INFLUENCE OF TEST ANXIETY AND SELF EFFICACY ON MATHEMATICS PERFORMANCE OF SECONDARY SCHOOL STUDENTS IN KANDUYI DIVISION OF BUNGOMA DISTRICT

By

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OCTOBER, 2010.
DECLARATION

“This thesis is my original work and has not been presented for a degree in any other University.”

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To my dear wife Maria and our children, Maureen, Valerie, Bramuel and Gideon. Your support, love and understanding remain a strong inspiration to move on.
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<td>ANOVA</td>
<td>Analysis of variance</td>
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<tr>
<td>CAT</td>
<td>Continuous Assessment Test</td>
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<tr>
<td>FEMSA</td>
<td>Female Education in Mathematics and Science in Africa</td>
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<td>KCPE</td>
<td>Kenya Certificate of Primary Education</td>
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ABSTRACT

The study investigated the influence of test anxiety and self-efficacy on the academic performance in Mathematics of Form two students in Kanduyi Division, Bungoma District of Western Province of Kenya. The study also sought to establish how self-efficacy and test anxiety varied with the students’ academic performance during continuous assessment tests (CAT). There was comparison of anxiety and self-efficacy between students in co-educational and single sex schools. Sex differences in the study sample in relation to the variables were also investigated. The study sample had 115 students from three secondary schools of Kanduyi Division, Bungoma District. The three schools were randomly selected from a pool of 14 schools, then stratified random sampling was used in getting participants for study. The sex strata consisted of male and female while the school type had boys’, girls’ and a co-educational school. Academic performance was obtained from the student scores in the CAT. Data was collected using two instruments namely Test Anxiety Inventory Questionnaire (TAIQ) and Mathematics Self Efficacy (MSE) scale. In addition oral interview was used to verify responses of participants in the questionnaires. Piloting was done on 20 participants. Instruments were adjusted accordingly to improve on reliability and validity. Data was coded, tabulated, scored and keyed in the computer. Analysis was done using the Statistical Package for Social Sciences (SPSS®). Percentages and frequencies were calculated according to categories. Inferential statistics used in the study were correlation and analysis of variance. The study found out that students face test anxiety during tests. The subjects had high self efficacy. There were no sex differences in relation to self efficacy and test anxiety. The study concluded that students experience test anxiety during mathematics test. The anxiety is triggered mainly by authority figures specifically teachers and parents. Peer opinion was also an important contributor to test anxiety.
CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Students face a variety of goals and assessments throughout their school life. However, with the introduction of free primary education and revised or new examination syllabus by the Kenya National Examinations Council (KNEC), the assessment targets are likely to be higher and extremely competitive.

Studies carried out by Female Education in Mathematics and Science in Africa (FEMSA, 1997) indicate that in 1993 secondary school examination results, 100 per cent of girls and 74 per cent boys had failed Mathematics in Ghana, while in Uganda only 11.4 per cent of girls and 20.7 per cent of boys had attained a pass grade in Mathematics in 1991. In Tanzania only 1.6 per cent of girls achieved grade A and B in Mathematics as compared to 7.94 per cent of boys in 1991 secondary level examinations.

Mathematics and Science Kenya Certificate of Secondary Examination (KCSE ) analysis report by KNEC (2006) indicated that boys had 18.49 per cent mean score while girls scored a mean of 12.97 per cent in the 2005 KCSE Mathematics examination. This was a decline in performance as compared to the year 2004 KCSE Mathematics in which boys scored a mean of 21.34 per cent while girls had mean score of 15.39 per cent.

In Kenya majority of households send their children to primary then secondary school so that upon attainment of good grades students can enter the job market or move on to higher training opportunities.
As they progress through the secondary school years and approach 15 to 16 years of age, emphasis begins to focus on preparation for the Kenya Certificate of Secondary Education (KCSE) examinations. These have always been considered the most important set of examinations for adolescents, the results of which will influence their progression into both further education and their employability in majority of careers.

However, with the introduction of free primary education, it is expected that there will be an increase in demand for secondary school education. Hence more candidates will sit for KCSE increasing the pressure to do well and succeed in getting other economic or educational opportunities.

