SELF-EFFICACY AND ACADEMIC ACHIEVEMENT AMONG

SECONDARY SCHOOLS IN KENYA: MATHEMATICS PERSPECTIVE

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©

2015

A Research Project Submitted In Partial Fulfillment for the Degree of

Master of Education (Measurement & Evaluation)

University of Nairobi

DECLARATION

This research project is my original work and has not been presented for any

degree in any other university.

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This research project has been submitted for examination with my approval as the

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DEDICATION

This research project is dedicated to my wives Eunice Ochieng and Jackline Ochieng'. It is also dedicated to my children Steven, Brenda, Glen, Austin Kwach and Macred who all encouraged me and prayed for me throughout the time of my studies. I am also deeply thankful to my classmates Apondi, Mulala, Ndungu, Mutua with whom we have shared many academic experiences and explorations. Lastly, special thanks go to my mum Anjeline, my in-laws, my only sister Lewtine Anyango, Benard Amuom, Erastus Ngutu, Beatrice Otieno, Fr. Benard Isiaho Omondi SJ and my mentor Nyandiwa Hudson. May the Almighty God bless them all for the unwavering support throughout my studies.

ACKNOWLEDGEMENT

ABSTRACT

The purpose of this study was to determine the relationship between 'Self-Efficacy' and 'Academic Achievement' from a Mathematical perspective among secondary schools in Kenya. The study was carried out in Nyakach Sub-county. The objectives were: (a) To determine the level of Self-Efficacy among secondary school students in Kenya (b) To determine the relationship between Self-Efficacy and Academic Achievement among male and female secondary school students. (c) To determine gender perspective between self–efficacy and Academic Achievements among male and female secondary school students. (d) To come up with recommendations on Self-Efficacy and its effects on Academic Achievement. The study applied quantitative research design using descriptive research method. The target population was secondary school students in the County. The sample was 390 secondary school students. The results show that Self Efficacy levels and Academic Achievement of the students are average. The results from gender perspective show that male students seem to have a higher Self–Efficacy than their female counterparts. It was also observed that there is a significant difference in Self-Efficacy regarding male as compared to their female counterparts. The study findings further indicate that those with high Self-Efficacy perform better in Mathematics more often than those with lower Self-Efficacy. It seems like Kenyan secondary schools students do not all demonstrate *sufficient* sense of Self–Efficacy. They are therefore not likely to put forth the necessary effort or persist longer on a task when faced with the academic challenges. The students therefore do not adequately engage in self regulating processes. Thus they do not seem apply effective learning strategies. This could mean low Academic Achievement. There is need to explore the issue of Self – Efficacy as a predictor of Academic Achievement and to make the education fraternity aware of its implications and applications in motivation of students and learning process.

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LIST OF ABBREVIATIONS

AA	Academic Achievement
ACI	Analytical Chemistry I
ANOVA	Analysis of Variance
ASES	Academic Self-Efficacy Scale
df	Degree of freedom
GPA	Grade Point Average
IAR	Crandall's Intellectual Achievement Responsibility
KCPE	Kenya Certificate of Primary Education
KCSE	Kenya Certificate of Secondary Education
MSES	Mathematics Self-Efficacy Scale
MSES-R	Mathematics Self-Efficacy Scale-Revised
NCTM	National Council of Teachers Mathematics
SD	Standard deviation
SE	Self-Efficacy
SPSS	Statistical Package for Social Sciences

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Self-Efficacy, in the past two decades, has emerged as a highly effective predictor of students' motivation and learning, and subsequently higher Academic Achievement. Accordingly, Self-Efficacy consistently predicts Academic Achievement (Bong and Clark, 1999) due to its effects on effort and persistence. It is stated that students who demonstrate greater senses of Self-Efficacy are more likely to put forth the necessary effort and persist longer when facing academic challenges (Schunk and Gunn, 1985). Schunk and Gunn further state that students who possess high efficacy about learning are more inclined to engage in self-regulatory processes like setting goals, using effective learning strategies, monitoring their comprehension and evaluating their goal progress. This study is on Self-Efficacy with the purpose to determine levels of Self-Efficacy (SE). the study will explore SE looking into Mathematics perspective. Bandura (1989) holds the view that Self-Efficacy is enhanced and influenced by the outcomes of behaviors such as goal progress, achievement and input from the environment such as feedback from teachers and social comparison with peers.

Bandura (1997) defines Self-Efficacy as one's belief in one's ability to succeed in specific situations or accomplish a task. One's sense of Self-Efficacy can play a major role in how one approaches goals, tasks, and challenges. The theory of Self-Efficacy lies at the center of Bandura's social cognitive theory, which emphasizes the role of observational learning and social experience in the development of personality.

The main concept in social cognitive theory is that an individual's actions and reactions, including social behaviors and cognitive processes, in almost every situation are influenced by the actions that individual has observed in others. Because Self-Efficacy is developed from external experiences and self-perception

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and is influential in determining the outcome of many events, it is an important aspect of social cognitive theory. Self-Efficacy represents the personal perception of external social factors. According to Bandura's theory, people with high Self-Efficacy, that is, those who believe they can perform well are more likely to view difficult tasks as something to be mastered rather than something to be avoided, (Graham and Weiner, 1996.)

Self-Efficacy in Mathematics indicates a student's self-belief in their ability to overcome difficulties or obstacles to solving Mathematics problems. Such a belief is important to motivation because confidence that one will be able to solve a problem is a precursor to investing the time and effort needed to tackle it. Mathematics has been widely studied. Further it is key in professional areas. It was found that Self-Efficacy (SE) beliefs appear to be a more important factor influencing attitudes, achievement and educational, career choices, than other variables such as anxiety, Mathematics experiences, perceptions of Mathematics and self-regulation beliefs (Zimmerman,2000). Thus, this study will be guided exploring SE applying Mathematics.

The influence of SE on Mathematics performance is as strong as the influence of general mental ability (Hackett and Betz, 1989), and that a negative relationship between SE in problem-solving and anxiety does occur (Pajares, 1996). Studies have reported that SE in problem-solving is a stronger predictor of academic performance than anxiety, self-concept or perceived usefulness of Mathematics (Pajares and Graham, 1999). The relation of SE to motivation and self-regulated learning can indirectly influence performance in Mathematics (Pintrich and De Groot, 1999), since students with high level of SE are motivated and confident in their skills, use self-regulatory strategies and achieve better than others.

Mathematics is seen as the foundation of scientific and technological knowledge that is vital in social-economic development of the nation. Because

Mathematics is a compulsory subject and also used as a basic entry requirement into common professional   courses such as Medicine, Architecture and Engineering among other degree programs.

Not much research has been done on the area of SE, more as it relates to Mathematics. It is hoped that the study will shed light into this area as the education fraternity recognize students' self-belief and the ability to overcome learning challenges, precursor to motivation and thus access towards acceptable Academic Achievement.

1.2 Statement of the Problem

Previously researchers have carried out numerous studies and most of them have been focused on the factors affecting students' performance. However, there has not been much focus on SE. As stakeholders seek to understand the influencing factors on Academic Achievement (AA). The research shows that Self-Efficacy influences to large extent AA. Bandura's theory of cognitive behavior (1997), argues that students may perform poorly because they lack the skills or because they have the skills but lack the perceived *personal efficacy* to make optimal use of them. In addition and as the literature shows, during the past two decades, Self-Efficacy has emerged as a highly effective predictor of students' motivation and learning and subsequent an influence on Academic Achievement.

1.3 Purpose of the study

 The purpose of this study is to examine the relationship between *Self-Efficacy* and *Academic Achievements* in Mathematics in secondary schools in Kenya.

1.4 Objectives of the Study

The objectives of the study:

a. To determine the level of Self–Efficacy and Academic Achievement among secondary school students in Kenya.

b. To determine the relationship between Self-Efficacy and Academic Achievement among male and female secondary school students in Kenya.

c. To determine the Gender perspective between Self-Efficacy and Academic Achievement among male and female secondary school students,

d. To come up with recommendations on Self-Efficacy and its effect on Academic Achievement.

1.5 Research Questions

The present study sought to answer the following questions:

i. What are the levels of Self-Efficacy and Academic Achievement of male and female secondary school students?

ii. Is there a relationship between Self-Efficacy and Academic Achievement in Mathematics by gender?

1.6 Significance of the Study

It is hoped that the study would provide useful information for teachers, counsellors and the Ministry of Education to assess the existing levels of Self-Efficacy among students at classroom level. This will enable them focus their efforts on improving the student's Self-Efficacy from a mathematical perspective. By understanding their Self-Efficacy levels, learners would also be able to identify the courses they would pursue at college level. Students would be able to lay out specific learning strategies and verbalize them. By doing this, they would be able to exploit their capacities to execute behaviours necessary to provide

specific performance attainments and leverage on their ability to exert control over one's own motivation, behaviour and social environment.

1.7 Justification of the Study

The performance of students in Mathematics at the Kenya Certificate of Primary Education (KCPE) and Kenya Certificate of Secondary Education (KCSE) has been low as compared to other compulsory subjects such as English and Kiswahili. Numerous studies (Bandura, 1986; Schunk, 1981; Diane, 2003; Pajares, 1996; Collins, 1982; Jinks and Morgan, 1999) and meta-analysis of research (Multon, Brown and Lent, 1991) in educational settings have found out that self–efficacy is related to Academic Achievement. Most of the research studies on Self-Efficacy and Academic Achievement have been conducted in the Western countries, and therefore this psychological construct needed to be understood in the context of the Kenyan learners and their Academic Achievement in Mathematics.

1.8 Terminologies

Academic Achievement: Is the extent to which a learner is profiting from instructions in a given area of learning i.e. achievement is reflected by the extent to which skill and knowledge has been imparted to him/her through good grades, (Crow and Crow, 1996).

Cognitive theory: An approach to psychology that attempts to explain human behavior by understanding the thought processes. The assumption is that in humans, thoughts are the primary determinants of emotions and behavior.

Examination: This is a formal test of a learner's knowledge, proficiency and ability in a subject.

Gender: The state of being male and female: typically used in reference to social and cultural differences rather than biological ones.

Self-Efficacy: The confidence individuals have in their abilities that they can successfully perform particular tasks (Bandura, 1997).

Self-regulation: An integrated learning process, consisting of the development of a set of constructive behaviors that affect one's learning. These processes are planned and adapted to support the pursuit of personal goals in changing learning environments.

Mathematics: This is a discipline defined as an abstract science of number, quantity and space either as abstract concepts (pure Mathematics) or as applied to other disciplines such as physics and engineering (applied Mathematics)

Motivation: This is the process that initiates, guides, and maintains goal-oriented behaviors. It involves the biological, emotional, social, and cognitive forces that activate behavior.

Perceived Ability: The ability to see, hear, or become aware of something through the senses

Self-concept: This is a collection of beliefs about oneself that includes elements such as academic performance, gender roles and sexuality, and racial identity. Generally, self-concept embodies the answer to "Who am I?".

Cognitive abilities: These are brain-based skills we need to carry out any task from the simplest to the most complex. They have more to do with the mechanisms of how we learn, remember, problem-solve and pay attention rather than with any actual knowledge

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

This chapter reviews the literature on Self-Efficacy and Academic Achievement. It highlights studies done regarding this topic, tries to conceptualize Self-Efficacy, Academic Achievement, self-concept, gender and general issues in Mathematics achievement. It also presents theoretical and the conceptual framework that defines this study.

2.1 Related Studies

Various studies have been conducted in the area of Self-Efficacy and Academic Achievement across the world. Some of these studies have interchangeably used the terms Academic Achievement and academic performance to mean the same thing. However, the contribution of these studies in the area of Self-Efficacy has been instrumental. A study by Li, (2012) on the relationship between social science students' attitude towards research methods and statistics, Self-Efficacy, effort and Academic Achievement showed that both attitude and Self-Efficacy could significantly predict effort but when multiple regression analysis was conducted to estimate the prediction power of attitude, Self-Efficacy and effort on Academic Achievement, it was found that effort failed to predict Academic Achievement.

Self-administered questionnaire was chosen as the primary data collection method and a sample of 153 students from Department of Applied Social Studies in the City University of Hong Kong were invited to complete the survey. After analyzing the data collected, Pearson's correlation coefficient reflected that there was a positive correlation between all the four variables – attitude towards research methods and statistics, Self-Efficacy, effort and Academic Achievement. It also indicated that academic Self-Efficacy and Academic Achievement are

positively correlated, which is found to be consistent with most of the existing literature. The study found that only attitude towards statistics (B = .106, p<.01) and academic Self-Efficacy (B = .324, p<.01) could significantly predict Academic Achievement (actual 2027 course grade). The two variables could explain 61.1% of variation of the actual 2027 course grade that students obtained ($R2 = .611$, F(152) = 78.128, p<.05). To conclude, effort could only be regarded as an indirect factor but not be a necessary factor in bridging the relationship between attitude, Self-Efficacy and Academic Achievement (Lilian, 2012).

A different study carried out by Tenaw, (2013) titled '*Relationship between Self-Efficacy, Academic Achievement and gender in analytical chemistry at Debre Markos College of Teacher Education in Ethiopia*' found out that female and male students' achievement and Self-Efficacy were positively correlated, (r=0.377 and r=0.362), and were statistically significant at 0.05 and 0.01 with 45 and 55 degree of freedom (2-tailed), respectively (Tenaw, 2013). In addition, total students' achievement and Self-Efficacy were positively correlated (r=0.385), which was also statistically significant at 0.01 with 98 degree of freedom (2-tailed). A t-test was used to examine the difference in their Analytical Chemistry I (ACI) achievement test results that would exist between the sexes (gender). The mean achievement test result was 61.8444 for females and 66.5636 for males with standard deviations 9.88 and12.12, respectively.

Here, females' mean achievement test result was lower than the males' one. This is statistically significant at 0.1 levels with 95% confidence level between genders with their achievement. Relations between students' total Self-Efficacy and their achievement in ACI were calculated using Pearson correlation coefficient(r). Therefore, correlation between achievement and Self-Efficacy for both sexes becomes r=0.385, which is statistically significant at 0.01 with 98 degree of freedom (2-tailed). Correlation between achievement and Self-Efficacy for females only becomes r=0.377*, which is statistically significant at 0.05 with

45 degree of freedom (2-tailed). Correlation between achievement and Self-Efficacy for males only becomes r=0.362, which is statistically significant at 0.01 with 55 degree of freedom (2-tailed).

Another related study was carried out by Moturi, (2012) on the relationship between Self-Efficacy and academic performance in Mathematics and English language among secondary school students in Nyamira District. The specific objectives of study were to determine; the relationship between gender and Self-Efficacy; the relationship between Self-Efficacy and academic performance in Mathematics and English language and; the relationship between gender and academic performance (Moturi, 2012). The study employed both quantitative and qualitative research techniques. Participants were selected through purposive and simple random sampling procedures. A study sample of 240 female and male students from public secondary schools was selected. This sample came from 30% of public secondary schools.

Data was collected through a questionnaire whose reliability coefficient was determined at 0.76, obtained through pre-testing. Descriptive and inferential statistics- Pearson Product Moment correlation, one-way ANOVA and t-test were used in data analyses. The results indicated no significant relationship between Self-Efficacy and general academic performance, $I = -.030$, $p>.05$. No relationship was found between Self-Efficacy and performance in English language, $I =.066>.05$. Study evidence indicated that there was a relationship: between Self-Efficacy and performance in Mathematics, $I =.13$, $P < .05$, Self-Efficacy and type of school, $F (2, 237) = 6.2$, $p< .05$. The results also showed no significant relationship between: gender and Self-Efficacy, $t(238) = -.895$, $p > .05$ and a significant relationship was found between gender and performance in Mathematics, $t (238) = 1.6$, $p > .05$. 0 significant relationship between gender and performance in English language, $t (238) = -.265$, $P < .05$.

