and academic performance. Their results indicated that there was a statistically significant difference (P <0.01) between the levels of anxiety aroused by different subjects. They further found out that both boys and girls are equally affected by test anxiety.

A research on anxiety and school performance was carried out by the Department of Pediatrics of Catania University – Italy in 2004, as cited by Mazzone, Ducci, Scoto, Passaniti, D’Arrigo, & Vitiello, (2007). The department did a study on Anxiety Test Performance on 478 children and adolescents (age 8 -16 years) who were from predominantly middle-class urban backgrounds. They studied the prevalence and relationship between anxiety and school performance. The children were grouped into three: elementary (ages 8-10yrs) - N=131, middle (ages11-13yrs) – N=267, and high school (ages 14-16 yrs) - N= 80 for the purpose of the study. The children completed the Multidimensional Anxiety Scale for Children (MASC). T- Scores were computed
for the frequencies returned. An analysis of the results demonstrated an average of 65% or above presence of anxiety. This score was above normal anxiety symptoms were relatively common among children and adolescents and could interfere with normal functioning. They further showed that the prevalence of abnormally high self-reported levels of anxiety increased in frequency with age and was negatively associated with school performance.

Although many Kenyan secondary schools have incorporated the G/C into their programs, the high demand and pressure placed on teachers for excellent results leads them to neglect the responsibility to provide the services (Aloka, 2012). Most of the available time is utilized in offering extra tuition and remedial classes. The youth who are on the receiving end are also pressurized to produce excellent academic results. Similarly, the result of these demands on the students leads to accumulation of excessively high anxiety levels thereby leading to low academic productivity. It is also likely that in some instances where teacher counselors are available, the daily school schedule does not provide time for students to attend G/C sessions. Moreover, those who are seen visiting the counselor are sometimes stigmatized as being dysfunctional. This trend deters students from readily seeking for G/C assistance, and to their accumulating unwarranted pressure from problems which they keep to themselves. The obvious result in such a case is a rise of their anxiety levels leading to a drop in their academic achievement. As already stated, this study therefore sought to establish the relationship of anxiety and students’ achievement in mathematics beyond gender differences and academic abilities.

2.3 Confidence and Mathematics Achievement.
Confidence in learning mathematics refers the degree to which a person feels certain of his or her ability to do well in mathematics. Its relationship with mathematics achievement and course selection has been studied, particularly in the context of understanding just gender-related
differences in mathematics. Confidence in learning mathematics develops from the self-concept of an individual. So the effect of confidence on mathematics achievement roots from academic self-concept which consists of an individual’s perception of self with respect to achievement in school.

Generally confidence in mathematics has been associated with mathematics achievement (Ryan and Pintrich, 2010), with correlation coefficients ranging from 0.3 to 0.4 (Hart, 2010). For example Hart (2010) found that the mean for high confidence students was more than that of low confidence students. Hart further found that high confidence students engage in mathematics a greater percentage of the time than were low confidence students. The gender differences in self-confidence were more marked for application problems than computation problems only, with female students showing significantly lower confidence for application problems. In summary examining the relationship of confidence and mathematics achievement, one finds a consistent, positive correlation association with some support for causal factor in the development of self-concept. For gender-related differences, several studies report no significant differences in self-concept between females and males. This indicates that, the effect of confidence on mathematics achievement requires further reasoning beyond gender differences and academic abilities.
2.4 Existing Knowledge Gaps in the Review of Related Literature.
The reported gender differences in attitude towards mathematics influenced some researchers to study some affective variables as mediators of gender differences in mathematics achievement (Casey, 2001). However, little consensus existed among researchers regarding the influence of affective variables on mathematics achievement. For example, some studies reported statistically significant effects of affective variables on the learning of mathematics (Ma and Kishor, 2010), while others indicated no relationship between attitude variables and mathematics achievement (Papanastasiou, 2000). Even among those studies that found a significant relationship, there was still controversy regarding the educational implications of the results. For example, some researchers concluded that although statistically significant, the mean effect size for the relationship between attitudes towards mathematics and achievement in mathematics was not strong enough to have useful implications for educational practice (Ma and Kishor, 2010).

On the other hand, some researchers (Narton and Rennire, 1998) have cautioned against dismissing the effects of affective variables on longer term learning outcomes, despite the finding that most of the gender differences in mathematics were small. One of the explanations for the inconsistent findings regarding the relationship between attitude and mathematics achievement, was that such a relationship existed only with respect to particular mathematics content areas and for specific affective variables (Ma, 1999). However, despite such consistent findings of female students’ negative attitude, high anxiety and low confidence in mathematics, studies of classroom environment have shown that the female students’ confidence in mathematics improved greatly in classes which actively involved female students in the learning of mathematics (Boaler, 2000).
In addition, apart from these controversial knowledge issues, there are main research gaps on affective variables and mathematics achievement. For example the inadequacy report of Fisher and Rickards (1998) that students’ attitude on mathematics achievement base only on the classroom behaviors of their teacher; Armstrong (1981) noting that sex difference existed only at high level but not at the junior level in mathematics achievement; and the implemented policy of class separation basing on gender for mathematics improvement according to Bosire (2008). Therefore on such bases this study addressed on the need to look beyond gender and academic abilities to establish the relationship of affective factors (attitude, anxiety and confidence) and students’ mathematics achievement for the purpose of managing the problem posed by females` underrepresentation in advanced mathematics careers.
CHAPTER THREE:

RESEARCH METHODOLOGY

3.0 Introduction.
This chapter entails the Research Design; Location and Target population of the study; Sample design and Sample size; Research instruments; Piloting study for validity and reliability; Instrumentation; Data analysis; Logistical and ethical consideration.

3.1 Research Design and Variables.

3.1.1 Research Design.
This study mainly used Descriptive Survey research design. Survey research is the most frequently used in all disciplines with more or less sophistication in many areas of human activity. Survey means “to look or see over or beyond” but the “looking” or “seeing” was not restricted to perception through the physical eye only. This Survey research involved acquiring information about students’ attitudes, anxiety and confidence on their mathematics achievement. The series of questions posed to the students summarized their responses with percentages, frequency counts, or more sophisticated statistical indexes. Thus the inferences about the secondary schools from the responses of the sample formed factual quantifiable information for decision making on the relationship between affective factors and mathematics achievement.

3.1.2 Variables.
This study involved affective factors and mathematics achievement as Independent and Dependent variables respectively. The affective factors include attitude, anxiety and confidence while students’ achievement in mathematics was determined by mathematics CAT. Whereby attitude refers as a consistent tendency to react in a certain way often positively or negatively toward any matter; for anxiety is an unpleasant state of inner turmoil or fear accompanied by nervous behavior, somatic complaints or rumination; on confidence, is the degree to which a
person feels certain of his or her ability to do well; while achievement connotes final accomplishment of something noteworthy after much effort and overcoming challenges designated by a test. Since it involved the mathematics classroom context, then intervening variables such as teaching techniques, individual differences, competition and indiscipline were considered.

The variables of this study targeted mainly the mixed day secondary schools and few boarding as well as single sex schools in Ganze District, Kilifi County. The importance of this narrow scope was to explain thoroughly and concretely the relationship between affective factors (attitude, anxiety, confidence) and students’ achievement in mathematics without major intervening variables that might have subsided the true results. It included some boarding and single sex schools for comparison of findings; so that to offer realistic recommendations on managing the underrepresentation of females in advanced mathematics careers without considering in-born gender differences and academic abilities.

3.2 Location of the Study.
This study took place in the secondary schools of Ganze District in Kilifi County, Kenya. This is because; studies from diverse fields continue to search for clues underlying the disparity between interest and achievement of male and female students in mathematics. For example, in Western Countries, psychologists have focused on factors such as attitudes and motives when studying females’ mathematics achievements. Relatively little attention has been placed on secondary schools in Sub-Saharan Countries particularly in the poorest and semi-arid areas such as Ganze District, Kilifi County. Therefore this study sought to establish the relationship between affective factors and students’ achievement in mathematics in Ganze District, Kilifi County.
3.3 Target Population.
Population is a group of individuals from which samples are taken for measurement. So the target population for this study comprised of both male and female students from secondary schools in Ganze District, Kilifi County. Currently there are 20 schools within the district’s 4 zones among which 12 are mixed day secondary schools, 4 boarding schools and 4 single sex schools. There are a total of 1620 male students and 1080 female students. (District Education Office, Ganze District, 2014).

3.4 Sample Design (sampling technique) and Sample Size.
Sampling means selecting a given number of subjects from a defined population as representative of that population, so that any statements made about the sample should also be true of the population (Orodho, 2002). Study employed the stratified sampling technique. This technique enables the researcher to divide the entire target population into subgroups or strata basing on criterions such as age, gender or educational levels and then randomly select the final subjects proportionally from the different strata in order to highlight the specific subgroups within the population. Therefore using proportional stratified random sampling it ensured that at least 50% of the schools are sampled from every location for fair distribution.

The students were selected through stratified sampling technique with lower strata representing students’ poor in mathematics basing on class lists of students’ achievement kept by the academic master or mistress in school administrative units. Form 4 and 3 were selected for study since they have been in the school much longer and are more knowledgeable about the school environment than the form 1 and 2.