Whenever the Minister for Education announces either Kenya Certificate of Primary Education (KCPE) or Kenya Certificate of Secondary Education (KCSE) results, parents or politicians engage in heated debate on causes of poor performance by students in particular regions or schools in the country. The competition for opportunities that follow has led to more pressure being exerted on students by teachers and parents to improve their test scores during school terms as a projection of their likely KCSE performance.

It appears necessary to emphasize the need for greater awareness of the distress that may be experienced by young children and adolescents taking this kind of test. There may be a need for early intervention in managing any possible adverse reactions and a greater number of services and support from schools and teachers.

Test taking is ubiquitous in our society and the process of testing applies to students at all levels of the educational ladder. Tests are used to monitor and evaluate the progress of
students, to assess problems, to measure intelligence and aptitude, to screen for admission to secondary or college, university and to determine whether university students, should go on to graduate and professional schools (Hembree, 1988).

Although boys generally perform better than girls in Mathematics in Kenya, the overall performance of all students in mathematics is quite low. The national mean grade in Mathematics is below 20 per cent (KNEC, 2006). Students do not also perform well in mathematics and the sciences due to: teacher-centered approaches in teaching, negative attitude of students in the subjects, lack of interest, and poor motivation. Tests generate anxiety among students. Anxiety in an evaluative situation is an important personal and social problem. Test anxiety is a distressing and unpleasant experience which plays a critical role in the mental state of students, and it is assumed to affect their performance and personal development (Sarason & Sarason, 1990). Anxiety is an aversive inner state that people seek to avoid or escape. Anxiety is a warning signal to the ego that something bad is about to happen (Freud, 1926; 1936). Freud (1926) distinguishes among three different types of anxiety as state, trait and neurotic, which reflect three different categories of unpleasant emotional arousal. The most basic is reality anxiety, which arises from a threat you experience when you realize that, you are about to be bitten by a dog, crash your car or fail a test. State anxiety is rooted in reality and it can be repressed, avoided or a person can fix the situation generating the feeling. For instance studying hard in preparation for a test will reduce state anxiety. Neurotic anxiety is the unconscious fear that your id will get out of control and make you do something that will get you punished.
The person experiencing a lot of neurotic anxiety is constantly worried about the id escaping from the ego control. The worry is unconscious. This anxiety isn’t a fear of expressing id impulse *per se*. It is a fear of punishment that may result from expressing them. While trait anxiety is a relative long term tendency to be generally anxious in many situations, state anxiety is a relatively short term tension, because of a specific situation like evaluation. Test anxiety is related with self efficacy in a person.

Self efficacy is the confidence individuals have in their abilities that they can successfully perform particular tasks (Bandura, 1997b). Self efficacy beliefs vary between individuals, fluctuate under different circumstances, and can change overtime. Among the determinants of self-efficacy, we have verbal persuasion and physiological and emotional states (Bandura, 1986; 1997). Bandura (1997) argues that verbal persuasion must be realistic and should come from a credible source; otherwise it can negatively affect student’s self-efficacy beliefs. The emphasis placed on good performance in tests by schools or parents generates high levels of test anxiety which hinders good performance. The stressful instructions by authority cause anxiety that interferes with performance (Wrightsman, 1962). This may lower self-efficacy in tasks at hand.

Anxiety interferes with and reduces the level of performance of anxious students. Failure due to high levels of anxiety leads to lower self-efficacy. Hence, we can hypothesize that students who suffer from high test anxiety are likely to be lower in self-efficacy rating. Probably, they would exhibit lower levels of academic performance. Such students worry about performance instead of studying to master content taught.
There is need to examine the relationship among test anxiety, self-efficacy and academic performance.