Further, a much related study was conducted by Onkundi, (2014) to determine whether academic performance could be predicted on the bases of the constructs; locus of control and academic Self-Efficacy in three schools from Nyamaiya Division, Nyamira County, Kenya. The study adopted a correlation research design and both descriptive and inferential statistics were employed to analyze the data. Three schools were sampled using stratified random sampling and the school sample comprised a total of 3 schools i.e. 1 boy school, 1 girl school and 1 mixed school. Using simple random sampling, 150 students were sampled. Two research instruments-an Academic Self-Efficacy Scale (ASES) and a modified Crandall's Intellectual Achievement Responsibility (IAR) questionnaire were used in data collection. IARQ was used to measure participants' locus of control and the ASES to measure Self-Efficacy. Scores on academic performance were obtained through document analysis by computing mean scores from three consecutive end-of-term examinations results English, Kiswahili and Mathematics. The relationship between two independent variables (Self-Efficacy and locus of control) and dependent variable (Academic Achievement) were tested using Pearson Product Moment Correlation coefficient. However, relationships among the three variables were determined using the multiple regression and F- test analysis at 0.05 alpha levels (Onkundi, 2014).

A study carried out by Shkullaku, (2013) explored gender differences in Self-Efficacy and academic performance among Albanian students from two major universities in Tirana, Albania. The data was collected from 180 students (102 females and 78 males) selected from first, second and third level studies. Both universities and participants were selected randomly. A questionnaire was used to measure Self-Efficacy and the Grade Point Average GPA of the first semester to measure the academic performance of the participants. The data was analyzed using descriptive and inferential statistics. The Pearson correlation coefficient was used to see the relationship between Self-Efficacy and academic

performance. T-test was used to compare male and female participants in Self-Efficacy and academic performance. The results of the study showed that there was a significant difference between males and females in Self-Efficacy. There was no difference between males and females in academic performance. Also, a significant relationship was found between the students' Self-Efficacy and academic performance (Shkullaku, 2013).

A research conducted by Goulao, (2014) examined the relationship between the academic Self-Efficacy of an adult learners group in an online learning context with their actual performance indicated that students' level of Self-Efficacy is high (average=45) and a significant relationship exists between Self-Efficacy and Academic Achievement (r=0.286, at 0.05 level). The study aimed to evaluate the relationship between self-concept of a group of students in online context and their Academic Achievement. Data were collected from 63 students of both genders, with average age of 42 years old, selected from the first years of their undergraduate studies. An adapted questionnaire was used to measure Self-Efficacy (α=.908) and their performance analyzed in academic course specifies. The data was analyzed using descriptive and inferential statistics. The Pearson correlation coefficient was used to see the relationship between Self-Efficacy and academic performance (Goulao, 2014).

Most of these past related studies have reported a positive relationship between Self-Efficacy and Academic Achievement/performance. Some of the studies that have sought to disaggregate the data by gender, have revealed that in some cases differences are discovered while in other cases the relationship is the same for both male and female students. Although the studies have used various instruments to measure and determine Self-Efficacy, the results have shown a relationship nonetheless. Also noteworthy is the fact that most of these studies have used survey methods to determine the relationship between the two or three variables.

2.2 Related literature

This section is discusses the concept of Self-Efficacy, Self-Efficacy and human functioning, Self-Efficacy for Academic Achievement and the constructs of gender, Self-Efficacy and Academic Achievement. Further, an account of general Mathematics performance and description of the theoretical and conceptual frameworks is also given under this section.

2.2.1 Concept of Self-Efficacy

Bandura (1997) uses the term Self-Efficacy to refer to beliefs in one's capabilities to organize and execute the courses of action required producing given attainments. According to Bandura (1997), Self-Efficacy beliefs constitute the key factor of human agency.

Bandura states that efficacy beliefs: Influence the courses of action people choose to pursue, how much effort they put forth in given endeavors, how long they will persevere in the face of obstacles and failures, their resilience to adversity, whether their thought patterns are self- hindering or self-aiding, how much stress and depression they experience in coping with environmental demands, and the level of accomplishments they realize (Bandura, 1997, p.3).

Self-Efficacy beliefs can influence an individual to become committed to successfully execute the behaviors necessary to produce desired outcomes. Self-Efficacy theory states that the level and strength of Self-Efficacy will determine a) whether or not behavior will be initiated, b) how much effort will result, and c) how long the effort will be sustained in the face of obstacles. According to Bandura (1993), humans make life decisions based on our perceived Self-Efficacy by undertaking activities and choosing situations we deem to be within our capabilities for success. Additionally, activities associated with failure are avoided. When humans have a strong sense of perceived Self-Efficacy, they put forth a greater effort to accomplish a task despite the obstacles they encounter

than those who have a weak sense of Self-Efficacy. It is believed that students who have a higher degree of Self-Efficacy will have a higher intention to remain enrolled in college and will be more likely to persist in the face of external obstacles.

Though Self-Efficacy has an important influence on behavior, it is not the only influence. Behavior is a function of many variables. In achievement settings, such as high school education, other important variables include skills, outcome expectations and the perceived value of outcomes (Schunk, 1991). When the necessary skills are lacking, Self-Efficacy will not produce competent performances. According to Bandura (1997), once efficacy beliefs are formed, they are not stable. They can vary in strength because the individual is constantly evaluating new information. However, once efficacy beliefs have been established over long periods of time and based on a large amount of information, they are unlikely to be changed. Because Self-Efficacy beliefs are specific in nature, it is impossible to discuss "general" or "global" Self-Efficacy. For example, students may have strong Self-Efficacy beliefs about their abilities to thrive in social situations, but weak efficacy beliefs about their abilities to succeed academically and specifically in Mathematics.

Bandura (1997) conceptualized Self-Efficacy as varying along three dimensions: level, strength, and generality. *Level* refers to the degree of difficulty of the behaviors or tasks that an individual feels capable of performing. *Strength* refers to the confidence a person has in his or her performance estimates. Weak Self-Efficacy expectations are easily modified by disconfirming experiences, while strong Self-Efficacy percepts are robust, promoting persistence in the face of obstacles. *Generality* of Self-Efficacy concerns the range of situations in which an individual considers him or herself to be efficacious (Lent and Hackett, 1987). Self-Efficacy theory states that the level and strength of Self-Efficacy will determine several things. For example, whether or not behavior will be initiated,

how much effort will result, and how long the effort will be sustained in the face of obstacles are all determined by Self-Efficacy. Self-Efficacy provides individuals with the ability to influence their won course of action and alter their environments (Bandura, 1997).

Bandura (1997) hypothesized that an individual's choice of activities, persistence, and effort is affected by Self-Efficacy beliefs. For example, people who have a low sense of efficacy for accomplishing a task may avoid it and those who believe they are capable should participate readily. Those individuals who feel efficacious are hypothesized to persist longer and work harder when they encounter difficulties as opposed to those who doubt their capabilities. The most reliable guide for assessing Self-Efficacy is the individuals' own performance. Self-Efficacy may go up or down depending on success or failure, but once Self-Efficacy is developed in an individual, failure may not have much of an impact (Schunk, 1991). According to Lent and Hackett (1987), accurate and strong expectations of personal efficacy are crucial to the initiation and persistence of behavioral performance in human development. Self-Efficacy theory has been applied to several areas of psychosocial functioning such as anxiety, phobias, health behaviors, and school achievement, with largely supportive results. For example, there is evidence that Self-Efficacy predicts such outcomes as Academic Achievement, social skills, pain tolerance and athletic functioning, (Schunk, 1991).

Self-Efficacy has been used interchangeably with self-regulation in learning context. In their publication, '*Self- Efficacy for Self-Regulated Learning'*, Zimmerman and Schunk (1989) define self- regulated learning in terms of self-generated thoughts, feelings, and actions, which are systematically oriented towards attainment of students' own goals. Self- regulated learners engage in academic tasks for personal interest and satisfaction. They are also meta-cognitively and behaviorally active participants in their own learning (Ablard and

Lipschultz, 1998). Self-regulated learners also have a large arsenal of cognitive and metacognitive strategies that they deploy when needed to accomplish academic tasks. They are also quite persistent in their efforts to reach their goals (Wolters, 1998).

Zimmerman (1999) identifies five key aspects of students' efforts to self-regulate their learning: goal setting, strategy use, context adaptations, social processes, and self- monitoring. No single self-regulatory process can explain the complexity and variations in students' efforts to learn on their own. Self-Efficacy beliefs also provide students with a sense of agency to motivate their learning through use of self-regulatory processes as self- monitoring, goal setting, self-evaluation, and strategy use (Zimmerman, 2000). The more capable students judge themselves to be, the more challenging the goals they embrace (Zimmerman, Bandura, and Martinez-Pons, 1992). When Self-Efficacy and personal goal setting were compared with the verbal subscale of the Scholastic Aptitude Test, there was an increase of 35% in predicting college students' final grades in a writing course (Zimmerman and Bandura, 1994).

Research in self-regulated learning supports an increase in academic performance when students actively engage in the academic process (Zimmerman, 1989). Therefore, self-regulated learners are typically high achievers (Zimmerman and Martinez-Pons, 1990). For example, students scoring in the top 1% on an achievement test more frequently use certain self- learning strategies that optimize (personal regulation (organizing and transforming information,] behavioral functioning (providing their own rewards and punishments based on performance), and [the immediate environment (reviewing notes, seeking peer assistance, and seeking adult assistance).

2.2.2 Self-Efficacy and Human Functioning

Of all the thoughts that affect human functioning, and standing at the very core of social cognitive theory, are Self-Efficacy beliefs that people's judgments of their capabilities to organize and execute courses of action required attaining designated types of performances. Self-Efficacy beliefs provide the foundation for human motivation, well-being, and personal accomplishment (Bandura, 1977). This is because unless people believe that their actions can produce the outcomes they desire, they have little incentive to act or to persevere in the face of difficulties. Much empirical evidence now supports Bandura's contention that Self-Efficacy beliefs touch virtually every aspect of people's lives- whether they think productively, self-debilitating, pessimistically or optimistically; how well they motivate themselves and persevere in the face of adversities; their vulnerability to stress and depression, and the life choices they make. Self-Efficacy is also a critical determinant of self-regulation (Bandura, 1977).

Human functioning is influenced by many factors. The success or failure that people experience as they engage the myriad tasks that comprise their life naturally influence the many decisions they must make; [Stajkovic and Luthans, 1998]. Also, the knowledge and skills they possess will certainly play critical roles in what they choose to do and not do. Individuals interpret the results of their attainments, however, just as they make judgments about the quality of the knowledge and skills they possess. For example, a student who has just received a grade of B on Mathematics tests. In and of itself, attaining a grade of B has no inherent causal properties. An "A student" who worked hard on that assignment will view that B in ways quite dissimilar from that of a "C student" who worked equally hard. For the former, the B will be received with disappointment; for the latter, the B is likely to be received with elation. The student accustomed to A's is likely to have his writing confidence negatively affected; the C-acquainted student is sure to have his confidence boosted [Bandura, 1982].

Bandura's (1997) key contentions as regards the role of Self-Efficacy beliefs in human functioning is that people's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true. For this reason, how people behave can often be better predicted by the beliefs they hold about their capabilities than by what they are actually capable of accomplishing, for these Self-Efficacy perceptions help determine what individuals do with the knowledge and skills they have (Bandura, 1997). This helps explain why people's behaviors are sometimes disjoined from their actual capabilities and why their behavior may differ widely even when they have similar knowledge and skills. For example, many talented people suffer frequent (and sometimes debilitating) bouts of self-doubt about capabilities they clearly possess, just as many individuals are confident about what they can accomplish despite possessing a modest repertoire of skills. Belief and reality are seldom perfectly matched, and individuals are typically guided by their beliefs when they engage the world (Bandura, 1997). As a consequence, people's accomplishments are generally better predicted by their Self-Efficacy beliefs than by their previous attainments, knowledge, or skills. Of course, no amount of confidence or self-appreciation can produce success when requisite skills and knowledge are absent.

People's Self-Efficacy beliefs should not be confused with their judgments of the consequences that their behavior will produce. Typically, of course, Self-Efficacy beliefs help determine the outcomes one expects (Bandura, 1977). Confident individuals anticipate successful outcomes. Students confident in their social skills anticipate successful social encounters. Those confident in their academic skills expect high marks on exams and expect the quality of their work to reap personal and professional benefits. The opposite is true of those who lack confidence. Students who doubt their social skills often envision rejection or ridicule even before they establish social contact. Those who lack confidence in their academic skills envision a low grade before they begin an examination or

enroll in a course. The expected results of these imagined performances will be differently envisioned: social success or greater career options for the former, social isolation or curtailed academic possibilities for the latter.

According to James (1981), because the outcomes we expect are themselves the result of the judgments of what we can accomplish, our outcome expectations are unlikely to contribute to predictions of behavior. Moreover, efficacy and outcome judgments are sometimes inconsistent. A high sense of efficacy may not result in behavior consistent with that belief, however, if the individual also believes that the outcome of engaging in that behavior will have undesired effects (James, 1981). A student highly self-efficacious in his/her academic capabilities may elect not to apply to a particular university whose entrance requirements are such as to discourage all but the hardiest souls. Low Self-Efficacy and positive outcome expectations are also possible. For example, students may realize that strong Mathematics skills are essential for a good KCSE score and eligibility for university education, and this, in turn, may ensure a comfortable lifestyle, but poor confidence in math abilities are likely to keep them away from certain courses and they may not even bother with the university education or the prestigious courses in the institutions of higher learning.

Because individuals operate collectively as well as individually, Self-Efficacy is both a personal and a social construct. Collective systems develop a sense of collective efficacy- a group's shared belief in its capability to attain goals and accomplish desired tasks (Miller & Dollard, 1941). For example, schools develop collective beliefs about the capability of their students to learn, of their teachers to teach and otherwise enhance the lives of their students, and of their administrators and policymakers to create environments conducive to these tasks. Schools with a strong sense of collective efficacy exercise empowering and vitalizing influences on their students, and these effects are palpable and evident through good performances and achievements, be they academic or social.

2.2.3 Self-Efficacy in Academic Achievement

Perceived academic Self-Efficacy is defined as personal judgments of one's capabilities to organize and execute courses of action to attain designated types of educational performances (Zimmerman, 1995). Bandura (1977) developed scales to measure perceived academic Self-Efficacy to assess its level, generality, and strength across activities and contexts. In terms of academic functioning, Self-Efficacy *level* refers to variations across different levels of tasks, such as increasingly difficult math problems. Self-Efficacy *generality* refers to the transfer of Self-Efficacy beliefs across activities, such as different academic subject matters. Finally, Self-Efficacy *strength* in academics is measured by degrees of certainty that one can perform given tasks (Zimmerman, 1995).

i.   Performance

According to Bandura (1997), performance successes generally strengthen efficacy beliefs and repeated performance failures weaken them, particularly if the failures occur early in the course of events and do not reflect lack of effort or adverse external circumstances. A small performance success that persuades individuals they have what it takes to succeed will often enable them to achieve higher accomplishments and to succeed at new activities or in new settings (Bandura, 1997). But performance alone does not provide sufficient information to judge one's level of capability, because many factors that have little to do with ability can affect performance. According to Bandura (1997), perceived Self-Efficacy is often a better predictor under variable conditions than past performance, because efficacy judgments encompass more information than just the executed action.