The research sample size consists of 250 students (150 males and 100 females) as represented in table 3.1 below.
Table 3.1 Population of Schools and Samples to be selected for this Study.

<table>
<thead>
<tr>
<th>Zone</th>
<th>Sampled Schools</th>
<th>Types</th>
<th>Students</th>
<th>Sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>MD</td>
<td>MB</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F₄</td>
<td>F₃</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>B</td>
<td>G</td>
</tr>
<tr>
<td>Jaribuni</td>
<td>5</td>
<td>M D</td>
<td>60</td>
<td>15</td>
</tr>
<tr>
<td>Bamba</td>
<td>6</td>
<td>M B</td>
<td>67</td>
<td>25</td>
</tr>
<tr>
<td>Vitengeni</td>
<td>5</td>
<td>M B</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Ganze</td>
<td>4</td>
<td>M B</td>
<td>50</td>
<td>7</td>
</tr>
<tr>
<td>TOTALS</td>
<td>20</td>
<td></td>
<td>237</td>
<td>117</td>
</tr>
</tbody>
</table>

|           |                 |       | (67+47=114B) | (50+26=76G) = 190S | (13+11=24B) | (10+6=16G) = 40S | 10B + 10G = 20S |

Key: Mixed Day (MD), Mixed Boarding (MB), Boarding Boys (BB), Boarding Girls (BG), Form four (F₄), Form three (F₃), Boys (B), Girls (G), Students (S).

Source: DEO, Ganze 2014

This sample size was the best from Ganze due to its locality and intervening variables experienced. Its locality is nationally known to be the poorest district in Kenya and geographically located in the semi-arid climate zone of Sub-Saharan country. So the sampled schools mainly involved students selected from 8 mixed day secondary schools experiencing these conditions at home and school every day with less intervening variables such as students’ strikes and high indiscipline levels. Also included some students selected from 2 boarding and 2 single sex schools for purpose of comparing findings to enrich the discussion.
3.5 Research Instruments.
The Fennema – Sherman Mathematics Attitude Scale (1976) is an instrument developed to measure students’ attitudes towards mathematics consists of a group of nine instruments: Attitude towards success in mathematics scale, Mathematics as a male domain scale, Mother or Father scale, Teacher scale, Confidence in learning mathematics scale, Efficacy and Motivation scales in mathematics, Mathematics anxiety scale, and Mathematics usefulness scale.

Since this research design is a descriptive survey research design, then it used Mathematics attitude questionnaire and Mathematics confidence questionnaire presented in the Likert’s Scale method to collect attitude and confidence data of students respectively. This is because Orodho (2004) noted that in education and social sciences research, the most commonly used instruments are questionnaires, interview schedules and observation forms. Thus questionnaires are used to collect important information about the large population within a short time and fewer personnel needed hence reducing cost. Anxiety of the students’ scores was obtained using Mathematics Anxiety Rating Scale (MARS). Mathematics achievements were obtained directly from the performance of the mathematics test administered to the sampled students, marked and scored by the researcher towards end of term two in form of common CAT mainly for the study purpose thus undocumented within school administrations.

The mathematics attitude questionnaire for students consisted ten statements responded by students using ticks either strongly agree (SA), agree (A), disagree (D) or strongly disagree (SD). The mathematics anxiety rating scale for students involved thirteen statements indicated by students through ticking appropriately as of not at all (NAA), a little fair (AL), a fair amount (AFA), much (M), very much (VM). Mathematics confidence questionnaire for students had nineteen statements ticked by the student either strongly agree (SA), agree (A), disagree (D) or
strongly disagree (SD). While the mathematics test for students consist seven problems totaling twenty marks expected they solved within half an hour.

3.6 Piloting the Instruments.
This study involved a test-retest piloting the instruments. It was done among some of those secondary schools in Ganze District not sampled. The purpose of piloting the instruments was to determine the content validity and reliability of the research instruments.

3.6.1 Validity.
Orodho (2009) defines validity as the accuracy and meaningfulness of inference, which are based on the research results. In other words, it is the degree to which results obtained from the analysis of the data actually represents the phenomenon under investigation. The content validity of the research instruments was established through test-retest by addressing the match between the questionnaire statements and what intended to assess. It involved administering the improved questions to the same student respondents for validity of the research instruments.

3.6.2 Reliability.
According to Mugenda and Mugenda (2003), for a research instrument to be considered reliable and a true measure for what is being established it must be tried several times in the field. The reliability of the research instruments was established using split-half method. The split-half method was done through coding the questionnaire items using odd or even numbering before calculating by:
$$r_{xx} = 2r_{1/2}$$

$$= \frac{1}{1+r_{1/2}}$$

Where; $r_{xx} =$ estimated reliability of the whole test

$r_{1/2} =$ reliability of the half-test

Through the split-half in the test-retest method the reliability of all the instruments clicked at $p<0.001$.

### 3.7 Instrumentation (data collection procedures).

This explains how the field data collection was done using the research instruments for this study. Instrumentation was done through administering of the questionnaires and mathematics test to the students sampled. The students were supposed to fill in mathematics attitude questionnaire and mathematics confidence questionnaire by ticking appropriately as well as indicating appropriately in the mathematics anxiety rating scale after identifying their respective forms, gender and type of school. The students’ achievement in the mathematics test was obtained directly from the sampled students in form of common CAT administered, marked and scored by the researcher mainly for the study purpose without being documented within school administration units.

### 3.8 Data Analysis.

This study applied Correlation Analysis to quantify the data collected. The computational formula of Pearson Product moment correlation coefficient ($r_{xy}$) indicated the statistical significant correlation value for either accepting or rejecting the null hypothesis that “there is no statistical significant relationship between affective factors and students’ achievement in mathematics”. The correlation coefficient, $r_{xy}$, varies between -1.00 and +1.00. A value of -1.00
indicates a perfect negative relationship, 0.00 no relationship while +1.00 perfect positive relationship. So values in between are judged low to high negative or positive relationship depending on their size. Correlation Analysis was compute on each objective to establish the relationship between the independent (attitude, anxiety, confidence) and dependent (mathematics achievement) variables.

For non-numerical data the indicator variables were coded as 0 or 1. Indicator variable was coded 0 for any case that did not match the variable name and 1 for any case that did match the variable name from baseline chosen. The neutral situation of attitude, anxiety or confidence formed the baseline. Thereafter the data was presented using text and tabular forms with the aid of SPSS program of IBM 2015 American version.

3.9 Logistical and Ethical Consideration.
To manage the logistical requirements of this research, there was need of seeking authorization letter from Kenyatta University Graduate School and research permit from the District Education Officer on behalf of MOE via the principals of the sampled schools. This was achievable through the application of human relation style of management in order to manage ethical issues by considering professionalism so that to protect the students` rights in the sampled schools in terms of gender differences and academic abilities. The researcher applied interpersonal skills to handle the sampled students who under exam tension in order to gather the anticipated results.
CHAPTER FOUR:

DATA ANALYSIS, PRESENTATION AND DISCUSSION

4.0 Introduction.
This chapter presents the findings, interpretations and discussions of attitude and mathematics achievement; anxiety and mathematics achievement; confidence and mathematics achievement basing on the objectives: To establish the relationship between student attitude and mathematics achievement; To establish the relationship between student anxiety and mathematics achievement; To assess the effect of confidence on mathematics achievement. Results determined the research null hypothesis, “There is no statistical significant relationship between affective factors and students’ achievement in mathematics”. Findings responded the research questions: How is attitude as an affective factor influence mathematics achievement?; To what extend is anxiety relevant in mathematics achievement as an affective factor? ; What are the determinants of confidence as an affective factor in mathematics achievement?

4.1 Questionnaire Return Rate.
The researcher had targeted 250 students for the study out of which 220 participated forming 88% return rate. The 30 students of which 14 boys and 6 girls from mixed day, 4 boys and 3 girls from mixed boarding, 2 boys and 1 girl from single sex boarding schools unreturned the questionnaires due to strikes against mock exams. Hartman and Headborn (1979) state that 50% is adequate, 60% is good and 70% or more is very good.
4.2 Attitude and Mathematics Achievement.

Results:

The study sought to establish the relationship between student attitude and mathematics achievement. The researcher used research question to determine how attitude as an affective factor influence mathematics achievement. Students were asked to indicate their attitude types by ticking appropriately on the mathematics attitude questionnaire administered to them after identifying their respective forms, gender and type of school. The responses per question were presented in percentages as in Table 4.1.
Table 4.1 Responses (%) for Mathematics Attitude Questionnaire.