1.2 Statement of the problem

When students expect examination, they tend to be anxious. This makes them prepare to sit for the test. However, anxiety in test situations may have destabilizing effects on the students just like low self-efficacy. The test anxiety levels may differ between boys, girls and the type of school that the students attend. If this is not checked it can affect the academic performance of these students. Academic performance is impaired by test anxiety as shown in research (Gaundry and Fitzegerald, 1971). Studies with medical students have shown high levels of reported anxiety at the time of examinations (Arndt, Guly, & McManus, 1986), as well as a significant negative correlation between test anxiety and performance. Self-efficacy is about students believing in themselves when they encounter a challenging situation like sitting for a test. Self-efficacy can differ between female and male students during the test. If this is not addressed according to the varying levels can affect academic performance. Self-efficacy which is a pre-examination factor is hypothesized to influence the cognitions of the individual during the examination hence affect performance of the person. The cognitive factors in the pre-examination stage that are influenced by the antecedent cognitive and emotional factors, include self-efficacy expectations (Bandura, 1977), or the individual’s belief in his or her ability to perform the particular task. Self-efficacy and test anxiety can affect students’ performance during tests. This study sought to examine the relationship among self-efficacy, test anxiety and mathematics performance of secondary school students.
1.3 Purpose of the study

The purpose of this study was to examine how test anxiety and self-efficacy correlate to academic performance of students in Mathematics. It also sought to investigate the interrelation among test anxiety, self-efficacy and academic achievement. Sex differences were also sought in these relationships. The study examined how different school types are affected by test anxiety and self efficacy levels.

1.4 Objectives of the study

1. To ascertain the relationship between test anxiety and mathematics performance among form two students.

2. To ascertain the relationship between self efficacy and mathematics performance among form two students.

3. To ascertain the influence of sex differences on levels of self efficacy, test anxiety and performance in mathematics.

4. To ascertain sex differences in self efficacy among form two students.

5. To find out the influence of school type on the relationship among self efficacy, test anxiety and students performance in mathematics.
1.5 Research Questions

1. Does test anxiety affect students’ performance in Mathematics?

2. Is there a sex difference in the level of test anxiety experienced during mathematics test?

3. Is there a sex difference in self-efficacy among students?

4. Is there a relationship between self-efficacy and academic performance in Mathematics?

5. Does the school type influence the relationship between test anxiety and self-efficacy and students’ academic performance?

1.6 Hypotheses

H_{a1}. Test anxiety affects students’ performance in mathematics.

H_{a2}. Girls experience higher levels of test anxiety during mathematics test than boys.

H_{a3}. Boys have higher self efficacy than girls in mathematics tasks.

H_{a4}. Students with lower personal efficacy perform better in mathematics.

H_{a5}. Students in coeducational schools have low efficacy in mathematics tasks.

All hypotheses were test at p<0.05 or the level of significance \( \alpha = 0.05 \)
1.7 Assumptions of the study

The study was based on the following assumptions.

1. Students experience some amount of anxiety during tests.

2. The students were honest in reporting their anxiety and self-efficacy.

3. Students’ performance was influenced by self efficacy and test anxiety only.

4. The students had accurate perceptions of their self-efficacy and Test anxiety levels.

1.8 Significance of the study

This study examined changes in the level of anxiety, efficacy and their effects on secondary school students as they approach examination time. The results of this study may prove useful to teachers, educators, school counselors to deal with anxious students. Students can be taught stress management to ease tension as they approach tests. Policy makers may be able to use findings in enhancing teacher training practices that will emphasize student centered teaching of mathematics to raise the learners self-efficacy.

1.9 Scope and Limitations of the Study

The study sample involved form two students from randomly selected schools in Kanduyi Division, Bungoma District in Western Kenya region. Due to practical constraints such as limited time only three schools were randomly selected to participate in the study. The selected schools included boys’, girls’ and co-educational. The study sought to investigate test anxiety, self efficacy and their influence on academic achievement however, it did not consider other attributes to performance like attitude, aptitude and intelligence.
Mathematics was chosen because it is the worst performed subject by most high school students, despite it being compulsory in school.

1.9.1 Theoretical and conceptual framework
Anxiety has been explained by different theories which include: The psychoanalytical theory, learning theory, and cognitive behaviour theory.