Research in academic settings verifies that perceived Self-Efficacy beliefs contribute independently to intellectual performance (Bandura, 1997). In research with children, Collins (1982), selected children who judged themselves to be of

high and low Self-Efficacy at each of three levels of mathematical ability, these children were then given mathematical problems to solve. Children who had stronger Self-Efficacy beliefs were quicker to discard faulty strategies, solved more problems, chose to rework problems they missed, and did so more accurately than children of equal ability who doubted their Self-Efficacy. In higher education settings, Pajares (1996) reports that Mathematics Self-Efficacy of college undergraduates was a better predictor of their Mathematics interest and majors than either their prior math achievement or math outcome expectations. According to Zimmerman, Bandura, and Martinez-Pons (1992), academic Self-Efficacy influenced achievement directly as well as indirectly by raising students' grade goals.

ii.   Academic Self-Efficacy

Zimmerman, Bandura, and Martinez-Pons (1992) used path analysis to demonstrate that academic Self-Efficacy mediated the influence of   Self-Efficacy for self-regulated learning on Academic Achievement. According to their research, academic Self-Efficacy influenced achievement directly as well as indirectly by raising students' grade goals. Other findings suggest that students who believe they are capable of performing academic tasks use more cognitive and metacognitive strategies and persist longer than those who do not (Pintrich& Garcia, 1991). The research base to support the important role played by Self-Efficacy in predicting and explaining human behavior has been well documented by Bandura (1977, 1997). Additionally, Pajares (1996) has summarized extensive literature on academic Self-Efficacy.

The following is a summary of Pajares' findings:

a. Because of beliefs individuals hold about their abilities and the outcomes of their efforts to powerfully influence the way in which they behave, knowledge, skill and prior attainments are often poor predictors of subsequent attainments;

b. Mathematics Self-Efficacy of college undergraduates is more predictive of their interest and choice of math-related courses and majors than either their prior math achievement or math outcome expectations;

c. Self-Efficacy is powerful motivations construct that works well to predict academic self-beliefs and performance at varying levels;

d. Self-Efficacy beliefs are correlated with other Self-Efficacy beliefs, motivation constructs, and academic choices, changes, and achievement;

e. General measures of Self- Efficacy insensitive to context are weak predictors of academic performances.

According to Diane, W. (2003) Academic Achievement is influenced by a multitude of factors: attitude leads to achievement (Schibeci and Riley, 1986), and aptitude is needed for successful performance (Schunk, 1991). Academic Achievement is a result of intellectual capability and motivation as well (Bandura, 1997). Based on replicable findings from several studies, Bandura (1997) states that gender and attitude influence Academic Achievement to some extent through their mediating effects on an individual's Self-Efficacy beliefs. Numerous studies (Bandura, 1997; Chemers, Hu and Garcia, 2001; Greene and Miller, 1996; Miller, et al., 1996; Multon, Brown and Lent, 1991; Pajares, 1996; Pintrich and DeGroot, 1990; Silver, Smith and Greene, 2001) have found that Self-Efficacy is one of the influences on both general Academic Achievement and science achievement.

Self-Efficacy predicts intellectual performance better than skills alone, and it directly influences Academic Achievement through cognition. Self-Efficacy also indirectly influences perseverance (Diane, 2003). Although past achievement raises Self-Efficacy, it is student interpretation of past successes and failures that may be responsible for subsequent success. Perceived Self-Efficacy predicts

future achievement better than past performance. Self-Efficacy beliefs also contribute to performance since they influence thought processes, motivation, and behavior (Bandura, 1986). Fluctuations in achievement may be explained by fluctuations in Self-Efficacy. For example, varying beliefs in Self-Efficacy may alter task performance or outcome, whether it involves two similarly-skilled individuals or the same person in two different situations (Bandura, 1997).

Individuals with high Self-Efficacy attempt challenging tasks more often, persist longer at them, and exert more effort (Schwarzer, 1992). If there are failures, highly efficacious individuals attribute it to a lack of effort or an adverse environment. When they succeed, they credit their achievement to their abilities. The perception that their abilities caused the achievement affects the outcome rather than their actual abilities (Maddux & Stanley, 1986). On the other hand, those that regard themselves as inefficacious shy away from difficult and challenging tasks, slacken their efforts and give up readily in the face of difficulties, dwell on their personal deficiencies, lower their aspirations, and suffer much anxiety and stress. Such self-misgivings undermine performance. Conversely, individuals with high Self-Efficacy frequently persevere despite difficult tasks or challenging odds and often succeed because perseverance usually results in a successful outcome. Self-Efficacy has been found to positively relate to cognitive engagement and academic performance (Pajares, Self-efficacy beliefs in academic settings, 1996). Self-Efficacy, self-regulated learning, and test anxiety have also been found to be the best performance predictors (Bandura, 2001).

Research findings over the last two decades have supported Bandura's contention that efficacy beliefs mediate the effect of skills or other self-beliefs on subsequent achievements (Bandura, 1997; Schunk, 1991). Scholars have also demonstrated that Self-Efficacy beliefs influence these achievements by influencing effort, persistence, and perseverance (Bandura and Schunk, 1981; Schunk and Hanson,

1985). For example, Collins (1982) identified learners of low, middle, and high Mathematics ability that had, within each ability level, either high or low Mathematics Self-Efficacy. After instruction, the learners were given new mathematical problems to solve and an opportunity to correct those they missed. Collins reported that ability is related to performance but that, regardless of ability level, learners with high Self-Efficacy completed more problems correctly and reworked more of the ones they missed. Self-Efficacy also enhances students' memory performance by enhancing persistence (Berry, 1987).

In two studies conducted (Miller et al., 1996) perceived ability was the best predictor of achievement for high school math students. Cognitive skills, modeling, feedback and goal-setting together affected Self-Efficacy beliefs that, in turn, affected performance. Student-held beliefs affect the amount of effort and perseverance they engage which subsequently influence achievement (Miller, Greene, Montalvo, Ravindran, & Nicholus, 1996).Many studies support a link between Self-Efficacy and Academic Achievement, especially for junior and high school students.

Zimmerman et al. have been instrumental in tracing the relationships among Self-Efficacy perceptions, Self-Efficacy for self-regulation, academic self-regulatory processes, and Academic Achievement (Risemberg & Zimmerman, 1992; Zimmerman, 1989, 1990, 1994, 1995; Zimmerman & Bandura, 1994). This line of inquiry has successfully demonstrated that self-regulatory efficacy contributes to academic efficacy. For example, Zimmerman et al. (1992) used path analysis to demonstrate that academic Self-Efficacy mediated the influence of Self-Efficacy for self-regulated learning on Academic Achievement (Zimmerman, Bandura, & Martinez-Pons, 1992). Academic Self-Efficacy influenced achievement directly as well as indirectly by raising students' grade goals. Pintrich and De Groot (1990) reported a correlation between academic Self-Efficacy and both cognitive strategy use and self-regulation through use of

meta-cognitive strategies. Academic Self-Efficacy also correlated with semester and final year grades, in-class seatwork and homework, exams and quizzes, and essays and reports. Pintrich and De Groot concluded that Self-Efficacy was key in the process of cognitive engagement, that raising Self-Efficacy beliefs might lead to increased use of cognitive strategies and, thereby, higher performance, and that students need to have both the will and the skill to be successful in classrooms.

Other researchers have assessed judgments of Self-Efficacy in terms of particularized self-perceptions of competence highly consistent with the criteria-task being assessed (Pajares & Johnson, 1996). This assessment requires that, if the criteria-task involves solving specific Mathematics problems, the efficacy assessment asks learners to provide judgments of confidence to solve similar problems, if the task involves reading comprehension, learners are asked to provide judgments of their perceived capability to correctly answer various questions that tap comprehension of the main ideas in a passage (Schunk & Rice, 1993); if the task involves writing an essay, learners are asked to provide judgments that they possess the various composition, grammar usage, and mechanical skills on which their writing performance is assessed (Pajares & Johnson, 1994).

Recall that significant relationships are obtained even with generalized domain-specific self-perceptions, provided that they assess skills and performances in related domains (Multon et al., 1991). Pajares and Miller (1995) found this phenomenon as well. Each subscale, as well as the full-scale, correlated significantly with each performance task. Such relationships attest to the generalizability of Self-Efficacy perceptions within a domain, but prediction is enhanced as Self-Efficacy and performance more closely match. One might also question the practical utility of administering a 52-item instrument when greater prediction may be had from a shorter instrument more closely matching the performance task.

Studies that report a lack of relationship between Self-Efficacy and performance often suffer from problems either in domain specificity or correspondence (Bandura, 1997). Benson (1989) found that the path from Mathematics Self-Efficacy to performance was not significant. Self-Efficacy was assessed with three global items that reflected a performance prediction in statistics class rather than a judgment of capability; performance was the midterm exam grade in a statistics course (Benson, 1989).

Findings on Self-Efficacy coincide on two points: when Self-Efficacy beliefs are globally assessed and/or do not correspond with the criteria-tasks with which they are compared, their predictive value is diminished or can even be nullified; when efficacy assessments are tailored to the criteria-task, prediction is enhanced. In general, there is ample reason to believe that Self-Efficacy is a powerful motivation constructs that works well to predict academic self-beliefs and performances at varying levels but works best when theoretical guidelines and procedures regarding specificity and correspondence are adhered to (Bandura, 1997).

The task will be avoided if it is perceived to be too difficult. Although inefficacious individuals usually avoid challenging tasks, when they do attempt them they give up more easily than individuals with high efficacy. When inefficacious individuals fail, they attribute the unsuccessful result to a lack of ability and tend to lose faith in their capabilities. When they succeed, they are more likely to attribute their success to external factors. If students master a challenging task with limited assistance, their levels of Self-Efficacy rise (Urdan & Pajares , 2006).Individuals who possess a high degree of Self-Efficacy are more likely to attempt challenging tasks, to persist longer at them, and to exert more effort in the process. If highly efficacious individuals fail, they attribute the outcome to a lack of effort or an adverse environment. When they succeed, they credit their achievement to their abilities. It is the perception that their abilities

caused the achievement that affects the outcome rather than their actual abilities (Brown, 1998).

Four factors determine Self-Efficacy: enactive mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states (Bandura, Self-efficacy: The exrcise of control, 1997). The most influential of these factors is enactive mastery experience, which refers to individuals' experiences with success or failure in past situations. Information gathered from these experiences is then internalized. Past successes raise Self-Efficacy and repeated failures lower it, which indicates to individuals their levels of capability (Bandura, Self-efficacy: The exrcise of control, 1997). In a vicarious experience, individuals compare themselves to peers whom they perceive are similar in ability and intelligence to themselves. Watching peers succeed raises observer's Self-Efficacy and seeing them fail lowers it (Bandura, 1986). Exposure to multiple successful role models helps increase Self-Efficacy in observers. Verbal persuasion tries to convince individuals, who may doubt their capabilities, that they possess the skills needed for success at a given task. In education, verbal persuasion delivered by teachers often takes the form of verbal feedback, evaluation, and encouragement. Persuasion must be realistic, sincere, and from a credible source; otherwise it can negatively affect student Self-Efficacy beliefs (Bandura, 1986). Emotional state can either positively or negatively affect interpretation of an event's outcome. In addition to the four factors that determine general Self-Efficacy, aptitude, attitudes, and attributions are found to predict math and science Self-Efficacy (Schunk, 1983a).

2.2.4 Gender and Self-Efficacy

Self-Efficacy predicts intellectual performance better than skills a lone, and it directly influences Academic Achievement through cognition. Self-Efficacy also indirectly influences perseverance (Diane, 2003). Although past achievement

raises Self-Efficacy, it is student interpretation of past successes and failures that may be responsible for subsequent success. Perceived Self-Efficacy predicts future achievement better than past performance. Self-Efficacy beliefs also contribute to performance since they influence thought processes, motivation, and behavior (Bandura, 1986). Fluctuations in achievement may be explained by fluctuations in Self-Efficacy. For example, varying beliefs in Self-Efficacy may alter task performance or outcome, whether it involves two similarly-skilled individuals or the same person in two different situations (Bandura, 1997).

Individuals with high Self-Efficacy attempt challenging tasks more often, persist longer at them, and exert more effort (Schwarzer, 1992). If there are failures, highly efficacious individuals attribute it to a lack of effort or an adverse environment. When they succeed, they credit their achievement to their abilities. The perception that their abilities caused the achievement affects the outcome rather than their actual abilities (Maddux & Stanley, 1986). On the other hand, those that regard themselves as inefficacious shy away from difficult and challenging tasks, slacken their efforts and give up readily in the face of difficulties, dwell on their personal deficiencies, lower their aspirations and suffer much anxiety and stress. Such self-misgivings undermine performance.

Conversely, individuals with high Self-Efficacy frequently persevere despite difficult tasks or challenging odds and often succeed because perseverance usually results in a successful outcome. Self-Efficacy has been found to positively relate to cognitive engagement and academic performance (Pajares, Self-efficacy beliefs in academic settings, 1996). Self-Efficacy, self-regulated learning and test anxiety have also been found to be the best performance predictors (Bandura, 2001). In a meta-analysis of 39 studies from 1977 to 1988, positive and statistically significant relationships were found among Self-Efficacy, academic performance, and persistence for a number of disciplines (Multon, Brown , & Lent, 1991). Out of the studies analyzed, 28.9 % involved higher education. Four

factors affected the link between Self-Efficacy and academic performance. One factor was the time period when the two were assessed. A stronger relationship resulted post-treatment meaning that experimental manipulations to change Self-Efficacy beliefs were successful not only in raising Self-Efficacy but in enhancing academic performance as well. Another factor involved a stronger link between Self-Efficacy beliefs and performance for low-achieving students.

In two studies conducted (Miller et al., 1996) perceived ability was the best predictor of achievement for high school math students. Cognitive skills, modeling, feedback and goal-setting together affected Self-Efficacy beliefs that, in turn, affected performance. Student-held beliefs affect the amount of effort and perseverance they engage which subsequently influence achievement (Miller, Greene, Montalvo, Ravindran, & Nicholus, 1996).Many studies support a link between Self-Efficacy and Academic Achievement, especially for junior and high school students.

a) Gender Based Skills and Self-Efficacy

Research findings over the last two decades have supported Bandura's contention that efficacy beliefs mediate the effect of skills or other self-beliefs on subsequent achievements (Bandura, 1997; Schunk, 1991). Scholars have also demonstrated that Self-Efficacy beliefs influence these achievements by influencing effort, persistence, and perseverance (Bandura & Schunk, 1981; Schunk & Hanson, 1985). For example, Collins (1982) identified learners of low, middle, and high Mathematics ability that had, within each ability level, either high or low Mathematics Self-Efficacy. After instruction, the learners were given new mathematical problems to solve and an opportunity to correct those they missed. Collins reported that ability is related to performance but that, regardless of ability level, learners with high Self-Efficacy completed more problems correctly and reworked more of the ones they missed. Self-Efficacy also enhances students' memory performance by enhancing persistence (Berry, 1987).

Zimmerman et al. have been instrumental in tracing the relationships among Self-Efficacy perceptions, Self-Efficacy for self-regulation, academic self-regulatory processes, and Academic Achievement (Risemberg & Zimmerman, 1992; Zimmerman, 1989, 1990, 1994, 1995; Zimmerman & Bandura, 1994). This line of inquiry has successfully demonstrated that self-regulatory efficacy contributes to academic efficacy. For example, Zimmerman et al. (1992) used path analysis to demonstrate that academic Self-Efficacy mediated the influence of Self-Efficacy for self-regulated learning on Academic Achievement (Zimmerman, Bandura, & Martinez-Pons, 1992). Academic Self-Efficacy influenced achievement directly as well as indirectly by raising students' grade goals. Pintrich and De Groot (1990) reported a correlation between academic Self-Efficacy and both cognitive strategy use and self-regulation through use of meta-cognitive strategies. Academic Self-Efficacy also correlated with semester and final year grades, in-class seatwork and homework, exams and quizzes, and essays and reports. Pintrich and De Groot concluded that Self-Efficacy was key in the process of cognitive engagement, that raising Self-Efficacy beliefs might lead to increased use of cognitive strategies and, thereby, higher performance, and that students need to have both the will and the skill to be successful in classrooms.