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mathematics is a science.</td>
<td>60</td>
<td>34</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Mathematics is a language consisting a set of tools to express scientific ideas.</td>
<td>59</td>
<td>30</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>There is nothing creative about mathematics; it’s just memorizing formulas.</td>
<td>34</td>
<td>9</td>
<td>18</td>
<td>39</td>
</tr>
<tr>
<td>4</td>
<td>In general, I feel comfortable with mathematics.</td>
<td>50</td>
<td>29</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>My peers tend to feel comfortable with mathematics.</td>
<td>17</td>
<td>12</td>
<td>31</td>
<td>40</td>
</tr>
<tr>
<td>6</td>
<td>Generally, people tend to feel comfortable with mathematics.</td>
<td>4</td>
<td>5</td>
<td>33</td>
<td>58</td>
</tr>
<tr>
<td>7</td>
<td>Calculators and computers are essential for solving math problems.</td>
<td>60</td>
<td>35</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>The most important thing in determining a student’s grade in a math should be the effort they put in, not necessarily whether or not they always obtained the correct answers.</td>
<td>57</td>
<td>32</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Most problems one faces in the real world typically do not relate with mathematics nor have a ‘correct answer’ per se.</td>
<td>38</td>
<td>10</td>
<td>17</td>
<td>35</td>
</tr>
<tr>
<td>10</td>
<td>If I need math in my career, I am sure I can find someone to do it for me.</td>
<td>57</td>
<td>31</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

*Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)*
Responses to the 10 statements above were coded 0 for a case that did not match the variable and 1 that did match the variable in order to identify negative and positive attitude respectively. The results of student attitude types analyzed in cumulative percentages in accordance with their mathematics test mean scores were indicated in Table 4.2.

**Table 4.2**: Attitude and Mathematics Achievement.

<table>
<thead>
<tr>
<th>ATTITUDE</th>
<th>Positive Attitude ( %)</th>
<th>Mean Score</th>
<th>Negative Attitude ( %)</th>
<th>Mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mixed Day Secondary Schools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=100)</td>
<td>84.62 (n=85)</td>
<td>55.45</td>
<td>15.38 (n=15)</td>
<td>15</td>
</tr>
<tr>
<td>Female (n=70)</td>
<td>90.91 (n=64)</td>
<td>36.5</td>
<td>9.09 (n=6)</td>
<td>25</td>
</tr>
<tr>
<td>Average (n=170)</td>
<td>87.77 (n=149)</td>
<td>45.98</td>
<td>12.23 (n=21)</td>
<td>20</td>
</tr>
<tr>
<td><strong>Mixed Boarding Secondary Schools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=20)</td>
<td>83.33 (n=17)</td>
<td>93</td>
<td>16.67 (n=3)</td>
<td>80</td>
</tr>
<tr>
<td>Female (n=13)</td>
<td>75 (n=10)</td>
<td>95</td>
<td>25 (n=3)</td>
<td>85</td>
</tr>
<tr>
<td>Average (n=33)</td>
<td>80.17 (n=27)</td>
<td>94</td>
<td>20.83 (n=6)</td>
<td>82.5</td>
</tr>
<tr>
<td><strong>Single Sex Boarding Secondary Schools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=8)</td>
<td>80 (n=6)</td>
<td>92.5</td>
<td>20 (n=2)</td>
<td>80</td>
</tr>
<tr>
<td>Female (n=9)</td>
<td>80 (n=7)</td>
<td>70</td>
<td>20 9 (n=2)</td>
<td>58.33</td>
</tr>
<tr>
<td>Average (n=17)</td>
<td>80 (n=13)</td>
<td>81.25</td>
<td>20 (n=4)</td>
<td>69.17</td>
</tr>
</tbody>
</table>

**Highlights of the Results:**

The Table 4.2 revealed the dynamic status of relationship between attitude and mathematics achievement. In mixed day secondary schools, females with positive attitude 90.91% towards mathematics recorded higher mean score 36.5 than female students with negative attitude 9.09%
at 25. While males with positive attitude 84.62% towards mathematics achieved mean score 55.45 which is more than male students with negative attitude 15.38% at 15. From mixed boarding secondary schools, females with positive attitude 75% had a mean score of 95 more than females of negative attitude 25% at 85. While males with positive attitude 83.33% towards mathematics recorded a mean score of 93 higher than males of negative attitude 16.67% at 80. For single sex boarding schools, both females and males had similar positive attitude 80% towards mathematics with high mean scores of 70 and 92.5 respectively. While, females and males of similar negative attitude rating at 20% towards mathematics recorded low mean scores of 58.33 and 80 respectively.

The results indicated that attitude as an affective factor plays a significant role in mathematics achievement. Attitude is directly proportional to achievement. Evidenced on average that in mixed day secondary schools students of positive attitude 87.77% towards mathematics recorded mean score of 45.98 higher than of negative attitude 12.23% at 20. Students in mixed boarding secondary schools of positive attitude 80.17% recorded a mean score of 94 higher than of negative attitude 20.83% at 82.5. For single sex boarding secondary schools, students of positive attitude 80% recorded a mean score of 81.25 higher than of negative attitude 20% at 69.17.

However, analysis basing on gender difference contradicts with the stereotype that females are always of negative attitude towards mathematics than boys, which is not the case in this study. For example, in mixed day secondary schools females indicated higher positive attitude than males but in mixed boarding males indicated higher positive attitude than females unlike in single boarding that both gender indicated similar attitude types towards mathematics. This indicates the relationship between attitude and mathematics achievement basing on gender differences and academic abilities is invalid. Therefore the above analysis from the Table 4.2
revealed that even if there exist statistical relationship between attitude as affective factor and students' achievement in mathematics this was not true by gender differences and academic abilities.

Further analysis of the mathematics achievement of students with positive and negative attitudes was done using computational formula of the Pearson Product Moment Correlation coefficient ($r_{xy}$) as shown in Table 4.3 below.

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

Where:  
X is averages of attitude types (%)

Y is averages of respective mean scores

N is number of corresponding data

$\sum$ is summation symbol
Table 4.3: \( r_{xy} \) for Attitudes and Mathematics Achievement.

\[
\begin{array}{c|c|c|c|c}
X & Y & X^2 & Y^2 & XY \\
87.77 & 48.98 & 7704 & 2399 & 4299 \\
80.17 & 94 & 6427 & 8836 & 7536 \\
80 & 81.25 & 6400 & 6602 & 6500 \\
12.23 & 20 & 149.6 & 400 & 244.6 \\
20.83 & 82.5 & 433.9 & 6806 & 1718 \\
20 & 69.17 & 400 & 4784 & 1383 \\
301 & 395.9 & 21514.5 & 29827 & 21680.6 \\
\end{array}
\]

\( r_{xy} = \frac{(6 \times 21680.6) - (301 \times 395.9)}{\sqrt{[(6 \times 21514.5) - (301)^2] \times [(6 \times 29827) - (395.9)^2]}} = 10918 \sqrt{38486 \times 22225} = 0.37 \)
The $r_{xy}$ shown in Table 4.3 above indicates statistical significant correlation of 0.37 between student attitudes and mathematics achievement by the computation. This relationship was because of factors such as parental and teachers’ negative contributions of mathematics being of general difficulty to learn and perform that influenced mathematics achievement. This is magnified by the perception of peer pressure against mathematics achievement among the students. Therefore the null hypothesis of this study, “there is no statistical significant relationship between attitude and students’ achievement in mathematics” was rejected.

**Interpretation and Discussion of Results:**

This study revealed a statistically significant effect of attitude on the learning and achievement in mathematics. This concurs with Ma and Kishor (2010) but contradicts with Papanastasiou (2010) that no relationship between attitude variables and mathematics achievement. The reasons behind this significant relationship base on students` feelings about mathematics, aspects of classroom or about themselves as learners of mathematics. The perception of learners about mathematics although being useful but too difficult, creates barrier to effective learning of mathematics. This result very few students to practice mathematics in solving challenging mathematical problems.

Unfortunately most of the interested students and of positive attitude towards mathematics require very close supervision and warm assistance from their teachers which is too minimal due to poor teaching methods and overloaded teaching workloads caused by understaffing. For the less interested students and of negative attitude towards mathematics, develop defensive mechanisms against tackling mathematics. These are evidenced by students` propagandas such as sayings of parents are not providing mathematical equipment, mathematics teachers do not know how to teach, the language used to set the mathematics questions was too difficult, and
mathematics is only for the gifted children (Khine, 2015). It result most of the students view mathematics can be performed by the capable few. This is a negative notion about mathematics that spreads too fast under the peer influence.

The findings of attitude and mathematics achievement outweigh the stereotype of gender and academic achievement. It is true that educational stakeholders should perceive mathematics achievement beyond gender differences and academic abilities. This is because the study of relationship between affective factors and mathematics achievement revealed findings which concur with most studies that show on average girls do better in school than boys. Girls get higher grades and complete high school at a higher rate compared to boys (Jacobs`, 2002).

Girls are no longer viewed to be of negative attitude towards mathematics, as indicated in this study females are of higher positive attitude than males. Educators have to know that standardized achievement tests also show that females are better at spelling and perform better on tests of literacy, writing and general knowledge (National Centre for Education Statistics, 2003). Girls continue to exhibit higher verbal ability throughout high school but they begin to lose ground to boys after fourth grade on tests of both mathematical and science ability. These gender differences in mathematics and science achievement have implications for girls` future careers and have been a source of concern for educators everywhere.

However, gender differences do not apply to all aspects of mathematical skill. Males and females do equally well in basic mathematics knowledge and girls actually have better computational skills but performance in mathematical reasoning and geometry shows the greatest difference (Fennema, Sowder and Carpenter, 1999). The negative mathematical reasoning skills exhibited by many female adolescents pose several educational implications. They also do expect to
achieve below average in these subjects and attribute their failures due to lack of ability (Eccles, Barber, Jozefowicz, Malenchuk & Vida, 1999). In secondary schools, girls decide to self-select out of higher-level, “academic track” mathematics and science courses like calculus and chemistry. This result one of long-term consequences among girls to lack the prerequisite secondary mathematics and science courses necessary in certain college majors such as engineering and computer science. Consequently, the enrollment of females pursuing advanced degrees in these fields is significantly reduced (Halpern, 2004).