**Psychoanalytic theory**

Psychoanalytical theory regards the source of generalized anxiety as an unconscious-conflict between the ego and id impulses, the ego is anxious because it is threatened with over-stimulation that it cannot control.

The impulses, usually sexual or aggressive in nature are struggling for expression but the ego cannot allow this because it unconsciously fears that punishment will follow. Sarason’s (1984) conception of anxiety is influenced by psychoanalytic theory which holds that the development of anxiety takes place in the family setting from the earliest years of life. Hence, a child’s behaviour is constantly being evaluated by his parents. Since the child is dependant on parents, he cannot be hostile to parents upon reprimand. Instead the child develops a sense of guilt and anxiety arousal.

The test anxious child often pays more attention to his own anxiety responses in test situations than the task. School situations arouse test anxiety primarily because of the stimulus similarities between the parents and the teachers. Both are adult authority figures with powers to perform evaluative functions and to dispense rewards and punishments. The emphasis placed on good performance in tests by schools or parents
generate high levels of test anxiety which hinders good performance. Psychoanalytic theory was used in the study to explain the relationship between test anxiety and performance in mathematics. It examines impact of anxiety during evaluation.

**Learning theory**

Learning theorists (for example Wolpe, 1958) attempt to account for generalized anxiety by rejecting a concept of ‘free floating anxiety’.

Instead, they would look with greater persistence for external causes. For example, a student anxious most of her waking hours might well be fearful of a test given that day. If the individual spends a good deal of time with other students doing the test, it may be useful to regard anxiety as tied to these circumstances rather than to any internal factors. Upon completion of the test, the tension levels are minimized and focus may be on other things within the environment. Learning theory is useful in examining test as an external trigger of anxiety and the individual levels of anxiety variation.

**Cognitive-behaviour theory**

A cognitive behaviour model of generalized anxiety focuses on control and helplessness. Mandler (1966) suggested that the feeling of not being in control is a central characteristic of all views of anxiety. According to psychoanalytic theory, the ego is anxious because it is threatened with over-stimulation that it cannot control.

A study by Neale and Katahn (1968) indicated that intellectual performance is superior when the students believe that they have control over the order in which they take a series
of tests. For instance, if students are given an examination timetable, they may experience less anxiety or may be in control due to test preparedness.

**Social cognitive theory**

Bandura (1977) postulated that human behaviour is as a result of interplay of factors both inside and outside the individual. According to Bandura (1977), ‘person factors’ such as cognition, biological variables and other internal events are related to behaviour which affects the external environment. Similarly, the environment can influence the person’s feelings and cognition. Success on first attempt on a task may change certain internal events, such as feelings about the circumstances involved with the success. Good performance in Mathematics after studying intensively is likely to motivate a student to develop a positive feeling towards the subject. Social cognitive theory, therefore, emphasizes the importance of experience in changing self-efficacy percepts. According to Bandura et al. (1999), the single most efficient method for boosting self-efficacy is performance accomplishment. Successful actual performance may lower anxiety. Social cognitive theory explains how self efficacy fluctuates in different situations and its relationship with mathematics performance. The theory examines how self efficacy and test anxiety interact in mathematics performance. A conceptual model in fig .1 illustrates the interrelationship of self efficacy, test anxiety and academic performance.
Figure 1: The interaction of academic performance with Test anxiety and Self efficacy. Arrows indicate direction of influence.
1.9.2 Operational definitions of terms

**Academic performance**: Mark or score obtained in the Mathematics.

**Anxiety**: An unpleasant emotional reaction that results from the perception or appraisal of a particular situation as threatening.

**Co-education school**: (Coed): Educational institutions where both boys and girls take their lessons in the same classroom.

**Sex**: Biological disposition of an individual being male or female.

**Self-efficacy**: the confidence individuals have in their abilities that they can successfully perform particular tasks.

**Test anxiety**: Distressing and unpleasant dispositional experience feelings of apprehension and worry cognitions, in a test environment of persons under scrutiny.

**Test**: Tasks given to students according to prescribed objectives. Students’ responses to tasks are scored by a teacher as a measure of an attribute.
CHAPTER TWO

LITERATURE REVIEW

This chapter discusses literature related to test anxiety, self efficacy, and academic performance. Studies related to sex differences influence, on anxiety and self efficacy level.