Some researchers have assessed judgments of Self-Efficacy in terms of particularized self-perceptions of competence highly consistent with the criteria-task being assessed (Pajares & Johnson, 1996). This assessment requires that, if the criteria-task involves solving specific Mathematics problems, the efficacy assessment asks learners to provide judgments of confidence to solve similar problems, if the task involves reading comprehension, learners are asked to provide judgments of their perceived capability to correctly answer various questions that tap comprehension of the main ideas in a passage (Schunk & Rice, 1993); if the task involves writing an essay, learners are asked to provide judgments that they possess the various composition, grammar usage, and

mechanical skills on which their writing performance is assessed (Pajares & Johnson, 1994).

Numerous studies that have examined the role of particularized Self-Efficacy beliefs in various academic contexts (Schunk, 1982b, 1983b, 1984b, 1984c, 1985, 1987, 1996a, 1996b) have shown that modeling treatments increased persistence and accuracy on division problems by raising children's Self-Efficacy beliefs, which had a direct effect on skill. Schunk showed that effort attribution feedback of prior performance raised the Self-Efficacy expectations of elementary school children, and this increase was, in part, responsible for increased skill in performance of subtraction problems (Schunk, 1982a). In subsequent experiments, he found that ability feedback had a stronger effect on Self-Efficacy and performance (Schunk, 1983a; Schunk & Gunn, 1986). Results of these investigations demonstrate that acquisition of cognitive skills, modeling effects, attribution feedback, and goal setting influence the development of Self-Efficacy beliefs and that these beliefs, in turn, influence academic performances. Students with similar previous academic performance and cognitive skills may differ in subsequent performance as a result of differing Self-Efficacy perceptions because these perceptions mediate between prior attainments and academic performances. As a consequence, such performances are generally better predicted by Self-Efficacy than by the prior attainments. Schunk (1991) suggested that variables such as perceived control, outcome expectations, and perceived value of outcomes, attributions, goals, and self-concept may provide a type of cue used by individuals to assess their efficacy beliefs.

Pajares and Miller (1995) reported that math Self-Efficacy had stronger direct effects on Mathematics problem-solving than did self-concept, perceived usefulness, or prior experience. Self-Efficacy mediated the effects of prior experience on self-concept, perceived usefulness, and problem-solving performance (Pajares & Miller, 1994). Pajares and Kranzler (1994) constructed

path models that included math Self-Efficacy, general mental ability, math self-concept, math anxiety, Self-Efficacy for self-regulation, previous grades in Mathematics, and sex. The most substantive effort to extend previous findings involved the inclusion in the model of a measure of general mental ability, or psychometric g, rather than a math-related aptitude assessment (Pajares & Kranzler, 1994). The researchers chose an assessment of psychometric because domain-related aptitude assessments as controls in studies of Self-Efficacy are confounded with the influence of self-beliefs that influence these assessments (Bandura, 1997). The key finding from these studies was that the direct effect of Self-Efficacy on performance was as strong as was the effect of general mental ability. The non-significant direct effect of anxiety) and the reduced effect of self-concept on performance, as well as the influence of Self-Efficacy on anxiety and self-concept, supported previous findings that the influence of these determinants on academic performances diminishes when particularized assessments of Self-Efficacy are included in a model (Pajares & Kranzler, 1995b).

Pajares (1996b) examined the interplay between Self-Efficacy judgments and the mathematical problem-solving of middle school students mainstreamed in algebra classes. Math Self-Efficacy made an independent contribution to the problem-solving performance of regular education students and of gifted students in a path model that controlled for the effects of math anxiety, cognitive ability, Mathematics grades, Self-Efficacy for self-regulatory learning, and sex. Pajares also reported that girls expressed lower confidence levels when performance scores did not warrant it and similar confidence when performance scores warranted greater confidence. Although most students were biased toward overconfidence, girls were less biased in that direction, and gifted girls were biased toward under-confidence (Pajares & Miller, 1995).

The Mathematics judgments assessed by the different subscales of the MSES are substantively different and tap differing math-related beliefs. Although

all are math-related, their predictive value should depend on the nature of the criteria-tasks with which they are compared. Consequently, students' judgments to solve math problems should be more strongly predictive of their capability to solve those problems than should their confidence to perform other math-related tasks or succeed in math-related courses. Similarly, their judgments to succeed in math-related courses should be more strongly predictive of their choice to enroll in such courses than should their confidence to solve specific problems or perform math-related tasks. Pajares and Miller (1995) compared these judgments of capability with two outcome measures: ability to solve the problems on which Self-Efficacy was assessed and math-relatedness of academic majors. Results confirmed that Bandura's (1986) cautions regarding specificity of Self-Efficacy and performance assessment are well founded. Students' confidence to solve Mathematics problems was a more powerful predictor of their ability to solve those problems than was their confidence to perform math-related tasks or their confidence to earn A's or B's in math-related courses. Similarly, their confidence to succeed in such courses was more predictive of their choice of majors that required them to take many of the math-related courses on which they expressed that confidence.

Recall that significant relationships are obtained even with generalized domain-specific self-perceptions, provided that they assess skills and performances in related domains (Multon et al., 1991). Pajares and Miller (1995) found this phenomenon as well. Each subscale, as well as the full-scale, correlated significantly with each performance task. Such relationships attest to the generalizability of Self-Efficacy perceptions within a domain, but prediction is enhanced as Self-Efficacy and performance more closely match. One might also question the practical utility of administering a 52-item instrument when greater prediction may be had from a shorter instrument more closely matching the performance task.

Studies that report a lack of relationship between Self-Efficacy and performance often suffer from problems either in domain specificity or correspondence (Bandura, 1997). Benson (1989) found that the path from Mathematics Self-Efficacy to performance was not significant. Self-Efficacy was assessed with three global items that reflected a performance prediction in statistics class rather than a judgment of capability; performance was the midterm exam grade in a statistics course (Benson, 1989).

Findings on Self-Efficacy coincide on two points: when Self-Efficacy beliefs are globally assessed and/or do not correspond with the criteria-tasks with which they are compared, their predictive value is diminished or can even be nullified; when efficacy assessments are tailored to the criteria-task, prediction is enhanced. In general, there is ample reason to believe that Self-Efficacy is a powerful motivation constructs that works well to predict academic self-beliefs and performances at varying levels but works best when theoretical guidelines and procedures regarding specificity and correspondence are adhered to (Bandura, 1997).

b) Implications of Self-Efficacy in Academic Achievement

One's sense of Self-Efficacy can play a major role in how one approaches goals, tasks, and challenges. The theory of Self-Efficacy lies at the center of Bandura's social cognitive theory, which emphasizes the role of observational learning and social experience in the development of personality. The main concept in social cognitive theory is that an individual's actions and reactions, including social behaviors and cognitive processes, in almost every situation are influenced by the actions that individual has observed in others. Because Self-Efficacy is developed from external experiences and self-perception and is influential in determining the outcome of many events, it is an important aspect of social cognitive theory. Self-Efficacy represents the personal perception of external social factors. According to Bandura's theory, people with high Self-

Efficacy that is, those who believe they can perform well are more likely to view difficult tasks as something to be mastered rather than something to be avoided.

Students with high Self-Efficacy are more likely to make efforts to complete a task, and to persist longer in those efforts, than those with low Self-Efficacy. The stronger the Self-Efficacy or mastery expectations, the more active the efforts. However, those with low Self-Efficacy sometimes experience incentive to learn more about an unfamiliar subject, where students with a high Self-Efficacy may not prepare as well for a task.

2.2.5 Mathematics and Self Efficacy

Mathematics Self-Efficacy is defined as an individual's beliefs or perceptions with respect to his or her abilities in Mathematics (Bandura, 1997). In other words, an individual's Mathematics Self-Efficacy is his or her confidence about completing a variety of tasks, from understanding concepts to solving problems, in Mathematics. Self-Efficacy, in general, has been linked with motivation. It has been well established that students with higher levels of Self-Efficacy tend to be more motivated to learn than their peers and are more likely to persist when presented with challenges (Pajares & Graham, 1999; Pajares & Kranzler, 1995; Zeldin, Britner & Pajares, 2008). Although the development of Self-Efficacy is not fully understood, researchers have consistently confirmed Bandura's (1997) four main sources of Self-Efficacy: mastery experiences, vicarious experiences, social persuasion, and physiological states (Hampton & Mason, 2003; Lopez & Lent, 1992; Usher & Pajares, 2009).

In a study on designing a scale to explore the sources of Mathematics Self-Efficacy, Usher and Pajares (2008) found that "perceived mastery experience is a powerful source of students' Mathematics Self-Efficacy. Students who feel they have mastered skills and succeeded at challenging assignments experience a boost in their efficacy beliefs" (p. 100). According to Bandura's (1997) social cognitive theory, Self-Efficacy is specific to context and must be measured appropriately.

For example, students might feel confident that they can correctly solve systems of linear equations but lack confidence in their abilities to prove a geometric theorem. In this situation, asking the students to rate their confidence in Mathematics generally could result in misleading responses. Bandura also suggested that Self-Efficacy should be measured close to the time that the task would take place. This proximity helps students to make more accurate judgments about their abilities than otherwise. With these guidelines for measuring Self-Efficacy in mind, it is crucial to understand how researchers typically measure Mathematics Self-Efficacy expressed that confidence.

a. **Mathematics as a Discipline**

Mathematics provides students with access to important mathematical ideas, knowledge and skills that they will draw on in their personal and work lives. The curriculum also provides students, as life-long learners, with the basis on which further study and research in Mathematics and applications in many other fields are built. Mathematical ideas have evolved across societies and cultures over thousands of years and are constantly developing, (CSMC, 2005). Digital technologies are facilitating this expansion of ideas and provide new tools for mathematical exploration and invention. While the usefulness of Mathematics for modelling and problem solving is well known, Mathematics also has a fundamental role in both enabling and sustaining cultural, social, economic and technological advances and empowering individuals to become critical citizens, (NCTM, 1970).

Number, measurement and geometry, statistics and probability are common aspects of most people's mathematical experience in everyday personal, study and work situations. Equally important are the essential roles that algebra, functions and relations, logic, mathematical structure and working mathematically play in people's understanding of the natural and human worlds, and the interaction between them. The Mathematics curriculum focuses on developing increasingly

sophisticated and refined mathematical understanding, fluency, reasoning, modelling and problem-solving. These capabilities enable students to respond to familiar and unfamiliar situations by employing Mathematics to make informed decisions and solve problems efficiently, (CSMC, 2005).

The curriculum ensures that the links between the various components of Mathematics, as well as the relationship between Mathematics and other disciplines, are made clear. Mathematics is composed of multiple but interrelated and interdependent concepts and structures which students apply beyond the Mathematics classroom. For example, in Science, understanding sources of error and their impact on the confidence of conclusions is vital; in Geography, interpretation of data underpins the study of human populations and their physical environments; in History, students need to be able to imagine timelines and time frames to reconcile related events; and in English, deriving quantitative, logical and spatial information is an important aspect of making meaning of texts,(NCTM, 1970).

The aims of Mathematics curriculum is to ensure that students, develop useful mathematical and numeracy skills for everyday life, work and as active and critical citizens in a technological world, see connections and apply mathematical concepts, skills and processes to pose and solve problems in Mathematics and in other disciplines and contexts, acquire specialist knowledge and skills in Mathematics that provide for further study in the discipline, appreciate Mathematics as a discipline – its history, ideas, problems and applications, aesthetics and philosophy, (Klein, 2003).

b. Measuring Mathematics Self Efficacy

The most commonly used scale for measuring Mathematics Self-Efficacy is the Mathematics Self-Efficacy Scale (MSES) (Betz and Hackett, 1983). This scale was originally developed to explore -gender differences in Mathematics Self-Efficacy and how these differences affect students' career choices. After

reviewing previous research on Mathematics anxiety and Mathematics Self-Efficacy, Betz and Hackett identified three main domains involved with studying Mathematics Self-Efficacy: solving Mathematics problems, using Mathematics in everyday tasks, and obtaining good grades in Mathematics courses. The MSES asks participants to rate their confidence on a scale from 0 to 9 in their ability to perform 18 Mathematics tasks, to correctly solve 18 Mathematics problems, and to get a B or better in 16 Mathematics-related college courses.

Although no factor analytic research has been conducted on the original MSES, Kranzler and Pajares (1997) used factor analytic techniques to analyze a revised version of the MSES, 6 referred to as the Mathematics Self-Efficacy Scale-Revised (MSES-R) (Pajares and Miller, 1995). The items on the MSES-R were taken from the original MSES, but the mathematical problems were replaced by problems from arithmetic, algebra, and geometry taken from the Mathematics Confidence Scale (Dowling, 1978). Also, on the MSES-R, students rated their confidence on a scale from 1 to 5, not 0 to 9 as in the original MSES. Factor analysis revealed three factors of the MSES-R, as expected: mathematical problems, mathematical tasks, and Mathematics courses. The courses, however, were split into two factors, pure Mathematics courses and science courses that require a lot of Mathematics.

The identification of multiple factors of the MSES-R suggests that Mathematics Self-Efficacy is conceptually more complex than Betz and Hackett (1983) believed. Although a score can be computed for the MSES, Kranzler and Pajares (1997) cautioned researchers that it is difficult to assign and make appropriate use of an overall score for Mathematics Self-Efficacy based on scales such as the MSES or MSES-R. It is important for researchers and educators to consider the multiple factors involved when assessing a student's level of Mathematics Self-Efficacy. Because of the nature of Mathematics Self-Efficacy, students can have, or lack, confidence in a multitude of areas involved with

Mathematics. If a student's score is lower on one factor than the rest of the factor scores on a Mathematics Self-Efficacy scale, his or her overall score can be distorted, which can lead educators or researchers to misjudge the student's overall level of Mathematics Self-Efficacy

2.3 Theoretical Framework

2.3.1 The Social Cognitive Theory

This study is anchored on the social cognitive theory. Bandura (1986) advanced a view of human functioning that accords a central role to cognitive, vicarious, self-regulatory and self-reflective processes in human adaptation and change. People are viewed as self-organizing, proactive, self-reflecting and self-regulating rather than as reactive organisms shaped and shepherded by environmental forces or driven by concealed inner impulses. From this theoretical perspective, human functioning is viewed as the product of a dynamic interplay of personal, behavioral, and environmental influences. For example, how people interpret the results of their own behavior informs and alters their environments and the personal factors they possess which, in turn, inform and alter subsequent behavior. This is the foundation of Bandura's (1986) conception of reciprocal determinism, the view that (a) personal factors in the form of cognition, affect, and biological events, (b) behavior, and (c) environmental influences create interactions that result in a triadic reciprocity. Bandura altered the label of his theory from social learning to social "cognitive" both to distance it from prevalent social learning theories of the day and to emphasize that cognition plays a critical role in people's capability to construct reality, self-regulate, encode information, and perform.

The reciprocal nature of the determinants of human functioning in social cognitive theory makes it possible for therapeutic and counseling efforts to be directed at personal, environmental, or behavioral factors. Strategies for

increasing well-being can be aimed at improving emotional, cognitive, or motivational processes, increasing behavioral competencies, or altering the social conditions under which people live and work, (Bussey and Bandura, 1999). In school, for example, teachers have the challenge of improving the academic learning and confidence of the students in their charge. Using social cognitive theory as a framework, teachers can work to improve their students' emotional states and to correct their faulty self-beliefs and habits of thinking (personal factors), improve their academic skills and self-regulatory practices (behavior), and alter the school and classroom structures that may work to undermine student success (environmental factors), (William, 1981).