Even if researchers argued that the gender gap in mathematics is biologically driven. There is evidence, however that socio-cultural factors may influence girls’ attitudes toward mathematics and science. Some parents tend to view mathematics as more important for sons and language, arts and social studies as more important for daughters. Parents are more likely to encourage their sons to take advanced high school courses in mathematics, chemistry and physics, and have higher expectations for their success. However, mixed day secondary schools portrayed a decline on gender disparity due to students’ competition and counseling from invited educational stakeholders that mathematics is for all. Competitions had inspired and put both males and females at similar levels in their ability and mathematics achievement. The only difference is that females indicated higher positive attitude towards mathematics due to their minimal indiscipline levels as in comparison to males.

Teacher behavior and the classroom environment do also contribute to this gender gap. The teaching methods in Ganze District Kilifi County Kenya are general inappropriate. They are of gender bias rather than equality in mathematics learning. Teachers play vital role in the acquisition and development of attitude among the learners. The kind of knowledge, skills and attitude transmitted by teachers to students bring great impact in mathematics achievement. If
mathematics teachers and other subject teachers speak at a while that mathematics is general difficulty, of less usefulness and male domain subject, then mathematics output will concur with this negative input as revealed in this study.

The classroom environments can be made to feel more “girl-friendly” by incorporating low levels of competition, public drill, and practice, high levels of teacher attention, hands-on activities, female role models, same-sex cooperative learning communities, non-sexiest books and materials to supplement the resource inadequacy noted in Ganze Secondary schools. Hence it is fortunately that sex differences in mathematical reasoning have begun to decline, and females’ enrollments are up in mathematics and science courses. Programs designed to interest girls in mathematics and science demonstrates how this knowledge will allow them to help others appear to be working.

Therefore since attitude is the key contributing factor for mathematics achievement, then all educational stakeholders should unity towards managing its implication without considering gender differences or academic abilities. The teachers to be at fore front line in encouraging students from the onset of learning mathematics. Handling the stressed slow learners in mathematics through remedial lessons will be fruitful. During academic clinics parents could volunteer in providing guidance and counseling talks among students without segregating them on bases of their gender differences or greatly deviating scored grades due to varying academic abilities. This narrows the gender disparity and transforms the negative attitude of mathematics being too difficult among students to ‘yes we can’ positive attitude as achievement slogans towards higher grades in mathematics too.
4.3 Anxiety and Mathematics Achievement.

*Results:*

The study sought to establish the relationship between student anxiety and mathematics achievement. Researcher used research questions to determine the extent of anxiety being relevant in mathematics achievement as an affective factor. Students were asked to tick their level of anxiety in a mathematics anxiety rating scale submitted to them after identifying their respective forms, gender and type of school. The responses per question were presented in percentages as in Table 4.4.
Table 4.4 Responses (%) for Mathematics Anxiety Questionnaire.

<table>
<thead>
<tr>
<th>No.</th>
<th>Situation</th>
<th>NAA</th>
<th>AL</th>
<th>AFA</th>
<th>M</th>
<th>VM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Studying for a math test</td>
<td>4</td>
<td>6</td>
<td>15</td>
<td>27</td>
<td>48</td>
</tr>
<tr>
<td>2</td>
<td>When given assignments of difficult problems due the next class meeting</td>
<td>2</td>
<td>2</td>
<td>17</td>
<td>30</td>
<td>49</td>
</tr>
<tr>
<td>3</td>
<td>Thinking about an upcoming math test 1 week before</td>
<td>34</td>
<td>25</td>
<td>18</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Thinking on upcoming math test a day before</td>
<td>7</td>
<td>9</td>
<td>21</td>
<td>29</td>
<td>34</td>
</tr>
<tr>
<td>5</td>
<td>Thinking on upcoming math test an hour before</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>32</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>Getting ready to study for a math test</td>
<td>12</td>
<td>14</td>
<td>18</td>
<td>23</td>
<td>33</td>
</tr>
<tr>
<td>7</td>
<td>Being given a “pop” quiz in a math class</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>33</td>
<td>59</td>
</tr>
<tr>
<td>8</td>
<td>Being given a set of numerical problems involving addition to solve on paper</td>
<td>3</td>
<td>7</td>
<td>14</td>
<td>29</td>
<td>47</td>
</tr>
<tr>
<td>9</td>
<td>Being given a set of subtraction problems to solve</td>
<td>6</td>
<td>9</td>
<td>22</td>
<td>28</td>
<td>35</td>
</tr>
<tr>
<td>10</td>
<td>Being given a set of multiplication problems to solve</td>
<td>0</td>
<td>4</td>
<td>7</td>
<td>32</td>
<td>57</td>
</tr>
<tr>
<td>11</td>
<td>Being given a set of division problems to solve</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>33</td>
<td>59</td>
</tr>
<tr>
<td>12</td>
<td>Watching a teacher work on an algebraic equation on the blackboard</td>
<td>35</td>
<td>24</td>
<td>19</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>13</td>
<td>Listening to another student explain a math formula</td>
<td>38</td>
<td>27</td>
<td>20</td>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

*Key: Not At all (NAA), A Little (AL), A Fair Amount (AFA), Much (M), Very Much (VM).*
Responses to the 13 statements above were coded 0 for a case that did not match the variable and 1 that did match the variable in order to identify high and low anxiety level respectively. The results for student anxiety levels analyzed in cumulative percentages corresponding to their mathematics test mean scored were indicated in Table 4.5.

**Table 4.5: Anxiety and Mathematics Achievement.**

<table>
<thead>
<tr>
<th>ANXIETY</th>
<th>Low Anxiety %</th>
<th>Mean Score</th>
<th>High Anxiety %</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mixed Day Secondary Schools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=100)</td>
<td>23.08 (n=23)</td>
<td>71.67</td>
<td>76.92 (n=77)</td>
<td>42.5</td>
</tr>
<tr>
<td>Female (n=70)</td>
<td>30.77 (n=22)</td>
<td>63.33</td>
<td>69.23 (n=48)</td>
<td>41.67</td>
</tr>
<tr>
<td>Average (n=170)</td>
<td>26.93 (n=45)</td>
<td>67.5</td>
<td>73.08 (n=125)</td>
<td>42.09</td>
</tr>
<tr>
<td><strong>Mixed Boarding Secondary Schools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=20)</td>
<td>33.33 (n=7)</td>
<td>88.75</td>
<td>66.67 (n=13)</td>
<td>87.5</td>
</tr>
<tr>
<td>Female (n=13)</td>
<td>50 (n=7)</td>
<td>92.5</td>
<td>50 (n=6)</td>
<td>92.5</td>
</tr>
<tr>
<td>Average (n=33)</td>
<td>41.66 (n=14)</td>
<td>90.63</td>
<td>58.34 (n=19)</td>
<td>90</td>
</tr>
<tr>
<td><strong>Single Sex Boarding Secondary Schools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=8)</td>
<td>40 (n=3)</td>
<td>86.67</td>
<td>60 (n=5)</td>
<td>80</td>
</tr>
<tr>
<td>Female (n=9)</td>
<td>40 (n=4)</td>
<td>70</td>
<td>60 (n=5)</td>
<td>57.5</td>
</tr>
<tr>
<td>Average (n=17)</td>
<td>40 (n=7)</td>
<td>78.34</td>
<td>60 (n=10)</td>
<td>68.75</td>
</tr>
</tbody>
</table>

*Highlights of the Results:*

The data in Table 4.5 revealed a significant relationship between anxiety and mathematics achievement. In mixed day secondary school, males of low anxiety 23.08% towards mathematics recorded mean score 71.67 more than males of high anxiety 76.92% at 42.5. While females of low anxiety 30.77% towards mathematics recorded mean score 63.33 more than females of high
anxiety 69.23% at 41.67. From mixed boarding secondary schools, males of low anxiety 33.33% towards mathematics recorded mean score 88.75 more than males of high anxiety 66.67% at 87.5. While, females of low anxiety 50% towards mathematics recorded mean score of 92.5 similar to females of high anxiety 50% at 92.5. For single sex boarding schools, males of low anxiety 40% towards mathematics recorded mean score of 86.67 more than males of high anxiety 60% at 80. While, females of low anxiety 40% towards mathematics recorded mean score of 70 more than females of high anxiety 60% at 57.5.

The results indicated anxiety as an affective factor plays a significant role in mathematics achievement. Achievement is indirectly proportional to anxiety. However, analysis basing on gender difference contradicts with the stereotype that males are always of lower anxiety towards mathematics than females, which is not the case in this study. This gender disparity based on type of school. For example, in mixed day secondary schools females indicated high anxiety 69.23% lower than males 76.92% but in mixed boarding females indicated high anxiety 50% lower than males 66.67% unlike in single boarding that both gender indicated similar low anxiety 40% and high anxiety 60% towards mathematics. This indicates the relationship between anxiety and mathematics achievement basing on gender differences and academic abilities is invalid. Therefore the above analysis from table 4.3 revealed that even if there exist statistical relationship between anxiety as affective factor and students` achievement in mathematics; but cannot base on in-born gender differences and academic abilities per se.