2.1 Description of self efficacy

Self efficacy, also called perceived ability, refers to the confidence people have in their abilities for success in a given task (Bandura, 1997b). 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 likely to attribute their success to external factors (Bandura, 1986; 1997b). If students master a challenging task with limited assistance, their levels of self-efficacy will rise (Bandura, 1986).

Self-efficacy is influenced by past success or failure. How we explain these experiences probably, influences self-efficacy (Schunk, 1995). A person with low self-efficacy in some area, for example, academics will probably attribute failure in the area to lack of ability which will promote a sense of low self-efficacy. The opposite pattern may occur for those with high self-efficacy in that same area (Bandura, 1992). Self efficacy is influenced by four main factors: enactive mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states (Bandura, 1986; 1997b).
The most influential of these factors is enactive mastery experience (performance 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 level of capability (Bandura, 1986; 1997b). In this case successes or failures are personal judgments.

In vicarious experience, individuals imitate or compare themselves to peers whom they perceive as similar in ability and intelligence to themselves. Watching peers succeed raises observer’s self-efficacy and seeing them fail, lowers it. Exposure to multiple successful role models helps to convince individuals who may doubt their capabilities that they posses the skills like the observed models hence increase their self efficacy (Bandura, 1986; 1997a).

Verbal persuasion is 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’s self-efficacy in observers (Bandura, 1986; 1997b).

Physiological state implies that failure or some degree of performance impairment can result if a person fearing is in a hyperactive state (Bandura, 1986; 1997b). A physiologically hyperactive state includes symptoms experienced during ‘fight and flight’ responses of the autonomic nervous systems, such as increases in heart rate, breathing rate, and sweating.
Emotional state refers to the mood one is in when performing, such as feeling anxious. Depending on the mood, emotional state can either positively or negatively affect interpretation of an event’s outcome (Bandura, 1986; 1997).

Even when one is doing well in a given task, experience of a small amount of anxiety raises doubts. If you become aware of this unpleasant feeling, you are likely to doubt your abilities than if you are relaxed or comfortable (Williams, 1995). In addition to the four factors that influence general self-efficacy, aptitude, attitudes and attributions are found to predict mathematics and science self-efficacy (Smist & Owen, 1994).

Efficacy beliefs vary between individuals and different tasks (Bandura, 1997b). In many activities self-efficacy beliefs affect how people approach new challenges and will contribute to performance since these beliefs influence the thought processes motivation and behaviour (Bandura, 1997b). Self-efficacy is a dynamic disposition that can change over time as a result of periodic reassessments of how adequate one’s performance has been (Bandura, 1986).

Self-efficacy is referred to as perceived ability in a given situation. On the other hand anxiety refers to an unpleasant emotional reaction that results from the perception or appraisal of a particular situation as threatening (Spielberger, 1980). An inverse relationship between anxiety and self-efficacy is illustrated in Figure 2.
The perception of inability to cope with the situation may be complicated further by the perceived inability to cope with the anxiety itself – a fear-of-fear response that can lead to panic (Barlow, 1991). Self-efficacy perception that one can perform the tasks required by a situation or cope with a situation is likely to reduce anxiety levels. Hence, according to social cognitive theory, perceived inefficacy plays a central role in anxiety and depression (Bandura, 1997b).

Sarason (1984) observed that cognitive interference is probably due to thoughts of fear of failure and social comparison rather than thoughts that are irrelevant to the situation. This conclusion made Sarason to suggest the construction of a multi-factor instrument which may make it possible to define anxiety more sharply and improve the understanding of how it relates to performance. His premise stated that test anxiety has two components: worry and test irrelevant thinking. Worry among test anxious students stems from

Figure 2: The Relationship between Self-Efficacy and Test Anxiety

![Diagram showing the relationship between self-efficacy and test anxiety](image-url)
anticipated failure due to negative self-judgments about ability (Sarason, 1986). A great deal of work in the test anxiety area has sought to test predictions derived from Carver and Scheiers’ (1986) self-regulation model. This model posits that worry arises from an exercise focus on the self-expectancies. They theorized further that pessimistic students are likely to withdraw or ‘disengage’ from a task than optimistic students. This pessimism is reflected in psychological distress, off-task thinking and poor academic performance.