Bandura's social cognitive theory stands in clear contrast to theories of human functioning that overemphasize the role that environmental factors play in the development of human behavior and learning. Behaviorist theories, for example, show scant interest in self-processes because theorists assume that human functioning is caused by external stimuli. Because inner processes are viewed as transmitting rather than causing behavior, they are dismissed as a redundant factor in the cause and effect process of behavior and unworthy of psychological inquiry. For Bandura, a psychology without introspection cannot aspire to explain the complexities of human functioning. It is by looking into their own conscious mind that people make sense of their own psychological processes. To predict how human behavior is influenced by environmental outcomes, it is critical to understand how the individual cognitively processes and interprets those outcomes. More than a century ago, William (1981) argued that introspective observation is what we have to rely on first and foremost and always. For Bandura (1986), a theory that denies that thoughts can regulate actions does not lend itself readily to the explanation of complex human behavior.

Similarly, social cognitive theory differs from theories of human functioning that overemphasize the influence of biological factors in human development and

adaptation. Although it acknowledges the influence of evolutionary factors in human adaptation and change, it rejects the type of evolutionism that views social behavior as the product of evolved biology but fails to account for the influence that social and technological innovations that create new environmental selection pressures for adaptiveness have on biological evolution (Bussey and Bandura, 1999). Instead, the theory espouses a bidirectional influence in which evolutionary pressures alter human development such that individuals are able to create increasingly complex environmental innovations that, "in turn, create new selection pressures for the evolution of specialized biological systems for functional consciousness, thought, language, and symbolic communication". This bidirectional influence results in the remarkable intercultural diversity evident in our planet.

Social cognitive theory is rooted in a view of human agency in which individuals are agents proactively engaged in their own development and can make things happen by their actions. Key to this sense of agency is the fact that, among other personal factors, individuals possess self-beliefs that enable them to exercise a measure of control over their thoughts, feelings, and actions that "what people think, believe, and feel affects how they behave (Bandura, 1986) Bandura provided a view of human behavior in which the beliefs that people have about themselves are critical elements in the exercise of control and personal agency. Thus, individuals are viewed both as products and as producers of their own environments and of their social systems. Because human lives are not lived in isolation, Bandura expanded the conception of human agency to include collective agency. People work together on shared beliefs about their capabilities and common aspirations to better their lives. This conceptual extension makes the theory applicable to human adaptation and change in collectivistic ally-oriented societies as well as individualistically-oriented ones, (Bussey and Bandura, 1999).

Environments and social systems influence human behavior through psychological mechanisms of the self-system. Hence, social cognitive theory posits that factors such as economic conditions, socio economic status, and educational and familial structures do not affect human behavior directly. Instead, they affect it to the degree that they influence people's aspirations, Self-Efficacy beliefs, personal standards, emotional states, and other self-regulatory influences, (Bandura, 1986). In all, this social cognitive view of human and collective functioning, which marked a departure from the prevalent behaviorist and learning theories of the day, was to have a profound influence on psychological thinking and theorizing during the last two decades of the twentieth century and into the new millennium. From this perspective, there researcher finds this study relevant in the sense that when students decide to perform well in Mathematics, they must be able to accept that they can do Mathematics and be ready to do it to demonstrate their abilities. On the contrary, when a student's Self-Efficacy towards Mathematics is low, s/he is likely to get bored with Mathematics lessons, put less or no effort into the subject and assignments, become inattentive in class, miss out on lessons, etc. These negative behaviors acquired by the self-inefficacious student leads to poor Academic Achievement, (Bussey and Bandura, 1999).

2.3.2 Fundamental Human Capabilities

Rooted within Bandura's social cognitive perspective is the understanding that individuals are imbued with certain capabilities that define what it is to be human. Primary among these are the capabilities to symbolize, plan alternative strategies (forethought), learn through vicarious experience, self-regulate, and self-reflect. These capabilities provide human beings with the cognitive means by which they are influential in determining their own destiny, (Graham and Weiner, 1996).

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Humans possess an extraordinary capacity to *symbolize*. By drawing on their symbolic capabilities, they can extract meaning from their environment, construct guides for action, solve problems cognitively, support forethoughtful courses of action, gain new knowledge by reflective thought, and communicate with others at any distance in time and space. For Bandura, symbols are the vehicle of thought, and it is by symbolizing their experiences that they can provide their lives with structure, meaning, and continuity. Symbolizing also enables people to store the information required to guide future behaviors. It is through this process that they are able to model observed behavior, (Miller and Dollard, 1941).

Through the use of symbols, individuals solve cognitive problems and engage in self-directedness and *forethought*. People plan courses of action, anticipate the likely consequences of these actions, and set goals and challenges for them to motivate, guide and regulate their activities. It is because of the capability to plan alternative strategies that one can anticipate the consequences of an action without actually engaging in it, (Schunk and Pajares, 2002).

People learn not only from their own experience but by observing the behaviors of others. This *vicarious learning* permits individuals to learn a novel behavior without undergoing the trial and error process of performing it. In many situations, it keeps them from risking costly and potentially fatal mistakes. The observation is symbolically coded and used as a guide for future action. Observational learning is governed by the processes of attention, retention, production, and motivation, (Miller and Dollard, 1941). Attention refers to one's ability to selectively observe the actions of a model. For their part, observed behaviors can be reproduced only if they are retained in memory, a process made possible by the human capability to symbolize. Production refers to the process of engaging in the observed behavior. Finally, if engaging in the observed behavior

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produces valued results and expectation, the individual is motivated to adopt the behavior and repeat it in the future.

Individuals have *self-regulatory mechanisms* that provide the potential for self-directed changes in their behavior, (Graham and Weiner, 1996). The manner and degree to which people self-regulate their own actions and behavior involve the accuracy and consistency of their self-observation and self-monitoring, the judgments they make regarding their actions, choices, and attributions, and, finally, the evaluative and tangible reactions they make to their own behavior through the self-regulatory process. This last sub-function includes evaluations of one's own self (their self-concept, self-esteem, values) and tangible self-motivators that act as personal incentives to behave in self-directed ways. For Bandura (1986), the capability that is most "distinctly human" (p. 21) is that of *self-reflection*, hence it is a prominent feature of social cognitive theory. Through self-reflection, people make sense of their experiences, explore their own cognitions and self-beliefs, engage in self-evaluation, and alter their thinking and behavior accordingly.

CHAPTER THREE
METHODOLOGY

3.0 Introduction

This section describes the study design, target population, sample and sample selection, data collection instruments and procedures, issues of validity, data analysis procedures and presentation and study limitations.

3.1 Research design

According to Onifade (2014) research design is the plan and structure of a research. This study employed a descriptive study design. A descriptive study systematically describes the facts and characteristic of a given population accurately and does not permit value judgments. Quantitative method will purely be used to collect data from the target population (students). The variables, that is, Self-Efficacy and Academic Achievement in Mathematics, are quantifiable in nature and yield numerical values. Self-Efficacy was measured by use of semi-structured questionnaires, while the Academic Achievement was determined through content analysis of the examination report cards or students' academic records. The Academic Achievement variable utilized the Mathematics scores in the three results, (Opening, Mid-Term and End-Term exams).

3.2 Study population

The present study was conducted among secondary school going students in Form three in Nyakach Sub-county. Three secondary schools were purposively selected from where the study was obtained (Thurdibuoro - A, Sang'oro – B and Nyong'ong'a – C). The target population comprised of the 390 students (girls and boys) in Form three who sat for their Term 1 2014 Mathematics test (Opening, Mid-Term and End-Term exams) and had received their results.

3.3 Sample and Sampling Method

3.3.1 The Sample

According to Bulmer (1979), a sample is a subset of subjects that is representative of the entire population. The sample, therefore, must be of sufficient size to warrant statistical analysis. In this study, a representative sample was determined using the Krejcie and Morgan formula for sample size calculation (Krejcie & Morgan, 1970). Based on the total student population of 390, and using the Krejcie and Morgan Sample Size Table, the population yielded a sample population of 200 students.

Table 3.1: Sample Population Distribution by School

School	Student Population	Sample Population
A	268	127
B	58	29
C	64	44
Total	**390**	**200**

3.3.2 The Sampling Method

According to Bulmer (1979), sampling method refers to the way that observations are selected from a population to be in the sample for a study population. Since the present study was purely quantitative, it employed a random sampling method where simple random technique was used to select a representative sample from the entire population (Krejcie & Morgan, 1970). A

lottery method was used to obtain the sample random sample, where the population members were assigned unique numbers and whoever selected specific odd numbers s/he was included in the sample.

3.4 Data Collection Instruments

Self-Efficacy was measured using Mathematics Self-Efficacy Questionnaire by Benard, (2012) while the Academic Achievement was captured using a document analysis table.

3.4.1 Questionnaire

The Mathematics Self-Efficacy Questionnaire by Benard (2012) is a simple and convenient set of 43-likert scale questions which is approximated to take15-25 minutes to complete. The Self-Efficacy questionnaire is comprised of four sections: have been developed around content-specific efficacy in math, math self-concept, interest in math and anxiety when solving mathematical problems or when sitting for a math test. The 43 statements have been assigned scores for 'very sure' to 'very unsure' and, 'strongly agree', 'agree', 'disagree' and 'strongly disagree' with scores ranging from 1 to 5. The students were required to select the description/statement that suit them and write the score of their selected items. The highest level of Self-Efficacy which can be recorded using this questionnaire is 5.0, and the lowest is 1.0. Gender information was captured for disaggregation of data[1].

3.4.2 Content Analysis

Analysis guide was used in recording secondary data of the students' Academic Achievement scores from the Mathematics teacher or class teacher's

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[1] Author: Benard Isiaho Omondi
Title: The Impact of Perceived Self-Efficacy in Mathematics (2012)
Contact: omondisj@gmail.com

records. Test scores for Opening, Mid-term and End of Term One 2014 in Mathematics were used, and mean scores calculated. The researcher having requested for the students' math scores records; recorded the scores together with the students' admission number on the test score table (See Appendix C).

3.5 Validity of the Instruments

Validity is defined as the accuracy and meaningfulness of inferences, which are based on the research results (Mugenda & Mugenda, 2003). In other words, it is the degree to which a test measures what it purports to measure. Validation of the instruments was taken care of as it was previously used by the author who gave permission for its use.

3.6 Reliability of the Instrument

Reliability of a research instrument refers to the ability of the instrument to yield similar results when administered to the same group of respondents under similar conditions (Mugenda & Mugenda, 2003). A good research instrument should have great a reasonable reliability coefficient for it to be scientific fit for use in data collection. Reliability was assumed.

3.7 Data Collection Procedures

Data collection was conducted after getting an approval from the University of Nairobi. The sampled students were invited to fill in the Self-Efficacy questionnaire in the class. Before the students started to fill in the questionnaire, the researchers briefed the students on how to go about it and were allowed to ask questions in the process in case they did not understand something. This briefing was part of data quality assurance measures that ensured that accurate and reliable data is gathered.

The students were also assured that the results of the study would be applied to research work only and their responses would have nothing to do with teachers' evaluation of them. Further, and more importantly, the respondents were assured of their free-will in participating in this study and they could quit the participation anytime.

3.8 Data Analysis and Presentation

Total Self-Efficacy scores were calculated by summing the average scores for all the 43 Likert-scale items. The data were then analyzed using appropriate descriptive and inferential statistics using SPSS v.20. Descriptive statistics included computing means and standard deviations and reporting number and percent for each demographic choice. Pearson Correlation Coefficient was used to establish the relationship between Self-Efficacy and Academic Achievement by gender.

The descriptive information was presented in the form of graphs, charts and tables. The Pearson Correlation Coefficient was presented numerically, and tables to show the relationship graphically.

CHAPTER FOUR

RESEARCH FINDINGS

4.1 Introduction

This chapter presents the findings of the study starting with the demographics of the study.

4.2 Gender Profile of the Students

Among the studied student sample, each gender was almost equally represented with 101 (50.5%) were boys and 99 (49.5%) were girls. This was expected since the number of boys in the Kenyan high schools is higher than their female counterparts.
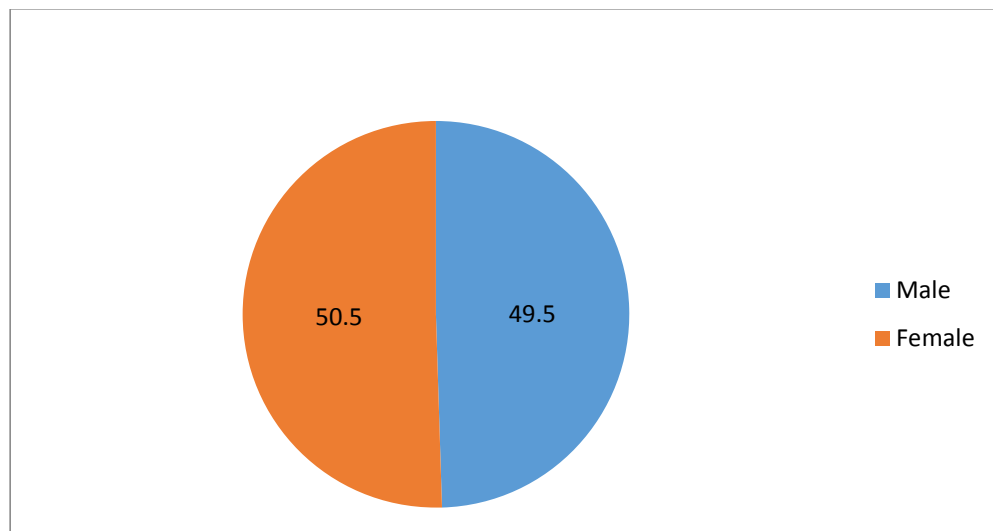
Figure 4.1: Gender Characteristics of the Students

4.3 Self-Efficacy Measures of the Students

The measures, which differed in length from 9 questions on the performance of specific math tasks scale to 19 questions on ones thinking about him/herself when studying Mathematics scale, were scored using a 5 point Likert scale ranging from 1= very unsure to 5= very sure. The data was found to contain a

good amount of variability by examining the range and the standard deviation (SD) reported.

4.3.1 Overall Students' Self-Efficacy Levels

The average scores on student's belief on his/her ability to perform math tasks were higher (mean=4.24; SD=0.608) as compared to 3.192 (SD=0.623) for the items that measured the student's thinking about oneself when studying math. According to the figure 4.2, the standard deviation indicates how spread the scores are from the mean and therefore a SD of 0.811 indicates a relatively wide distribution/spread from the mean for the scores on student's feeling about oneself when studying Mathematics than the standard scores for other Self-Efficacy measures.
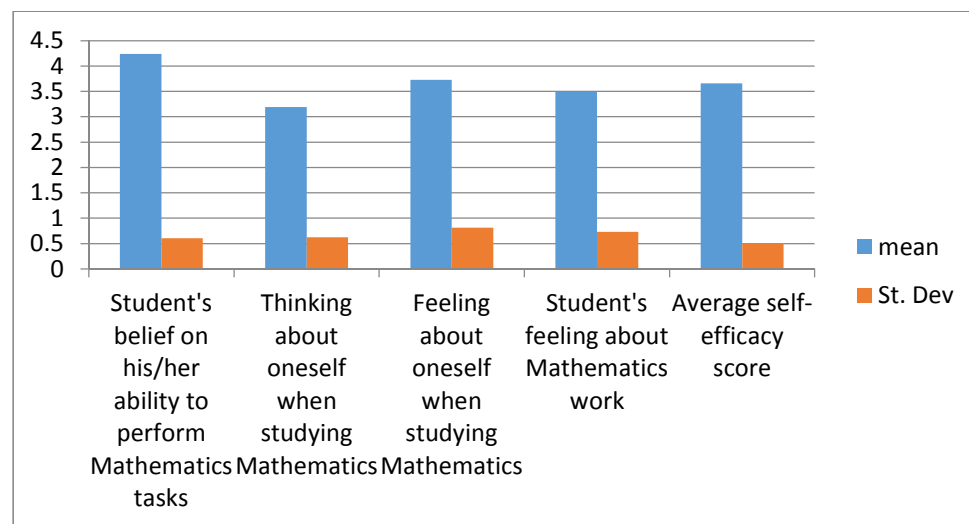
Figure 4.2: Overall Self-Efficacy Levels of the Students

The results show that most of the students believe on their abilities to perform well in Mathematics at a score of 4.240 (st. dev 0.608). Further at a mean score of 3.728 (st. dev. 0.822), the students felt contended while doing Mathematics, the students' scored averagely in Mathematics at a mean rating in 3.656 (st dev.