Further analysis of the mathematics achievement of students with low and high anxiety levels was done using computational formula of the Pearson Product Moment Correlation coefficient ($r_{xy}$) as shown in Table 4.6 below.
\[ r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}} \]

Where:  
X is averages of anxiety levels (%)  
Y is averages of respective mean scores  
N is number of corresponding data  
\( \sum \) is summation symbol

**Table 4.6:** \( r_{xy} \) for Anxiety and Mathematics Achievement.

<table>
<thead>
<tr>
<th>( X )</th>
<th>( Y )</th>
<th>( X^2 )</th>
<th>( Y^2 )</th>
<th>( XY )</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.93</td>
<td>67.5</td>
<td>725.2</td>
<td>4556</td>
<td>1818</td>
</tr>
<tr>
<td>41.66</td>
<td>90.63</td>
<td>1736</td>
<td>8214</td>
<td>3776</td>
</tr>
<tr>
<td>40</td>
<td>78.34</td>
<td>1600</td>
<td>6137</td>
<td>3134</td>
</tr>
<tr>
<td>73.08</td>
<td>42.09</td>
<td>5341</td>
<td>1772</td>
<td>3076</td>
</tr>
<tr>
<td>58.34</td>
<td>90</td>
<td>3404</td>
<td>8100</td>
<td>5251</td>
</tr>
<tr>
<td>60</td>
<td>68.75</td>
<td>3600</td>
<td>4727</td>
<td>4125</td>
</tr>
<tr>
<td>300</td>
<td>400</td>
<td>16406.2</td>
<td>33506</td>
<td>21180</td>
</tr>
</tbody>
</table>

\( N=6 \)

\[ r_{xy} = \frac{(6 \times 21680) - (300 \times 400)}{\sqrt{[(6 \times 16406.2) - (300)^2][(6 \times 33506) - (400)^2]}} \]

= \( \frac{127080 - 120000}{\sqrt{[98437.2 - 90000][(201036 - 160000)]}} \)
\[ \frac{7080}{\sqrt{8437 \times 41036}} = \frac{7080}{\sqrt{346220732}} = \frac{7080}{18607} \]

\[ r_{xy} = 0.38 \]

The \( r_{xy} \) shown in Table 4.6 above indicates statistical significant correlation of 0.38 between student anxiety and mathematics achievement by computation. This relationship was due to unbearable anxiety levels and unmanageable indiscipline among the students. Students wasted much of their study time in acts against school rules instead of concentrating during teaching-learning process in their classroom. This resulted a great deviation from their normal anxiety levels due to being unprepared as they were nearing the mathematics test. Therefore the null hypothesis of this study, "there is no statistical significant relationship between anxiety and students’ achievement in mathematics" was rejected.

**Interpretation and Discussion of Results:**

The study revealed a clear cause-effect relationship between mathematics anxiety and achievement in mathematics. Mathematics achievement is indirectly proportional to anxiety. Evidenced on average that in mixed day secondary schools students of low anxiety 26.93% towards mathematics recorded a mean score of 67.5 more than of high anxiety 73.08% at 42.09. Students in mixed boarding secondary schools of low anxiety 41.66% recorded a mean score of 90.63 more than of high anxiety 58.34% at 90. For single sex boarding secondary schools, students of low anxiety 40% recorded a mean score of 78.34 more than of high anxiety 60% at 68.75. This mean the increase of students’ anxiety towards mathematics results a decrease in
their mathematics achievement. A decrease of students’ anxiety towards mathematics results in increase in their mathematics achievement. It can be inferred that increase and decrease of the students’ anxiety should be to a relevant and manageable level. Because too low anxiety level may cause overconfidence which in turn result students’ underrating mathematics test (Morena, 2010). While excessive anxiety level can cause withdrawals or collapsing of students during mathematics test, which apart from resulting poor mathematics achievement it is unhealthy to the students’ growth and development.

The slight gender disparity on anxiety and mathematics achievement in half of the schools where the study was carried out, expounded due to both the principal and the deputy principal being of the same gender and students lacked people to deal with their gender issues. Teachers were employing many strategies to improve students’ mathematics achievement in the schools under FDSE despite many challenges. For example, group work and demonstration methods were used to cover the syllabus, which was overloaded and to cope with shortage of facilities especially in the science subjects including mathematics and shortage of teachers. Hence these teaching methods did not enhance student learning since it encouraged high anxiety levels towards mathematics thus poor performance of both male and female students.

Furthermore, schools under free day secondary education lacked funds to provide health facilities for their students in school leading to absenteeism as they sought medical attention outside the school compound. This inconsistency in syllabus coverage among the students creates examination fever which can gradual shoot up as the candidates are nearing mocks. Since learning is a continuous process then learners have to be in classroom most of the time to be facilitated through by their teachers. Unfortunately, apart from deficiencies in the schools’ health-up kits, 60% of students in Ganze district were of chronic absenteeism and truancy due to
their rampant indiscipline levels. The class in attendance led the students to be unprepared for their examinations thus indicated higher anxiety levels which affect mathematics achievement.

Whereby, the anxiety levels were due to poor mathematics concepts being built in the students` minds under minimal consultations from their teachers. It result the students` mathematics achievement be recorded below average and in turn develop fear towards their next mathematics test. Most students indicated panic, the need of their minds not to be destructed as they were about to tackle mathematics test, and others even dodged mathematics quiz. These are behavioral indicators of excessive anxiety levels which alters the mind process of thinking in turn result poor mathematics achievement. Others testify dormancy behavior and no striving spirit towards achieving in mathematics. Evidenced by students leaving three quarter of mathematics test not attempted.

From home, most parents did not inspire their children, were not of good role models, did not bond well with their children and did not have high expectations in mathematics achievement. Little parental support and participation in school programs was also witnessed which led to poor mathematics achievement of students. This is because; Anglin (2008) found that, parental inspiration is related to retention and improved student performance. Absence of high strong emotional bonds of students with their families correlates with diminished academic performance; and parental expectations with inspirations increase student educational aspirations and performance.

The mathematics achievement is higher when anxiety level is low. Only that parental input, students` indiscipline and unpreparedness towards mathematics examination foster high anxiety among students of both genders. This result low mathematics achievement against expectations.
These anxiety levels are expounded by the type of school based on gender differences. For example, in mixed day secondary schools females indicated high anxiety 69.23% lower than males 76.92% but in mixed boarding females indicated high anxiety 50% lower than males 66.67% unlike in single sex boarding that both gender indicated similar low anxiety 40% and high anxiety 60% towards mathematics. Where the destructive effect of higher anxiety levels was well noted before the candidates sat for their mock exams by behavioral burning school dormitories.

The challenge of dealing with anxiety is not unique to adolescents only, but is one among a variety of common unpleasant emotional experiences that every human being encounters in different magnitudes at one time in life. Therefore mathematics anxiety beyond manageable level has to be addressed by all stakeholders in education including parents, teachers, community and students themselves. Academic talks to preside consistently when students are about to tackle mathematics test. This lowers or uplifts students anxiety levels to a relevant status for mathematics achievement. Teachers to encourage students during revision so that students strengthen their weaknesses in mathematics and gain a spirit of being bold when about to tackle any mathematics test in their future life without fear (Galvin, 1994).
4.4 Confidence and Mathematics Achievement.

Results:

The study sought to assess the effect of confidence on mathematics achievement. The researcher used research questions for determinants of confidence as an affective factor in mathematics achievement. Students were asked to tick the best one among a range of answers in the mathematics confidence questionnaire submitted to them after identifying their respective forms, gender and type of school. The responses were presented in percentages as in Table 4.7.
Table 4.7: Responses (%) for Mathematics Confidence Questionnaire

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I am sure that I can learn mathematics</td>
<td>15</td>
<td>21</td>
<td>30</td>
<td>34</td>
</tr>
<tr>
<td>2</td>
<td>Mathematics doesn`t scare me at all</td>
<td>35</td>
<td>32</td>
<td>23</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>I can get good grades in mathematics</td>
<td>39</td>
<td>22</td>
<td>18</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>I have a lot of self-confidence when it comes to maths</td>
<td>40</td>
<td>18</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>I`m not the type to do well in mathematics</td>
<td>17</td>
<td>24</td>
<td>27</td>
<td>32</td>
</tr>
<tr>
<td>6</td>
<td>For some reason even though I study, mathematics seem unusually hard for me</td>
<td>44</td>
<td>30</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>A mathematics test would scare me</td>
<td>42</td>
<td>21</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>8</td>
<td>Mathematics is enjoyable and stimulating to me</td>
<td>23</td>
<td>27</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>9</td>
<td>I haven`t usually worried about being able to solve mathematics problems</td>
<td>34</td>
<td>33</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td>10</td>
<td>I almost never have got nervous during a mathematics test</td>
<td>14</td>
<td>22</td>
<td>29</td>
<td>35</td>
</tr>
<tr>
<td>11</td>
<td>Mathematics is of no relevance to my life</td>
<td>0</td>
<td>2</td>
<td>39</td>
<td>59</td>
</tr>
<tr>
<td>12</td>
<td>Mathematics usually makes me feel uncomfortable and nervous</td>
<td>35</td>
<td>29</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>13</td>
<td>I am challenged by mathematics problems I can`t understand immediately</td>
<td>16</td>
<td>25</td>
<td>27</td>
<td>32</td>
</tr>
<tr>
<td>14</td>
<td>Girls can do just as well as boys in mathematics</td>
<td>60</td>
<td>38</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>I study mathematics because i know how useful it is</td>
<td>59</td>
<td>37</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>I expect to have little use for mathematics when I get out of school</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>17</td>
<td>Maths teachers have made me feel I have the ability to go on in mathematics</td>
<td>46</td>
<td>32</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>18</td>
<td>I will need mathematics for my future work</td>
<td>59</td>
<td>39</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>19</td>
<td>Mathematics is a worthwhile and necessary subject</td>
<td>60</td>
<td>40</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD).
Responses to the 19 statements above were coded 0 for a case that did not match the variable and 1 that did match the variable in order to identify less and more confidence respectively. The results of student confidence levels were analyzed in cumulative percentages in line with their mathematics test mean scores as indicated in Table 4.8.