However, Bandura (1986) emphasized perceived inefficacy in coping with potentially aversive events rather than on intra-psychic conflict or the threat of unconscious impulses. He suggested that people benefit more from changing their conscious cognitive functioning than uncovering an unconscious. According to social cognitive theory, people have self-conceptualizations and self-evasions but they do not have selves or generalized self-concepts. A global self-conception does not do justice to the complexity of self-efficacy percepts, which vary across different levels of the same activity, and different circumstances (Bandura, 1986, p.410). Hence, experiences change self-efficacy percepts.

Therefore, self-efficacy and test anxiety are units of personality that interact as parts of a dynamic system rather than as isolated static components. Cognitions and affects interact with one another in an organized fashion; that is there is coherence to personality functioning (Cervone & Shoda, 1999). It is this organization that constitutes the basic stable structure of personality and it is unique to each individual. At the same time it is the dynamic interplay among these cognitions and affects in relation to internal stimuli and external situations that provides for variability in individual performances. Cognitive processes are important in motivation, emotion and action. There is an interactive;
reciprocal relationship between persons and situations, as well as among thought feelings and behaviour. Just as people influence situations, situations too influence people overt behaviour, feelings and thoughts. We can therefore, hypothesize that inefficacy leads to test anxiety that debilitates good performance. Self-efficacy and test anxiety fluctuate overtime and contribute to performance changes.

2.2 Relationship among Self-efficacy, Test Anxiety and sex

Starting in seventh grade, girls tend to underestimate their abilities in mathematics and science (Sadker & Sadker, 1995). Several studies (Debacker & Nelson, 1999; 2000; Miller, et al., 1996; Pintrich & de Groot, 1990; Smist, Archambault & Owen, 1997; Tippins, 1991) have documented that female students have lower self-efficacy in mathematics and science compared to male students. Girls’ capabilities are undermined by sex-role stereotypes in cultures intimating that females are not able as males, especially in such disciplines as mathematics and sciences (Bandura, 1997a). Attitude rooted in the cultural milieu and reinforced by society are probably the determining factor in whether girls succeed in mathematics or not. Eshiwani (1974) suggests that the teaching methods employed to teach boys and girls make a difference in achievement. He argues that most mathematics teachers hold a belief that girls are incapable of doing well in mathematics.

Researches by Eshiwani (1974) and Sheikh (1977) show that generally females tend to have negative attitudes towards mathematics and this tends to affect their performance. These findings indicated that lack of self-confidence for laboratory work and in
Mathematics affected their performance in science particularly the physical science. Though research findings indicate that mathematics anxiety influences performance, it does not point out clearly whether self-efficacy and test anxiety are the main forces in operation. This study attempted to move towards this direction.

Both boys and girls show little differences in performance on spatial tasks during childhood. At about 13 to 14 years old, boys begin to perform at a higher level than girls and they tend to increase this advantage throughout their adolescence period (Maccoby & Jacklin, 1974).

Perhaps differences in gender performance in mathematics could be attributed to variation in learning opportunities. A study by (Sharma and Meighan, 1980) compared results of a representative sample of candidates for the Cambridge local ‘O’-level mathematics examination; found that whereas exam entrance for subsidiary subjects was highly predictive of mathematics examination results the effect of sex was negligible. The subsidiary subjects provide an opportunity for the students to practice Mathematical skills.