0.512), they also have positive feelings about their scores in Mathematics at a mean score of 3.489 (st dev. 0.729) and finally they said that they have thoughts about how they performed in Mathematics at a mean rating of 3.192 (st dev, 0.623).

4.3.2 Students' Self-Efficacy Levels by Gender

When examined through gender perspective, the male students have higher scores in every Self-Efficacy measure such as performance in specific math tasks, ones thinking and feeling during a math study and the student's feeling about math work and assignments. According to the figure 4.3 below, on the items measuring the students' belief on one's ability to perform math tasks, the male students have an average of 4.418 with a narrow spread of scores (SD=0.519) as compared to their female counterparts who have an average of 4.058 with minimum distribution of scores (SD=0.642).
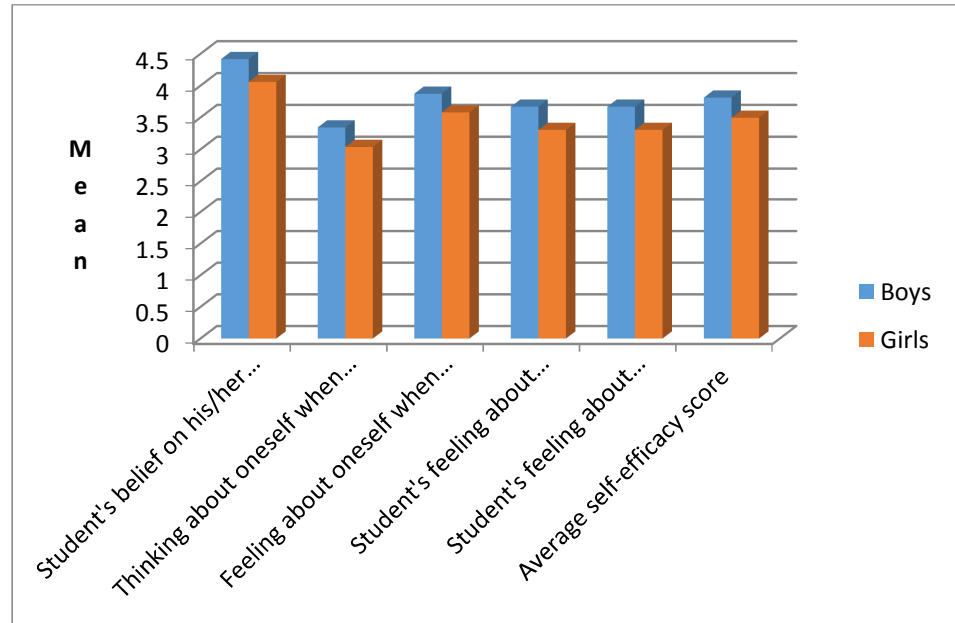
Figure 4.3: Self-Efficacy Levels of the Students by Gender

On average, the Self-Efficacy scores for the male students remain higher (3.813) as compared to that of the females (3.496) with a standard deviation of 0.538 and 0.432 respectively. This means that the Self-Efficacy scores for the male students are much spread from the mean as compared to those of the female students. The average Self-Efficacy score is the mean score of the 43 items in the instrument used in this study.

4.3.3 Self-Efficacy by Academic Achievement Levels

In order to establish whether there exists a difference in the Self-Efficacy levels based on the Academic Achievement level of the student, the data was disaggregated by the same criterion. According to the figure 4.4 below for high achievers, there students' belief on their ability to perform math tasks scored relatively higher with 4.446 (SD=0.475) as compared to students' thinking about oneself when studying math which has a mean score of 3.361 (SD=0.685).
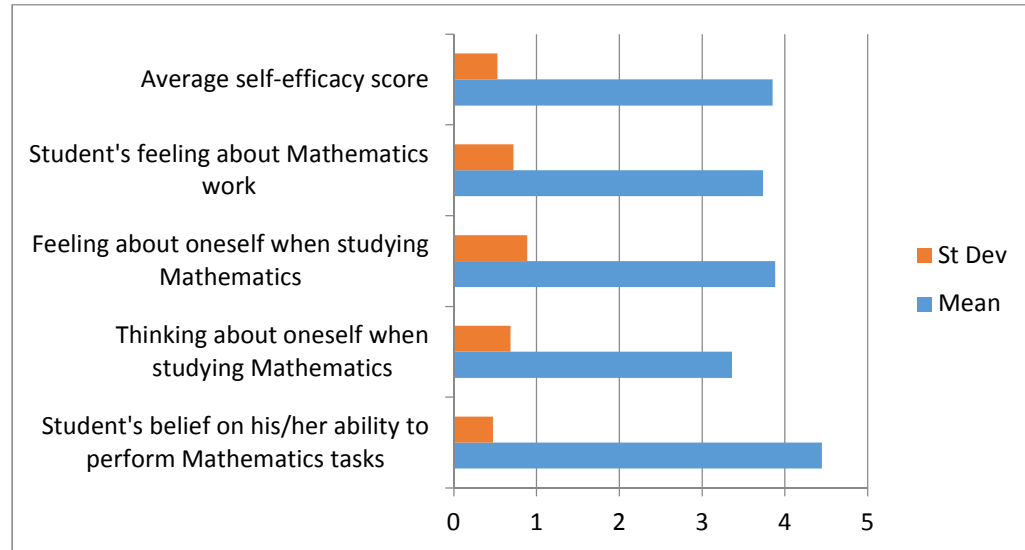
Figure 4.4: Self-Efficacy Levels among the High Achievers Group

On the average Self-Efficacy score, the high achieving group scored 3.852 (SD=0.526) with a skewedness value of -0.540 indicating that the distribution is moderately skewed to the negative. On the other hand, the low achieving group reports a comparatively higher scores on ones belief on his/her ability to perform math tasks with a mean score of 4.068 (SD=0.655). The second measure on the students' thinking about oneself when studying Mathematics has a mean of 3.052 (SD=0.530), which is the lowest among the four measures.
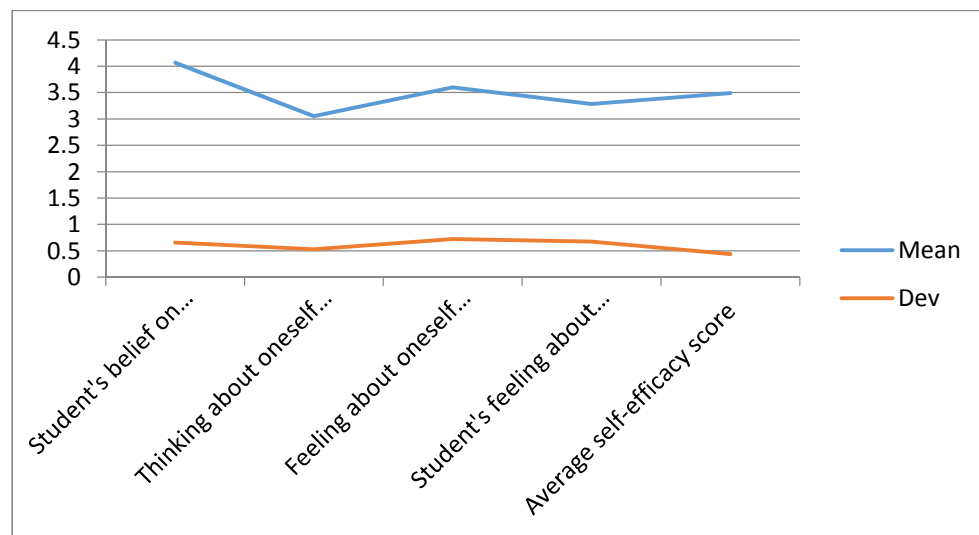
Figure 4.5: Self-Efficacy Levels among the Low Achievers Group

The student's feeling about oneself when studying Mathematics and about Mathematics work had a mean of 3.600 (SD=0.721) and 3.285 (SD=0.674) respectively. The average mean Self-Efficacy score for the low achieving group was 3.493 (SD=0.440).

4.4 Students' Mathematics Achievement Levels

The present study sought to examine the Self-Efficacy in relation to Academic Achievement, and therefore an achievement criterion was established based on their performance in Mathematics achievement test.

According to Table 4.1 below, among the sampled boys, 91 (90.1%) were high achievers compared to 42 (42.4%) of the girls. Further, 10 (9.9%) of the boys were low achievers as compared to 57 (57.6%) of the girls in the same category.

Table 4.1: Students' Academic Achievement Levels by Gender

Achievement Levels[a]

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**High Performing School –Boys**		91	90.1	90.1	90.1
	Low Performing School- Boys		10	9.9	9.9	100.0
	Total		101	100.0	100.0	
a. Student's gender = MALE						
Valid	**High Performing School-Girls**		42	42.4	42.4	42.4
	Low Performing School-Girls		57	57.6	57.6	100.0
	Total		99	100.0	100.0	
a. Student's gender = Female						

4.4.1 Overall Students' Mathematics Achievement Levels

An analysis of the Mathematics achievement scores is presented by a pie chart below in the figure 4.6 below. According to the table, the overall mean score of the 200 students was 33.25(SD= 14.89).The skewedness value of .413 show that the distribution is approximately symmetrical (but not exact) while the kurtosis value of -0.069 show that the distribution is much flat and scores highly distributed.
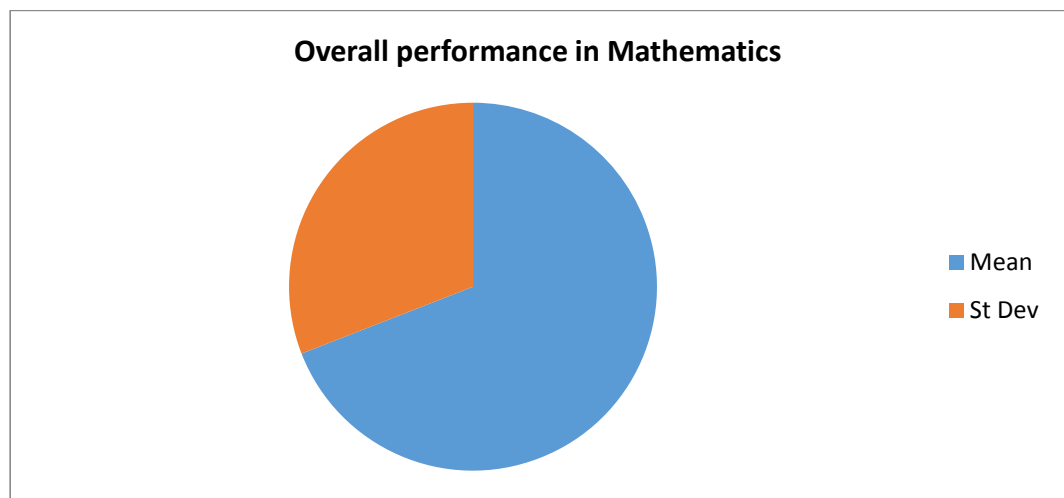
Figure 4.6; Overall Mathematics Achievement

Overall the students' performance in Mathematics was found to average at a mean score of 33.25 (st. dev, 14.89).

4.4.2 Mathematics Achievement by Gender

In order to explore the difference in Mathematics achievement based by gender, the variable was analyzed and disaggregated by gender. The male students have high Mathematics mean score of 37.07 (SD=15.818). The lower mode reflects a positively skewed distribution in which there are a large number of low scores and a smaller number of high scores. Confirmation of this distributional shape was found by examining the frequency distribution together

with the skeweness coefficient of .399 which indicated that the distribution for the male students was slightly positively skewed while the kurtosis value of -0.381 indicates that the peak of the curve is flattened.
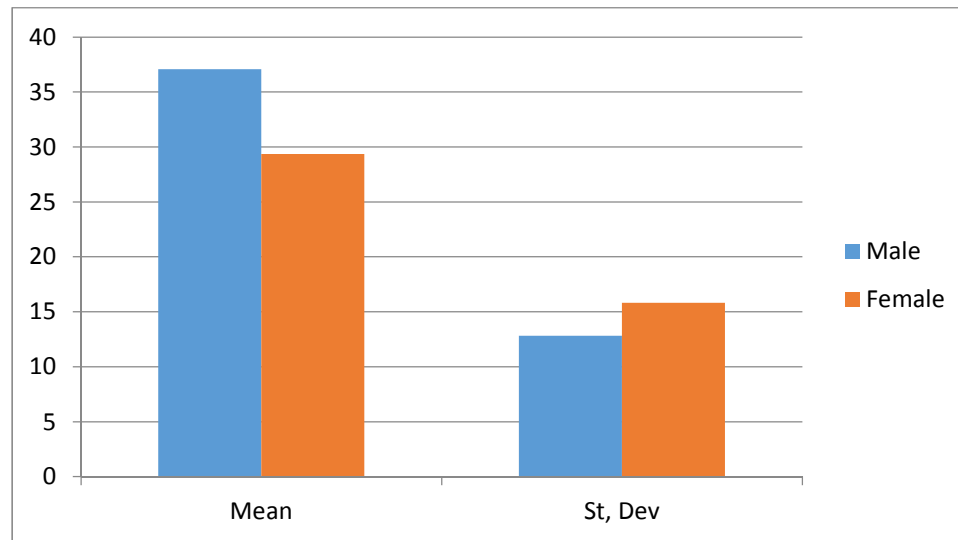
Figure 4.7: Students' Mathematics Achievement by Gender

On the other hand, the female students seem to achieve low scores (mean of 29.35) in Mathematics test as compared to their male counterparts. In terms of distribution of scores, the standard deviation of 12.821 indicates that the scores are comparatively less spread compared to those of the male students. Further, the positive skewedness value of 0.78 indicates that the distribution is approximately symmetrical, while the negative kurtosis value of -0.511 indicates that the math test scores for the girls are taking somewhat flatter peak.