**Table 4.8: Confidence and Mathematics Achievement.**

<table>
<thead>
<tr>
<th>CONFIDENCE</th>
<th>More Confidence (%)</th>
<th>Mean Score</th>
<th>Less Confidence (%)</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mixed Day Secondary Schools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=100)</td>
<td>84.62 (n=85)</td>
<td>50</td>
<td>15.38 (n=15)</td>
<td>45</td>
</tr>
<tr>
<td>Female (n=70)</td>
<td>75 (n=53)</td>
<td>38.33</td>
<td>25 (n=45)</td>
<td>25</td>
</tr>
<tr>
<td>Average (n=170)</td>
<td>79.81 (n=138)</td>
<td>44.17</td>
<td>20.19 (n=60)</td>
<td>35</td>
</tr>
<tr>
<td><strong>Mixed Boarding Secondary Schools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=20)</td>
<td>83.33 (n=17)</td>
<td>93</td>
<td>16.67 (n=3)</td>
<td>80</td>
</tr>
<tr>
<td>Female (n=13)</td>
<td>75 (n=10)</td>
<td>95</td>
<td>25 (n=3)</td>
<td>85</td>
</tr>
<tr>
<td>Average (n=33)</td>
<td>79.17 (n=27)</td>
<td>94</td>
<td>20.83 (n=6)</td>
<td>82.5</td>
</tr>
<tr>
<td><strong>Single Sex Boarding Secondary Schools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=8)</td>
<td>80 (n=6)</td>
<td>92.5</td>
<td>20 (n=2)</td>
<td>80</td>
</tr>
<tr>
<td>Female (n=9)</td>
<td>80 (n=7)</td>
<td>70</td>
<td>20 (n=2)</td>
<td>62.5</td>
</tr>
<tr>
<td>Average (n=17)</td>
<td>80 (n=13)</td>
<td>81.25</td>
<td>20 (n=4)</td>
<td>71.25</td>
</tr>
</tbody>
</table>

**Highlights of the Results:**

The Table 4.8 above revealed a significant relationship between confidence and mathematics achievement. In mixed day secondary school, males of more confidence 84.62% towards mathematics recorded mean score 50 and males of less confidence 15.38% at 45. While females
of more confidence 75% towards mathematics recorded mean score 38.33 and females of less confidence 25% at 25. From mixed boarding secondary schools, males of more confidence 83.33% towards mathematics recorded mean score of 93 and males of less confidence 16.67% at 80. While females of more confidence 75% towards mathematics recorded mean score of 95 and females of less confidence 25% at 85. For single sex boarding schools, males of more confidence 80% towards mathematics recorded mean score of 92.5 and males of less confidence 20% at 70. While, females of more confidence 80% towards mathematics recorded mean score of 80 and females of less confidence 20% at 62.5.

The results indicate that confidence as an affective factor plays a significant role in mathematics achievement. Confidence is directly proportional to achievement. Evidenced on average that in mixed day secondary schools students of more confidence 79.81% towards mathematics recorded mean score of 44.17 but of less confidence 20.19% at 35. Students in mixed boarding secondary schools of more confidence 79.17% recorded mean score 94 but of less confidence 20.83% at 82.5. For single sex boarding secondary schools, students of more confidence 80% recorded mean score 81.25 but of less confidence 20% at 71.25.

However, analysis basing on gender difference contradicts with the stereotype notion that females are always of less confidence towards mathematics than males, which is not the case in this study. For example, though in mixed day and mixed boarding secondary schools males indicated more confidence than females, unlike in single boarding that both gender indicated similar confidence levels towards mathematics. Therefore the above analysis from the table proved that even if there exist statistical relationship between confidence as affective factor and students` achievement in mathematics; but it`s beyond gender differences and academic abilities.
Further analysis of the mathematics achievement of students with more and less confidence levels was done using computational formula of the Pearson Product Moment Correlation coefficient ($r_{xy}$) as shown in Table 4.9 below.

\[
r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}
\]

Where: $X$ is averages of confidence levels (%)  
$Y$ is averages of respective mean scores  
$N$ is number of corresponding data  
$\sum$ is summation symbol

**Table 4.9:** $r_{xy}$ for Confidence and Mathematics Achievement.

<table>
<thead>
<tr>
<th>$X$</th>
<th>$Y$</th>
<th>$X^2$</th>
<th>$Y^2$</th>
<th>$XY$</th>
</tr>
</thead>
<tbody>
<tr>
<td>70.81</td>
<td>44.17</td>
<td>6370</td>
<td>1951</td>
<td>3525</td>
</tr>
<tr>
<td>79.17</td>
<td>94</td>
<td>6268</td>
<td>8836</td>
<td>7442</td>
</tr>
<tr>
<td>80</td>
<td>81.25</td>
<td>6400</td>
<td>6602</td>
<td>6500</td>
</tr>
<tr>
<td>20.19</td>
<td>35</td>
<td>407.6</td>
<td>1225</td>
<td>706.7</td>
</tr>
<tr>
<td>20.83</td>
<td>82.5</td>
<td>433.9</td>
<td>6806</td>
<td>1718</td>
</tr>
<tr>
<td>20</td>
<td>71.25</td>
<td>400</td>
<td>5077</td>
<td>1425</td>
</tr>
<tr>
<td>300</td>
<td>408.17</td>
<td>20279.5</td>
<td>30497</td>
<td>21316.7</td>
</tr>
</tbody>
</table>

$N=6$

\[
r_{xy} = \frac{(6\times21316.7) - (300\times408.17)}{\sqrt{[(6\times20279.5) - (300)^2][6\times30497 - (408.17)^2]}}
\]
\[
\sqrt{\frac{127900 - 122451}{\sqrt{[121677 - 90000] [(182982 - 166603)]}}}
\]

\[
= \frac{5449}{\sqrt{31677 \times 16398}}
\]

\[
= \frac{5449}{\sqrt{519439446}}
\]

\[
= \frac{5449}{22791}
\]

\[
r_{xy} = 0.23
\]

The \(r_{xy}\) shown in Table 4.9 above indicates statistical significant correlation of 0.23 between the student confidence and mathematics achievement by computation. This relationship was due to the self-concept of the individual students through the attribution theory that determines student confidence rather than gender or academic comparisons. Also academic talks contributed inferiority level of female gender towards mathematics diminishing rapidly, and teachers improving their teaching methods by matching teaching methodologies to gender. Therefore the null hypothesis of the study, "there is no statistical significant relationship between confidence and students` achievement in mathematics" was rejected.

**Interpretation and Discussion of Results:**

The study revealed that confidence determines mathematics achievement beyond gender differences and academic abilities. It roots from academic self-concept as the individual`s perception of self with respect to achievement in school. Whereby, there is no significant difference in confidence between females and males, but the relationship is of statistically significance between students` confidence and mathematics achievement.
The cause effect of confidence on mathematics achievement starts at discussion level as the students constantly consult from their mathematics teachers. Students become determined to tackle all problems fearing that if not able to attempt all of them then would fail. The volunteering behavior towards attempting mathematics was experienced from both female and male students with inferiority of female gender towards mathematics diminishing rapidly. For example, female students showed high confidence, required very less supervision, had minimal consultations and were determined in calculating all questions under limited time. So the determinants of confidence is how someone’s self-concept will be serious in striving to achieve in mathematics without basing on person’s gender difference nor academic abilities (Weiner, 1974).

Vast majority of dropouts noticed annually in the district are boy students in secondary schools due to their rising indiscipline verses diminishing confidence levels. Evidenced by females admitted to college in mathematics careers being greater than males (JAB, 2015). Though these gender disparities play out differently among social class, racial, and ethnic groups. In geographical areas with more wealthy families, gender achievement gaps in reading and mathematics may lessen somewhat by middle school. However, gaps often continue to widen in middle and working-class districts. Most notably, the gaps between racial and ethnic groups tend to be much greater than achievement gaps by gender (Sadowski, 2010).