Dale (1974) reported that mathematics was one subject in which co-educational schools performed better than their peers in single-sex schools. Becker (1981) stressed the fact that girls do not benefit from classes that are sexually imbalanced in favour of boys. Studies have shown that girls may profit from single-sex classes in co-educational classes set ups. This will improve teacher-initiated interaction with girls during the lesson. Sexual stereotyping could be one major explanation of inefficacy of girls in mathematics.
In the Kenyan context, girls in single sex secondary schools perform better in mathematics and sciences than both boys and girls in coeducational schools. These findings by Eshiwani (1984) led to suggestion that co-education be de-emphasized as a strategy of improving girls’ performance in science and mathematics. Therefore, we will hypothesize that girls in coeducational schools have lower self-efficacy than girls in single sex schools. According to Bandura (1986), self-efficacy expectations help to determine such important outcomes as people’s choice of activities effort expenditure, and persistence in the face of obstacle.

Hodge, G.M., McCormick, J. and Elliot, R. (1997) examined test anxiety in a large group of adolescents as they approached their end of school examinations. The results indicated that a significant proportion of students were experiencing high levels of distress during this period, particularly females, with factors such as low socio-economic status and perceived academic ability increasing the vulnerability of these negative emotions. Hodge et al. (1997) reported differences between schools in terms of anxiety and indicated that females attending independent or grammar schools, reported greater anxiety levels before examinations. Hence, sex differences and type of school influence distress experiences reported.

Similarly, Cole, D.A., Martin, J.M., Peeke, L.A., Seroczynski, A.D. and Fier, J. (1999) investigated perceived academic competence compared to the objective rating of teachers in relation to feelings of depression and symptoms of anxiety. Sex differences were again evident, with girls reporting higher levels of anxiety and depression whilst also underestimating their academic competence, whereas boys showed an opposite trend and over-estimated their competence.
Zeidner and Schleyer (1998) described how individuals feeling less academically confident may in turn lead to increased test or examination related anxiety and result in a poorer performance. Bandura et al. (1999) investigated this concept a prospective study examining the perceived social and academic efficacy of a community sample of children in relation to depression, academic achievement and social problem behaviour. The results indicated that the belief in their own academic and social inefficiency significantly contributed to the depression within this group. This prospective study aims at examining changes that occur in efficacy and anxiety in secondary school students as they approach examination time and within the examination duration. For it can be a basis for interventions to be set up to minimize any undesirable effects of inefficacy and test anxiety.

“Self-efficacy is especially important in learning difficult subjects (such as mathematics, biology and other sciences) given that students enter courses with varying levels of fear and anxiety” (Baldwin, J.A, Ebert-May, D. and Burns, D.J., 1999, p399). They also stated that self-efficacy becomes more important over the duration of the course as science or mathematics concepts increases in complexity.

Since most of the mentioned studies were carried out in the western world, the current study will venture into influence of self-efficacy and test anxiety on performance in mathematics locally.

2.3 Influence of Test Anxiety and Self-Efficacy on Mathematics Performance

Test anxiety and self-efficacy have been reported in numerous studies to influence academic performance, especially in mathematics. Vizekvidovic (1991) found that
mathematics anxiety, perceived mathematics incompetence and mathematics self-efficacy contribute most to the total variance in mathematics grades of secondary school students. Pajares (1996) studied middle school gifted students and found that mathematics problem-solving was influenced by high self-efficacy in a model that controlled the effects of mathematics anxiety, cognitive ability and mathematics grade points average (GPA).

Anxiety is also linked to performance goal orientation. Brunch, M.A, Juster, H. and Kaflowitz, N.(1983) found that in predicting mathematics test performance, ability was the most powerful variable, whereas negative thoughts during the test accounted for only a minor proportion of variance. Research findings therefore point at the negative effects of test anxiety on performance. Academic grades or behaviour is partly related to intelligence of an individual. Studies by Gaudry and Fitzgerald (1971) in Australia, showed that test anxiety, as well as intelligence, and were related to high school marks. Their hypothesis was that high anxiety would facilitate the performance of the most able group and lower the performance of the remainder when compared with comparable low anxious groups. The research findings did not support this view although their data were generally suggestive of these predictive trends.

In their research conducted in India, Sharma and Rao (1983) studied test anxiety intelligence and performance interactions. They found that low test anxious girls scored consistently higher than their high test anxious counterparts on the same three courses they studied in their research (English, Mathematics and General Science). They concluded that the debilitating effects of high test anxiety on performance were nested in the upper range of intelligence achieved less and at comparable level regardless of their
anxiety. Their findings seem less consistent with the ones reported by Gaundry and Fitzgerald (1971) where test anxiety contributed to the prediction of academic achievement above and beyond the influence of intelligence.