Below is a graphical presentation of the math scores in a distribution curve by gender dimension:
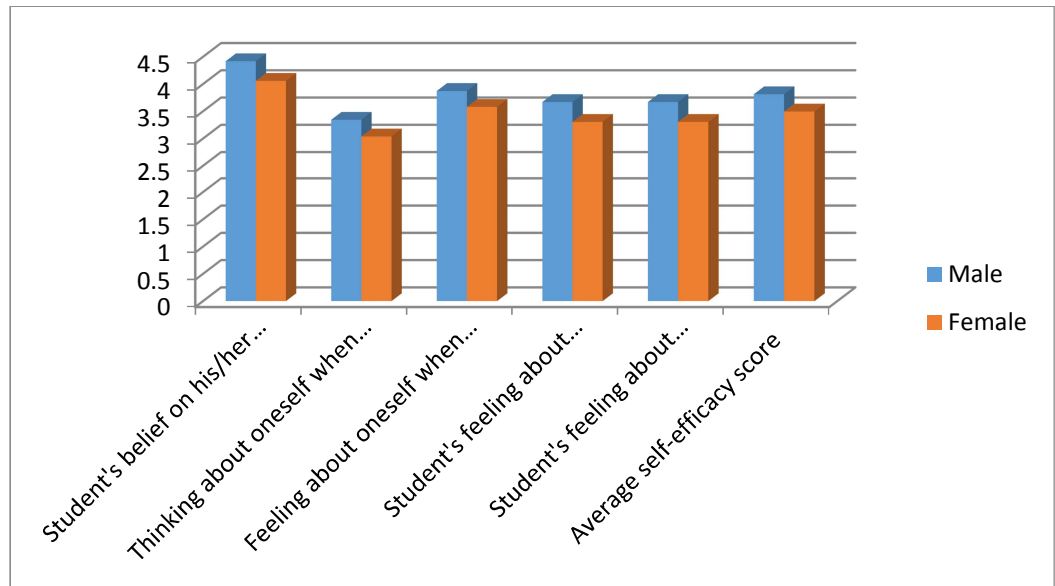
Figure 4.8: Students' Mathematics Score Distribution by Gender

According to figure 4.8 above, the standard deviation of 15.818 for the male students' Mathematics scores indicates that the scores are much spread compared to those of the female students. This is demonstrated by the wider base of the graph showing a range of 0 to 80. For the female students Mathematics scores, the distribution is comparatively less that the male ones indicated by the standard deviation of 12.821 and the relatively less wide base of the graph ranging from 0 to 60.

4.5 Correlation between Self-Efficacy and Mathematics Achievement

In order to establish the relationship between Self-Efficacy and Mathematics achievement of the students the Pearson Moment Correlation Coefficient was used. The Self-Efficacy scores used were the mean Self-Efficacy scores. The Table 4.2 revealed that high scores on the Self-Efficacy measures tended to be paired with high scores on the Mathematics performance measure. This pattern occurred across the Self-Efficacy measures and showed a linear relationship.

Table 4.2. Correlation between Self-Efficacy and Mathematics Achievement

Item	Mathematics score	Mean score	Self-Efficacy
Student's belief on his/her ability to perform Mathematics tasks	10	1	
Thinking about oneself when studying Mathematics	23	3	
Feeling about oneself when studying Mathematics	27	5	
Student's feeling about Mathematics work	67	2	
Average Self-Efficacy score	34	1	

Establishment of a linear relationship between science performance and Self-Efficacy allowed for Pearson product moment correlations to be calculated. The Pearson correlations, shown in Table 4.3 below, in all the overall and male student cases were positive (except two cases for the female students), indicating that those pupils with the highest Self-Efficacy scores also did the best on the Mathematics performance task. This, however, does not mean that one can assume causality. Whether Self-Efficacy has a causal impact on performance cannot be determined in this way.

Overall, the correlation of 0.376 indicates a relatively weak positive relationship between Self-Efficacy and Mathematics achievement scores significant at $P<0.005$.

Table 4.3: Correlation Coefficients between Learning Styles and Mathematics Achievement

Correlation coefficients between Self-Efficacy and achievement in Mathematics		Overall	Male	Female
Student's belief on his/her ability to perform Mathematics tasks	Pearson Correlation	.094	.228[*]	-.192
	Sig. (2-tailed)	.183	.022	.057
Thinking about oneself when studying Mathematics	Pearson Correlation	.442[**]	.607[**]	.076
	Sig. (2-tailed)	.000	.000	.456
Feeling about oneself when studying Mathematics	Pearson Correlation	.343[**]	.490[**]	.043

	Sig. (2-tailed)	.000	.000	.676
Student's feeling about Mathematics work	Pearson Correlation	.234[**]	.379[**]	-.094
	Sig. (2-tailed)	.001	.000	.357
	Pearson Correlation	.376	.572	
Mean Self-Efficacy score				-.071
	Sig. (2-tailed)	.000	.000	.487
	N	200	101	99

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

It can be seen from Table 4.3 that all the correlations reached statistical significance at either 0.01 or 0.05 level. Overall, all the Self-Efficacy measures were positively correlated with achievement in Mathematics, the lowest being the students' belief on his/her ability to perform Mathematics tasks measure with the weakest correlation ($r = 0.094$) and the students' thinking about oneself when studying Mathematics having a relatively weaker correlation coefficient of 0.442.

According to the Table above, the overall correlation ($r=0.376$, $p<.000$) means that the relationship is statistically significant and therefore there is enough evidence for such as claim. In terms of the individual Self-Efficacy measures, the overall correlation for the students' belief on his/her ability to perform Mathematics tasks ($r=.94$, $p>.05$) means that the relationship is not statistically significant, while for the other three measures: students' thinking about oneself when studying Mathematics ($r=.442$, $p<0.05$), students' feeling about oneself when studying Mathematics ($r=.343$, $p<0.05$) and students' feeling about Mathematics work ($r=.234$, $p<0.05$) means that the relationships are statistically significant.

When looked from a gender perspective, there generally seems to be a positive relationship between Self-Efficacy measures and Mathematics

achievement among the male students. The overall correlation for the male students ($r=0.572$, $p<0.05$) indicates that there is a statistically significant relationship while for the girls ($r=-0.71$, $p>0.05$) indicates lack of statistically significant relationship thereof. In terms of the specific Self-Efficacy measures, the female students do not have any statistically significant relationship among the four measures, while the male students have significant relationship among the rest of the measures except on student's belief on his/her ability to perform Mathematics tasks ($r=0.228$, $p>0.05$).

4.6 Analysis of Variance ANOVA

In this study, one-way analysis of variance (ANOVA) was conducted to determine any of the differences between the means are statistically significant by comparing the p-value with the significance level to assess the null hypothesis which states that the population means are all equal.

According to Table 4.4 below, there is a statistically significant difference existing within the overall Self-Efficacy measures ($F=1.948$, $P<0.05$) and the students' thinking about oneself when studying Mathematics ($F=1.768$, $P>0.05$). However, there are no significant differences in the specific other Self-Efficacy measures: the student's belief on his/her ability to perform Mathematics tasks ($F=1.642$, $P>0.05$);; the students' feeling about oneself when studying Mathematics ($F=1.546$, $P>0.05$); the students' feeling about Mathematics work ($F=1.240$, $P>0.05$) all indicate lack of enough evidence to reject the null hypothesis that the population means are all equal.

Table 4.4: Overall Significance of the Self-Efficacy Levels

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Student's belief on his/her ability to perform Mathematics tasks	Between Groups	29.701	58	.512	1.642	.010
	Within Groups	43.972	141	.312		
	Total	73.674	199			
Thinking about oneself when studying Mathematics	Between Groups	32.554	58	.561	1.768	.004
	Within Groups	44.76	141	.317		
	Total	77.314	199			
Feeling about oneself when studying Mathematics	Between Groups	50.902	58	.878	1.546	.020
	Within Groups	80.051	141	.568		
	Total	130.953	199			
Student's feeling about Mathematics work	Between Groups	35.702	58	.616	1.240	.155
	Within Groups	69.997	141	.496		
	Total	105.699	199			
Average score	Between Groups	23.223	58	.400	1.948	.001
	Within Groups	.602	141	.206		
	Total	1.002	199	1.002		

Table 4.5 below shows that statistically significant difference exists within the male group on the students' thinking about oneself when studying Mathematics (F=2.428, df=47, P<0.05) and the overall male students Self-Efficacy (F=2.471, df=47, P<0.05). However, there is lack of enough evidence to reject the null hypothesis based on the male student's three other Self-Efficacy measures. The students' belief on his/her ability to perform Mathematics tasks (F=1.355, df=47, P>0.05); the students' feeling about oneself when studying Mathematics (F=1.964, df=47, P>0.05) and the Student's feeling about Mathematics work (F=1.662, df=47, P>0.05) all are not statistically significant.

Table 4.5: One-Way ANOVA for the Male Group

ANOVA[a]

		Sum of Squares	df	Mean Square	F	Sig.
Student's belief on his/her ability to perform Mathematics tasks	Between Groups	.312	47	.312	1.355	.142
	Within Groups	0.542	53	.230		
	Total	0.854	100	0.542		
Thinking about oneself when studying Mathematics	Between Groups	0.663	47	0.663	2.428	.001
	Within Groups	0.936	53	0.273		
	Total	1.209	100	0.936		
Feeling about oneself when studying Mathematics	Between Groups	1.012	47	1.012	1.964	.009
	Within	1.724	53	.515		

		Sum of Squares	df	Mean Square	F	Sig.
	Groups					
	Total	2.239	100	1.724		
Student's feeling about Mathematics work	Between Groups	.690	47	.690	1.662	.037
	Within Groups	1.105	53	.415		
	Total	1.795	100	1.105		
Average Self-Efficacy score	Between Groups	.422	47	.422	2.471	.001
	Within Groups	0.593	53	.171		
	Total	0.764	100	0.593		
a. Student's gender = Male						

Table 4.6 below shows that there is no statistically significant difference existing within the female group on any of the Self-Efficacy measures. According to the table, the student's belief on his/her ability to perform Mathematics tasks (F=1.523, df=42, P>0.05); the students' thinking about oneself when studying Mathematics (F=0.925, df=42, P>0.05); the students' feeling about oneself when studying Mathematics (F=0.790, df=42, P>0.05); the students' feeling about Mathematics work(F=1.174, df=42, P>0.05) all indicate lack of enough evidence to reject the null hypothesis that the population means are all equal.

Table 4.6: One-Way ANOVA for the Female Group

ANOVA[a]

		Sum of Squares	df	Mean Square	F	Sig.
Student's belief on his/her ability to perform Mathematics tasks	Between Groups	21.512	42	.512	1.523	.070
	Within Groups	18.830	56	.336		
	Total	40.324	98			
Thinking about oneself when studying Mathematics	Between Groups	11.058	42	.263	.925	.600
	Within Groups	15.935	56	.285		
	Total	26.993	98			
Feeling about oneself when studying Mathematics	Between Groups	19.272	42	.459	.790	.786
	Within Groups	32.518	56	.581		
	Total	51.790	98			
Student's feeling about Mathematics work	Between Groups	23.868	42	.497	1.174	.285
	Within Groups	23.704	56	.423		
	Total	44.573	98			
Average Self-Efficacy score	Between Groups	7.806	42	.186	.993	.504
	Within Groups	10.480	56	.187		
	Total	18.286	98			

a. Student's gender = Female

4.7 Summary of the Main Findings

The study findings were presented based on the study objectives as follows;

4.7.1 The levels of Self-Efficacy and Academic Achievement among male and female secondary school students in Kenya

Having addressed all two research objectives it can be seen that the current study has shown the following:

In measuring Self-Efficacy, four measures were used: student's belief on his/her ability to perform Mathematics tasks (9 items); student's thinking about oneself when studying Mathematics (19 items); student's feeling about oneself when studying Mathematics (7 items) and student's feeling about Mathematics work (8 items). To establish the overall Self-Efficacy level, an average of the scores across the four measures (43 items) was determined. The study findings show a high level of Self-Efficacy among learners with an overall Self-Efficacy of 3.656 (SD=0.512). The male students have a higher Self-Efficacy level of 3.813 (0.538) as compared to their female counterparts who have 3.496 (SD=0.432). The high achieving group has a higher Mathematics Self-Efficacy level of 3.852 (SD=0.526) compared to the low achieving group with 3.493 (SD=0.440). In terms of Mathematics achievement levels, the overall mean achievement score is 33.25 (SD=14.89). From a gender dimension, the male students have a higher Mathematics achievement mean score of 37.07 (SD=15.818) as compared to the females 29.35 (SD=12.821).

4.7.2 The relationship between Self-Efficacy and Academic Achievement among male and female secondary school students

There is an overall positive relationship between Self-Efficacy and Mathematics achievement as demonstrated by the correlation coefficients of 0.376 (p<0.05) which indicate that the relationship is statistically significant. The male students have a positive relationship (r=0.572, p<0.05), while the female students have a very weak negative relationship (r=-0.071, p>0.05) which is not

statistically significant. The relationship among the male students is significant at 0.01 level of significance. There is a statistically significant difference existing within the overall Self-Efficacy measures (F=1.948, P<0.05) and the students' thinking about oneself when studying Mathematics (F=1.768, P>0.05). However, there are no significant differences in the specific other Self-Efficacy measures: the student's belief on his/her ability to perform Mathematics tasks (F=1.642, P>0.05);; the students' feeling about oneself when studying Mathematics (F=1.546, P>0.05); the students' feeling about Mathematics work (F=1.240, P>0.05) all indicate lack of enough evidence to reject the null hypothesis that the population means are all equal. The students' belief on his/her ability to perform Mathematics tasks (F=1.355, df=47, P>0.05); the students' feeling about oneself when studying Mathematics (F=1.964, df=47, P>0.05) and the Student's feeling about Mathematics work (F=1.662, df=47, P>0.05) all are not statistically significant. This means that the positive relationship may not have occurred by chance although the cause-effect relationship is not what the present study aimed to determine.

CHAPTER FIVE

DISCUSSIONS, SUMMARY, CONCLUSION RECOMMENDATIONS

5.1 Introduction

In this section, the discussions summary, conclusion and recommendations will be presented

5.2 Discussion

5.2.1 The levels of Self-Efficacy and Academic Achievement among male and female secondary school students in Kenya

This study investigated the relationship between Self-Efficacy on Mathematics achievement among high school students with a gender perspective. Since the study took a correlation design, the study could not establish the cause-effect relationship between Self-Efficacy and Mathematics achievement among the students, and therefore this is direction for future research. The study findings indicate that the Self-Efficacy levels of the students are average since they are above 2.500 in most of the components. Based on the distribution characteristics of the data for each of the Self-Efficacy and performance measures, the students in the sample appear to be on the whole quite positive about their capabilities.

In this study, the domain-specific measures, which require judgments to be made regarding capabilities in Mathematics, are thought to have greater explanatory value than global measures. This is because the Self-Efficacy scores on the items measuring the task-specific Self-Efficacy were matched with higher scores in Mathematics achievement. However, Pajares (1996) maintains that task-specific measures are superior in some domains, and not all. The results of the present study confirmed Pajares' speculation, since higher correlations with achievement were found with the task-specific measure than the general-domain

measures. This finding suggests that the greater the information students are given regarding a task, the better their resultant Self-Efficacy beliefs predict performance. In many ways this seems an obvious statement and yet task-specific measures of Self-Efficacy are not widely utilized and there exist a real need for instruments to be developed that measure the Self-Efficacy construct in an appropriate way. As Pajares (1997) notes, Self-Efficacy is plagued with miss measurement since much Self-Efficacy research fails to apply Bandura's theory correctly. It is likely that the common use of global measures of Self-Efficacy, which violates the basic assumption that Self-Efficacy is a multi-dimensional construct, is to blame for this situation.

Based on the above argument, the findings provide an indication that task-specific measures may be a superior form of measurement, but whether task-specific measures can have a real practical application in the classroom is a matter for debate. The problem is that task-specific measures by their nature dictate that the questions are tailored to specific tasks (Pajares, 1997). The only way measures of this kind can be integrated into the classroom would be for the teachers to write their own. But the question remains whether this is feasible or would it be better to accept a lower correlation and use a measure (such as domain-specific or self-regulated learning) that can be used 'off the shelf' and does not require teacher input into its development?