This study concurs with recent advancements in neuroscience which improves our ability to understand how the brain works and offer possible reasons why so many of our boys are falling behind. Both male and female brain requires different teaching methodologies for different learning styles. In the book, “Delusions of Gender: How our Minds, Society, and Neurosexism Create Difference, by Cordelia Fine (2010)” points out that our own stereotypes about gender,
and the social expectations they carry, both influence the ever-changing brain and even the research that is done in neuroscience. When we confidently compare the `female mind` and the `male mind,` we think of something stable inside the head of the person, the product of a `female` or `male` brain. But such a tidily isolated data processor is not the mind that social and cultural psychologists are getting to know with ever more intimacy. It`s for this reason that we can`t understand gender differences in female and male minds. Minds are the source of our thoughts, feelings, abilities, motivations, and behavior; without understanding how psychologically permeable is the skull separating the mind from the socio-cultural context in which it operates.

Regardless of the debate over effects from differences in male-female brain structure, what is more important in male and female brains are the differences in their sequence of development. Different regions of the brain develop in different sequences in different sexes (Lenroot, 2007) with certain major structures of girls` brains mature more quickly than boys in size and shape. However, there is no one best way to measure brain development. But, whichever method you use, the message is the same: girls develop substantially faster than boys; and boys don`t catch up until well after the age of high school graduation (NASSPE, 2004).

Hence as educators learn more about gender differences, many have begun to reflect on matching teaching methodologies to gender. One rule that most seem to agree on is that there are no differences in what boys and girls can learn, but there are different ways to teach them. Educators need to begin to take the differences in sequence of brain development into account. Teachers and parents need to model these higher-level thinking skills, and continuously build up the self-esteem of all students, modeling and supporting a “can-do” confidence
4.5 Summary
The study established the relationship between student attitude and mathematics achievement. Used research question to determine how attitude as an affective factor influence mathematics achievement. Analyzed students questionnaires indicated attitude as an affective factor plays a significant role in mathematics achievement. Attitude is directly proportional to achievement. Evidenced in mixed day secondary schools, students of positive attitude 87.77% towards mathematics recorded mean score of 45.98 higher than of negative attitude 12.23% at 20. Students in mixed boarding of positive attitude 80.17% recorded mean score 94 higher than of negative attitude 20.83% at 82.5. Single sex boarding, students of positive attitude 80% recorded mean score 81.25 higher than of negative attitude 20% at 69.17. This relationship was because of factors such as parental and teachers` negative contributions of mathematics being of general difficulty to learn and perform that influenced mathematics achievement. Magnified by the perception of peer pressure against mathematics achievement among the students.

Other objective established the relationship between student anxiety and mathematics achievement. Used research question to determine the extent of anxiety being relevant in mathematics achievement as an affective factor. Analyzed students` mathematics anxiety rating scales revealed a clear cause-effect relationship between mathematics anxiety and achievement in mathematics. Mathematics achievement is indirectly proportional to anxiety. Evidenced in mixed day secondary schools students of low anxiety 26.93% towards mathematics recorded mean score of 67.5 more than of high anxiety 73.08% at 42.09. Students in mixed boarding secondary schools of low anxiety 41.66% recorded mean score 90.63 more than of high anxiety 58.34% at 90. For single sex boarding secondary schools, students of low anxiety 40% recorded mean score 78.34 more than of high anxiety 60% at 68.75. This relationship was due to unbearable anxiety levels and unmanageable indiscipline among the students. Students wasted
much of their study time in acts against school rules instead of concentrating during teaching-learning process in their classroom. Result a great change from their normal anxiety levels due to being unprepared as they were nearing the mathematics test.

Lastly the study assessed the effect of confidence on mathematics achievement. Used research question for determinants of confidence as an affective factor in mathematics achievement. The analyzed students’ questionnaires indicated confidence as an affective factor plays a significant role in mathematics achievement. Confidence is directly proportional to achievement. Evidenced in mixed day secondary schools students of more confidence 79.81% towards mathematics recorded mean score of 44.17 but of less confidence 20.19% at 35. Students in mixed boarding of more confidence 79.17% recorded mean score 94 but of less confidence 20.83% at 82.5. Single sex boarding, students of more confidence 80% recorded mean score 81.25 but of less confidence 20% at 71.25. This relationship was due to the self-concept of the individual students through the attribution theory that determines student confidence rather than gender or academic comparisons. Also academic talks contributed inferiority level of female gender towards mathematics diminishing rapidly, and teachers improving their teaching methods by matching teaching methodologies to gender.

Therefore the above data analysis, presentations and discussions resulted the null hypothesis of the study, "there is no statistical significant relationship between affective factors and students` achievement in mathematics" be rejected.
CHAPTER FIVE:

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction
This chapter entails the summary of the main results in attitude and mathematics achievement; anxiety and mathematics achievement; confidence and mathematics achievement; conclusions and recommendations.

5.1 Summary of the Study
This study sought to establish the relationship of attitude, anxiety and confidence with students` mathematics achievement beyond gender differences and academic abilities. Objectives were: To establish the relationship between student attitude and mathematics achievement; to establish the relationship between student anxiety and mathematics achievement; and to assess the effect of confidence on mathematics achievement. The null hypothesis of this study was, “There is no statistical significant relationship between affective factors and students` achievement in mathematics”. Descriptive Survey research design with a sample size of 250 students (150 males and 100 females) from form 4 and 3 was used. Data collection was done by administering mathematics student attitude questionnaire, mathematics student anxiety, mathematics student confidence questionnaire and mathematics test to the students sampled. The findings of the relationship between affective factors and students` achievement in mathematics were summarized as follows:
5.2 Summary of Findings.

5.2.1 Attitude and Mathematics Achievement.
Analyzed students questionnaires indicated attitude as an affective factor plays a significant role in mathematics achievement. Attitude is directly proportional to achievement. This is because of factors such as parental and teachers` negative contributions towards learning of mathematics magnified by the perception of peer pressure against mathematics achievement among the students. However, analysis basing on gender difference contradicts with the stereotype that females are always of negative attitude towards mathematics than boys, which is not the case in this study. In mixed day secondary schools females indicated higher positive attitude than males but in mixed boarding males indicated higher positive attitude than females unlike in single sex boarding that both genders indicated similar attitude types towards mathematics.

5.2.2 Anxiety and Mathematics Achievement.
Analyzed students mathematics anxiety rating scales revealed a clear cause-effect relationship between mathematics anxiety and achievement in mathematics. Anxiety is indirectly proportional to achievement. This was due to unbearable anxiety levels and unmanageable indiscipline among the students. Students wasted much of their study time in acts against school rules instead of concentrating during teaching-learning process in their classroom. Result a great deviation from their normal anxiety levels due to being unprepared as they were nearing the mathematics test. However, analysis basing on gender difference contradicts with the stereotype that males are always of low anxiety towards mathematics than females, which is not the case in this study. In mixed day secondary schools females indicated lower anxiety than males but in mixed boarding males indicated lower anxiety than females unlike in single sex boarding that both gender indicated similar anxiety levels towards mathematics.
5.2.3 Confidence and Mathematics Achievement.
Analyzed students questionnaires indicated confidence as an affective factor plays a significant role in mathematics achievement. Confidence is directly proportional to achievement. Was due to the self-concept of the individual students through the attribution theory that determines student confidence rather than gender or academic comparisons. Also academic talks contributed inferiority level of female gender towards mathematics diminishing rapidly, and teachers improving their teaching methods by matching teaching methodologies to gender. However, analysis basing on gender difference contradicts with the stereotype that females are always of less confidence towards mathematics than males, which is not the case in this study. Though in mixed day and mixed boarding secondary schools males indicated more confidence than females, unlike in single sex boarding that both genders indicated similar confidence levels towards mathematics.

5.3 Implication of the Findings for Practice.
The findings form a base of addressing the trending low mathematics achievement successful basing on affective factors beyond gender differences and academic abilities. Encourage creation of equal competitive academic environment among mixed students. Improve content delivery during teaching to enhance learning of mathematics. It enhances the students’ grouping criterion for effective mathematics teaching and learning. The development of knowledge was hoped to be contributed much by the affective factors on the attributes of ability, task difficulty, effort and luck towards high mathematics achievement.
5.4 Conclusion.
The results from this study suggest that secondary students know that mathematics is important and they seem willing to learn mathematics and learn it well. However, their attitudes, anxiety and confidence affect their achievement of the subject. In addition, school teachers are aware that there are certain aspects of students` learning in mathematics that need to be improved. Only that teachers and students limit to theoretical teaching and focused on passing examinations. In this sense, mathematics students do not demonstrate in a more practical way, by which student can't spontaneously associate mathematics knowledge with everyday environment. Engagement and exposure will result in students’ better perspective of mathematics and their mathematics achievement, which in turn help students to develop more positive attitudes, low anxiety and more confidence toward the subject. This promotes learning ability and consequently performs better in mathematics examinations.

A certain amount of attitude, anxiety and confidence is required as an impetus towards positive action; an opposite of the same could be detrimental to the students’ well-being and may greatly contribute to low mathematics results. Therefore, Students should get equipped with knowledge on affective factors and effective management skills for their own benefit while in school and elsewhere. Students should take responsibility to seek for affective management help from teacher counselors, other teachers or from the peer counseling clubs within their schools in order to ensure that their affective factors do not escalate to levels that impact negatively on their academic results. Students should realize that individuals have the capacity to decide on how they process the problems they encounter. Since problems left unprocessed unconsciously become major sources of negative attitude, high anxiety and less confidence.

It is therefore imperative that the students should desist from apportioning blame, and instead proactively seek to find positive solutions to their problems for better adjustment. Students
should be encouraged to use all available opportunities to raise issues that cause them be of negative attitude, high anxiety and less confidence; so that enlightening discussions could be organized either amongst themselves or with the teacher counselors to facilitate positive resolutions to the problems raised. Teachers sought to understand the nature of student’s anxiety causing factors so that they are able to address the same as part of affective management skill acquisition process. The developmental process and especially during teenage poses many anxiety causing challenges to the students. Teacher counselors should therefore invest a lot of time in imparting knowledge on development so at to help reduce pressure that might arise from the growth process experience. Teacher counselors therefore should help students to learn to take positive responsibility to seek counseling help when need be. Principals play a very vital role in the life of students as they have the monopoly to design school programs. From this study, the attitude type, anxiety and confidence levels have shown students often suffer negative attitude, high anxiety and less confidence; as a result their academic results are lacking. Hence the relationship between Affective Factors and Students` Achievement in Mathematics is beyond gender differences and academic abilities.

Since the study identified the relationship between affective factors (attitude, anxiety, confidence) and students` achievement in mathematics the following recommendations are suggested.
5.5. **Recommendations**
Based on the foregoing discussion of the findings and conclusion, the following recommendations are offered to students, educators and the government regarding the mathematics achievement in secondary schools.

5.5.1 **Policy Recommendations**
   a. Mathematics teachers have to inculcate positive attitude classroom environment for better achievement since attitude is direct to achievement.
   b. Anxiety is indirect to achievement therefore mathematics teachers have to create friendly learning environment that avoid students being anxious toward mathematics.
   c. Mathematics teachers need to guide students through solving mathematics problems in order they develop self-confidence since confidence is direct to achievement.

5.5.2 **Recommendations for Further Research**
   i. The impact of special teaching methods for students with negative attitudes, high anxiety and low confidence towards mathematics.
   ii. The effect of group discussion for female students with positive attitudes, low anxiety and high confidence towards mathematics under guidance.
   iii. This study only focused on relationship between affective factors and students` achievement in mathematics. It would be also interesting to know the effect of teachers` affective factors towards teaching and achievement in mathematics among students.
REFERENCES


Schools. PHD Dissertation: Department of Didactics, University of the Western Cape, P, B, Bellville 7535, South Africa.


McLeod, D.B. (1992). Research on affect in Mathematics Education: A reconceptualization. In D.A. Grouws (Eds.), *Handbook of research on Mathematics teaching and learning (pp. 575-596).*


Ojerinde, A. (2009). Birth order and academic achievement. A seminar paper, Department of Educational Foundations and Counseling, University of Ife (Obafemi Awolowo University Ile-Ife)


APPENDICES:

APPENDIX I - RESEARCH INSTRUMENTS:

a) Mathematics Attitude Questionnaire for Students.

The purpose of this questionnaire is to establish the relationship between student attitude and mathematics achievement among secondary schools in Ganze district, Kilifi County. Please answer the following questions as free as possible by ticking one answer. The answers provided will be kept confidential and will only be used for the purposes of this study.

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mathematics is a science.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Mathematics is a language consisting a set of tools to express scientific ideas.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>There is nothing creative about mathematics; it’s just memorizing formulas.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>In general, I feel comfortable with mathematics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>My peers tend to feel comfortable with mathematics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Generally, people tend to feel comfortable with mathematics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Calculators and computers are essential for solving math problems.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>The most important thing in determining a student’s grade in a math should be the effort they put in, not necessarily whether or not they always obtained the correct answers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Most problems one faces in the real world typically do not relate with mathematics nor have a ‘correct answer’ per se.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>If I need math in my career, I am sure I can find someone to do it for me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD).*
b) Mathematics Anxiety Rating Scale for Students.

The purpose of this questionnaire is to establish the relationship between student anxiety and mathematics achievement among secondary schools in Ganze district, Kilifi County. Please indicate the level of your anxiety in the following situations.

<table>
<thead>
<tr>
<th>No.</th>
<th>Situation</th>
<th>NAA</th>
<th>AL</th>
<th>AFA</th>
<th>M</th>
<th>VM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Studying for a math test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>When given assignments of difficult problems due the next class meeting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Thinking on upcoming math test 1 week before</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Thinking on upcoming math test a day before</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Thinking on upcoming math test an hour before</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Getting ready to study for a math test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Being given a “pop” quiz in a math class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Being given a set of numerical problems involving addition to solve on paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Being given a set of subtraction problems to solve</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Being given a set of multiplication problems to solve</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Being given a set of division problems to solve</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Watching a teacher work on an algebraic equation on the blackboard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Listening to another student explain a math formula</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Key: Not At all (NAA), A Little (AL), A Fair Amount (AFA), Much (M), Very Much (VM).*
c) Mathematics Confidence Questionnaire for Students.

The purpose of this questionnaire is to assess the effect of confidence on mathematics achievement among secondary schools in Ganze district, Kilifi County. Please answer each statement using the answers ranging from “strongly agree” to “strongly disagree”. Read each carefully before you tick the best one.

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I am sure that I can learn mathematics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Mathematics doesn’t scare me at all</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I can get good grades in mathematics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I have a lot of self-confidence when it comes to maths</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I’m not the type to do well in mathematics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>For some reason even though I study, mathematics seem unusually hard for me</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>A mathematics test would scare me</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Mathematics is enjoyable and stimulating to me</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>I haven’t usually worried about being able to solve mathematics problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I almost never have got nervous during a mathematics test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Mathematics is of no relevance to my life</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Mathematics usually makes me feel uncomfortable and nervous</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>I am challenged by mathematics problems I can’t understand immediately</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Girls can do just as well as boys in mathematics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>I study mathematics because I know how useful it is</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>I expect to have little use for mathematics when I get out of school</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Maths teachers have made me feel I have the ability to go on in mathematics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>I will need mathematics for my future work</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Mathematics is a worthwhile and necessary subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key:** Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD).
d) Mathematics Test for Students (20 marks).
The purpose of this mathematics test is to determine the students’ achievement in mathematics among secondary schools in Ganze district, Kilifi County. Please answer all the following questions for half an hour.

1. Kadzo had cows, sheep and goats in her farm. The number of cows was 32 and number of sheep was twelve times the number of cows. The number of goats was 1344 more than the number of sheep. If she sold \( \frac{7}{8} \) of the goats, find the number of goats that remained. (3 marks).

2. The mass of a solid cone radius 14 cm and height 18 cm is 4.62 kg. Find its density in g/cm\(^3\). (3 marks).

3. A businessman makes a profit of 20% when he sells a carpet for Ksh 36000. In a trade fair he sold one such carpet for Ksh 33600. Calculate the percentage profit made on the sale of the carpet during the trade fair. (3 marks).

4. The area of a sector of a circle, radius 2.1 cm, is 2.31 cm\(^2\). The arc of the sector subtends an angle \( \Theta \), at the Centre of the circle. Find the value of \( \Theta \) in radians correct to 2 decimal places. (3 marks).

5. The sum of interior angles of a regular polygon is 1800\(^0\). Find the size of each exterior angle. (3 marks).

6. Solve \( 4 \leq 3x - 2 < 9 + x \), hence list the integral values that satisfies the inequality. (3 marks).

7. Expand and simplify \( (x+2y)^2 - (2y-3)^2 \). (2 marks).
APPENDIX II: AUTHORIZATION LETTER.

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: kubps@yahoo.com
       dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: E55/CE/24575/12
Date: 29th June, 2015

The Principal Secretary,
Higher Education, Science & Technology,
P.O. Box 30040,
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MR. NICKSON T. MWENI - REG. NO.E55/CE/24575/12

I write to introduce Mr. Mweni who is a Postgraduate Student of this University. He is registered for a M.Ed. degree programme in the Department of Educational Communication & Technology in the School of Education.

Mr. Mweni intends to conduct research for a thesis Proposal entitled, “Relationship between Affective Factors and Students’ Achievement in Mathematics in Ganze District, Kilifi County Kenya”.

Any assistance given will be highly appreciated.

Yours faithfully,

[Signature]

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

RM/cao
APPENDIX III: RESEARCH PERMIT

REPUBLIC OF KENYA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
State Department of Education

Telegram: “EDUCATION” Ganz
Telephone: +254 712 125 251
E-mail: eduganzedoo@yahoo.com
when replying please quote:

Ref: GNZ/EDU/H12/1/14

SUB COUNTY EDUCATION OFFICE,
GANZE SUB COUNTY,
P.O. BOX 6,
GANZE, KILIFI

15TH May, 2015

RE: NICKSON TSOF'A MWENI ADMN NOE55/CE/24575/2012

The above named, has permission to conduct research on “Relationship between affective factors and students’ achievement in Mathematics in Ganze District, Kilifi County Kenya” in the following Secondary Schools:-

1. Jila
2. Bandari
3. Mitangani
4. Palakumi
5. Petungu
6. Dungicha
7. Kachororoni
8. Magogoni
9. Gudoma
10. Vitengeni
11. Ganze Girls
12. Sokoke boys

The principals in these schools are requested to accord him necessary assistance.

He is expected to conduct the research normally and normal school routine should not be interfered by this study.

Omar Boru
Sub- County Education Office
GANZE
APPENDIX IV: MAP OF GANZE DISTRICT