According to Bandura (1997), people do generally overestimate their capabilities. He suggests that optimistic Self-Efficacy beliefs are not a failing but a benefit since they raise aspirations and sustain motivation. According to him, if one could alter learners' self-beliefs then it is highly likely that the learners' academic performance would also alter. Self-Efficacy beliefs influence persistence, motivation, effort and choice which ultimately affect performance

(Bandura, 1997). Thus, although no causal connection can be made on the basis of this study, altering the student's Self-Efficacy beliefs may help him or her to raise the level of effort, to persist longer on school work, to be more motivated and to choose not to avoid certain tasks. These attributes have the potential to raise the student's performance in Mathematics. Of course, as Pajares and Schunk (2001) discuss, a high sense of Self-Efficacy cannot raise performance beyond the capabilities of the student. It can merely help the child to make optimal use of them. Thus, it appears that the high school teachers would do well to attend to the Self-Efficacy beliefs of their students.

5.2.2 The relationship between Self-Efficacy and Academic Achievement among male and female secondary school students

From the gender perspective, male students were reported to have higher Self-Efficacy than their female counterparts. This is consistent to several styles conducted on Self-Efficacy and Academic Achievement (Jinks and Morgan, 1999; Bussey and Bandura, 1999). Many reasons have been suggested to explain gender differences such as learning styles, assessment styles, cultural issues such as the increase of 'laddish' behavior' and teacher gender values. Another explanation relates to the idea that girls use interpersonal relationships to construct their identities (Gilligan, 1993). This idea appears relevant to Self-Efficacy research since it has been suggested that girls and boys may use a different frame of reference with which to provide Self-Efficacy judgements. Indeed, Pajares, Miller and Johnson (1999) speculated that girls use a more social comparative method of evaluating their Self-Efficacy beliefs than boys.

The present study findings indicate that highly efficacious students in Mathematics perform well than students with low Self-Efficacy. Self-Efficacy is depicted as having a significant effect on Mathematics achievement. The study

depicts that Self-Efficacy does significantly influence gender. The measures used in the Mathematics questionnaire substantiate the view that particularized or task specific measures of Self-Efficacy can be combined with the global measures in the explanation and prediction of academic outcomes. From the analysis of data, it was found that there is a significant difference between the mean achievement scores of secondary school male and female in Mathematics, as boys scored higher than the girls. This result is supported by that of Osafehinti (1988) who also found gender difference in students' Mathematics achievement exists. Achievement in Mathematics correlates highly with the level of Self-Efficacy in which there's significant consistent gender differences found with the relationship among the male students being stronger than the females'.

In this study, it was also observed that there is a significant difference in the Mathematics Self-Efficacy scores of male and female students. This result agreed perfectly with the work of previous researchers who also found significant evidence of gender difference in math achievement. Although differences in Mathematics achievement between male and female secondary school students is consistently found, this difference may be less pronounced in Mathematics confidence of males and females at the secondary school level. Further, secondary school females may continue to exhibit weaker Mathematics self-belief, than the males, but these differences may be less pronounced when female are asked to provide a judgement of confidence to solve a specific problem. In other words, their weaker self-beliefs may be more generally experienced and less contextually based (Pajares, 2001).

It was also revealed that there is a positive relationship between Mathematics Self-Efficacy and achievement in Mathematics, although the strength of the relationship varied between the male and female students. This is consistent to study findings by other scholars (Hackett, 1985; Lent & Hackett, 1987; Pajares 1996b).Findings from this study support Bandura's (1986, 1997)

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claim that Self-Efficacy beliefs predict academic outcomes and Mathematics achievement in this case. They also support the work of investigators who report significant relations between Self-Efficacy, other motivation constructs, and Academic Achievements. The implication that arises is that researchers and high school counsellors should be looking to student's beliefs about their Mathematics capability, for they are important components of motivation and of Mathematics achievement (Bandura, 1997; Pajares, 1997; and Schunk, 1991). It also seems warranted to suggest that researchers should continue to identify the contexts in which certain motivation constructs may be better predictions of Mathematics related outcomes as well as the unique role that the construct plays in the general development of self – regulatory and performance skills. The result will be a clearer and deeper understanding of the nature of the interplay among the differing self-beliefs, and Mathematics achievement.

It is noteworthy that this correlation study only indicates the presence of a relationship, not the nature of the relationship. Correlation is not causation. There is always the possibility that a third variable influenced the results. For example, perhaps the students in the small classes were higher in verbal ability than the students in the large classes or were from higher income families or had higher quality teachers. On this basis therefore, it must be noted that the existence of a strong relationship between the two variables does not mean that one causes the other. Issues of causality cannot be ascertained through correlational studies. However, relationships of the magnitude found in the current study are not a chance occurrence considering the size of the sample population. The relationships for the overall students was significant to the 0.01 level which indicate that pupils with a high sense of Self-Efficacy tend to have higher performance than those pupils with a low sense of Self-Efficacy. Self-belief in one's capabilities to perform certain tasks therefore seems to be connected to ultimate performance in those tasks.

5.3 Summary of the Study

The study purpose of this study was to Self-Efficacy and Academic Achievement among secondary schools in Kenya: Mathematics perspective. From the findings, study acknowledges that high school teachers or instructors have helped to promote their students Self-Efficacy by taking interest on the same. In applying Self-Efficacy theory to education it has been found logical to predict that students with a high sense of Self-Efficacy would demonstrate superior performance on a task than those with low Self-Efficacy.

This study finds Bandura's arguments on social cognitive theory on the ways in which a strong sense of efficacy enhances human accomplishment and personal well-being. In contrast to individuals who doubt their capabilities, students were found to possess high Self-Efficacy approach treat difficult tasks in Mathematics as challenges rather than threats, they set challenging goals for themselves and maintain commitment to achieving these goals, they sustain effort even when faced with failure and quickly recover after setbacks, they develop an intrinsic interest in activities, and they attribute failure to factors which are adaptable, for example, insufficient effort or skills (Bandura, 1994). It is easy to see how these attributes would contribute to Mathematics learning and achievement. If teachers could develop a strong sense of efficacy in their students they would equip them for life. But this should be done in consideration of the gender differences in Self-Efficacy and particularly in Mathematics, and generally subject-specific. Indeed (Bandura, 1997) maintains that the major goal of formal education should be to equip students with the intellectual tools, efficacy beliefs and intrinsic interests to educate themselves in a variety of pursuits throughout their lifetime.

The present study findings also suggest that efforts are needed for promoting Mathematics Self-Efficacy for high school students because Mathematics Self-Efficacy was positively associated with Mathematics

achievement. As previously discussed, research conducted in the 1980s by Schunk suggests that students' perceived Self-Efficacy beliefs influence motivation and achievement level. These studies have established that Self-Efficacy beliefs strengthen when: students are encouraged to set their own goals, when teachers give frequent and immediate feedback, when students attribute success to their own level of effort, when progress is monitored daily, and when social comparative feedback communicates that others can master the material. In addition to an increase in Self-Efficacy beliefs performance also increases. According to Schunk (1991), Self-Efficacy could be increased by using the right instructional strategies such as helping students to set learning goals, providing timely and explicit feedback, encouraging students to study harder and using high achieving students as models.

5.4 Conclusion

In conclusion, the study found that in the midst of all the attention to student achievement in Mathematics, there may be a natural tendency by secondary schools to try to identify "the one best approach" for achieving Mathematics success. However, one doesn't exist. In fact, it is clear that complicated and multifaceted factors for student Mathematics achievement are likely to require complex and diverse solutions based on the diversity of all secondary schools in Kenya. Therefore, it is for these reasons that high academic Self-Efficacy is likely to espouse higher Academic Achievement, whereas low academic Self-Efficacy is likely to diminish it. While such efforts may be praiseworthy.

The findings in this study support the point of view that Mathematics Self-Efficacy appears to be a significant factor contributing to Academic Achievement. Although Mathematics Self-Efficacy was shown to positively relate with the Mathematics achievement scores among the secondary school students, the real

question might be how it causes or affects the achievement? The research posits that Self-Efficacy does not directly influence the Mathematics achievement scores; rather it influences the psychological and behavioral traits, which, in turn, influence achievement. As an example, low Self-Efficacy has been shown to be linked to low academic motivation, such as not persisting at a task or not working hard.

Lastly, a direction for future research is the possibility that student ability levels moderate the effect of classroom environments on Self-Efficacy. Other scholars have suggested that students of different ability levels might interpret and respond to the classroom environment differently. For example, Mathematics Self-Efficacy of a student with high math ability might not be strongly affected by a caring teacher, but might be strongly affected by a challenging one. In contrast, the math Self-Efficacy of a student with low math ability might be strongly affected by a caring teacher, but might not be affected by or even negatively affected by a challenging one. It is also important to examine how math Self-Efficacy might mediate the effect of student perceptions of achievement-orientation on standardized math test achievement.

5.5 Recommendations

From the findings, the study recommends that educators should be cautious about any thoughts of universal applicability and effectiveness as no single approach can be effective in all circumstances and situations. The current research results suggest a variety of directions for future research. First, further research is needed to more accurately determine the magnitude of relationship between Self-Efficacy beliefs and standardized Mathematics achievement across a number of schools drawn from different cultural backgrounds. The expectation is that the relationship between Self-Efficacy and standardized Mathematics test

achievement will be larger when Self-Efficacy and performance indices are more highly concordant.

Second, the finding that perceptions of the classroom environment indirectly effect math achievement through Self-Efficacy suggests that what teachers do in the classroom matters. Although the indirect effects of our classroom environment variables were not taken into account, it is interesting to consider that they might add up. For example, providing a challenging classroom environment might only slightly increase students' Self-Efficacy beliefs; however, providing a challenging, caring, and mastery-oriented classroom environment might increase students' Self-Efficacy beliefs by a more notable degree. Moreover, there are several additional classroom variables that might further work together to influence student's Self-Efficacy beliefs. These possibilities can be examined in future research by measuring a wider variety of perceptions of the classroom and examining their influence on Self-Efficacy and Mathematics achievement.

5.6 Suggestions for Further Studies

Based on the findings, the study recommends further studies on the following areas;

1. The various classroom variables influencing student's performance in Mathematics in secondary schools such as attitudes in Mathematics.
2. A similar study should be carried out among other primary schools and compare with the findings to establish generalizability.

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APPENDICES

APPENDIX A

Part one: Consent Note

Part two: The Mathematics Self-Efficacy Questionnaire

Part three: Sample questions

APPENDIX B: Permission to collect data

APPENDIX C: Academic Achievement data collection tool

APPENDIX D: Data Collection Permit

PART ONE

CONSENT NOTE FOR RESEARCH INSTRUMENTS

Ateneo de Manila University,
P.O Box 240, UP Post Office,
1144 Quezon City, Manila Philippines.
27/7/2015.
University of Nairobi,
P.O Box 30197,
Nairobi – Kenya.

Dear Sir/Madam.
REF: Authorization to use my Self-Efficacy Instrument

I hereby authorize Wenslaus Ochieng, a Med. Student of measurement and evaluation in your university all the my copyright privileges of using my Self-Efficacy instrument. I have consented to the usage of the details present in my Self-Efficacy instrument for the purposes of his research. The reliability of instrument is effective in measuring and evaluating the performance of students in classroom settings and has its source and reliability in Albert Bandura, a well known scholar in assessing motivation of students in academic settings. Perceived Self-Efficacy beliefs have been investigated in a wide range of disciplines and settings including educational research where research has been explored in relation to advancement to further study and career choices. Perceived Self-Efficacy beliefs have also been reliably observed in the affective and motivational domains and their influence on students' performance and achievement. One's perceived Self-Efficacy expectations play a significant role in determining one's behavior with regard to how much effort one will utilize in a designated performance and for how long it will be maintained. Zimmerman, an educational research scholar, postulates that Self-Efficacy has emerged as an effective and reliable instrument of predicting students' motivation and learning. This is due to the fact that Self-Efficacy differs distinctively from other related motivational constructs such as outcome expectations, self-concept and locus of control. Zimmerman further states that Self-Efficacy as a performance based measure of perceived capability differs conceptually and psychometrically from the other related constructs and that researchers have verified its distinctiveness and convergent validity in predicting common motivational outcomes as witnessed in students' activity choices, effort, persistence and emotional reactions. As an education researcher, I trust the validity and reliability of my Self-Efficacy instrument and I do encourage the usage of the prior instrument in measuring, determining and evaluating the performance of students in educational settings.

Yours faithfully,

Benard Omondi

PART TWO

MATHEMATICS SLEF-EFFICACY QUESTIONNAIRE

Author: Benard Isiaho Omondi

Title : The Impact of Perceived Self-Efficacy in Mathematics (2012)

Contact: omondisj@gmail.com

Section 1: How sure are you about being able to do the following Mathematics tasks?

APPENDIX A: PART THREE.

Sample questions:

1. Using a train timetable to work out how long it would take to get from one place to another.

2. Calculating how much cheaper a music player would be after a 30% discount on the retail price.

3. Calculating the area of the school's football pitch in square metres

4. Understanding all the types of graphs presented in newspapers.

5. Solving an equation like $3(x+5) = 17$.

Section 2: How do you think about yourself when studying Mathematics?

1. I am just not good at Mathematics

2. I get good marks in Mathematics.

3. I learn Mathematics quickly

4. I have always believed that Mathematics is one of my best subjects

5. In my Mathematics class, I understand even the most difficult work

APPENDIX B

PERMISSION TO COLLECT DATA

Wenslaus Ochieng

P.O Box 30197 - 00100

Nairobi Kenya.

Email: owenkwach@gmail.com

April 2015

To whom it may concern

    REF: **Data Collection for a Study on 'Self-Efficacy and Academic Achievement among Secondary Schools in Kenya: Mathematics Perspective'**

I am Wenslaus Ochieng', ID.NO. 22175076, a student at the University of Nairobi, School of Education, Registration Number E58/67162/2013. I am currently undertaking my research project as a requirement for award of the degree of Masters of Education in Measurement and Evaluation.

I hereby request for permission to gather data in your school in order to fulfill the purpose and objectives of this research project. I also request for your cooperation during my data collection process for this study. The data gathered will be treated with the utmost confidentiality and only used for the academic purpose of this research. The details of respondents and other sources of information shall also be kept confidential.

I look forward to your cooperation.

Yours sincerely,

Wenslaus Ochieng'

APPENDIX C

ACADEMIC ACHIEVEMENT DATA COLLECTION

TOOL

Academic Achievement Scores Data Collection Tool – 1st, 2nd And 3rd Term

Classroom Assessment Scores

Class: Form 3, 2014 no of students:			Term 1		Term 2		Term 3		Average mean Score
No	Student Name	Admission No	Mathematics		Mathematics		Mathematics		
			M	F	M	F	M	F	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
up to 200									

APPENDIX D

DATA COLLECTION PERMIT

UNIVERSITY OF NAIROBI

COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
FACULTY OF ARTS
DEPARTMENT OF PSYCHOLOGY

Telegrams Varsity Nairobi	P.O. BOX 30197 00100
Telephone. 318262	NAIROBI
Fax: 3245566	KENYA
Telex 22095 varsity Ke Nairobi, Keny	29th July 2015

REF : REQUEST TO COLLECT DATA: WENSLAUS OCHIENG : E:58/67164/2013

To whoever this may concern,

This is to inform you that the above named is a registered student in the M.Ed Programme _ Measurement and Evaluation, Education Psychology, Psychology Department. He would like to collect data in your organization on Self Efficacy and Academic Achievement. Please accord Him all the assistance he needs.

Sincerely,

For:
Dr. Luke Odiemo
Chair_ Psychology Department

Dr. Karen T. Odhiambo
Coordinator _ M.Ed Measurement anf Evaluation Programme