There is a degree of stability in state test anxiety score if subjects are tested repeatedly in naturalistic situations. Usula and Hertzog (1991) observed that as the term progresses, the students reported decline in test anxiety in each test. Irrelevant thoughts decreased from the study period to the test (F1;133)= 94.81, P< .001). These results suggest that subjects were more task focused during the actual test, relative to the study period. This is the case depending on the content being tested and student attitude together with proper mastery of content, which enhances self efficacy among students.

In summary self efficacy and test anxiety are units of a dynamic system rather than isolated static components.

Cognitive process are important in motivation, emotion and action. There is an interactive reciprocal relationship between persons and situations, as well as among thought feelings and behaviour. Just as people influence situations too influence people over behaviour feelings and thoughts. We can therefore hypothesize that how self efficacy leads to increased test anxiety that adversely affects good performance in mathematics.
CHAPTER THREE

METHODOLOGY

This chapter provides information on methodology used in the study, research design, population of study sample, and sampling techniques. It also outlines instrumentation as well as data collection procedure. Explanation of logistical and ethical consideration concludes the chapter.

3.1 Research Design

A correlation research design was used to investigate the relationship among test anxiety, self efficacy and academic performance in mathematics.

Fraenkel and Wallen (1993) described a correlation design as a research design that allows the researcher to find out whether two or more variables associate and to establish the relationship between the variables. The researcher does not manipulate any independent variables rather one simply measures two or more variables and then determines if a correlation relationship exists between them.

3.2 Variables

The variables of this study were test anxiety and self efficacy as the independent variables, while mathematics performance was the dependent variable.

3.3 Study locale

This study was carried out in Kanduyi Division of Bungoma District in western province.

The Government of Kenya population census and housing (2009) report, indicate
secondary school enrolment in Kanduyi was 5,862 students in 25 schools. Only 14 schools had boarding facilities which was a requirement for this study. The enrolment is high to provide study sample.

3.4 Target population

The target population for this study consisted of Form two students from three secondary schools in Kanduyi division of Bungoma District. The form two students happen to be in a class in which attitudes are formed towards teachers and subjects taught. They also make choices of careers and activities of interest for accomplishment purpose as a way of boosting their self esteem. Self esteem problems among form two students may affect performance. The students differed in terms of sex and attended different school formations namely; coeducational, single girls and single boys. All participants were aged between 14 and 17 years; this was meant to curb any influences of age on the variables of interest. Furthermore, all participants were boarding in their schools to ensure that at least adequate prep time is available for them to study in the evenings and possibly in the morning. This excluded day scholars who spend a lot of time walking and sorting out non school related activities. There were 14 schools in the geographical zone of study with boarding facilities.
3.5 Sampling technique and sample size

3.5.1 Sampling Technique

The sampling technique used was stratified random sampling. The goal of this method was to achieve desired representation from various sub-groups in the population (Mugenda & Mugenda, 1999). The criterion used for stratification was sex and school formation. There were two sex strata namely female and male with a three schools formation strata consisting of 4 coeducational schools, 5 girls schools and 5 boys schools. Three schools were sampled out of fourteen.

3.5.2 Sample size

The sample consisted of 40 students from each school formation. There were 60 males and 60 females, selected randomly for each stratum. After stratification admission numbers for each of the form two students was written on equal sized cards. The cards were put in strata containers shuffled and were picked in blind fold selection using lottery method. The total sample had 120 subjects but 5 students declined participation due sickness. Hence 115 participants were involved in the study.

3.6 Instrumentation

There were two main instruments used in collection of data namely Test Anxiety Inventory Questionnaire (TAIQ) and the Mathematics Self Efficacy Scale – MSES. oral interview was used to confirm answers given by participants in the main instruments.

3.6.1 Mathematics Self-efficacy (MSE) scale

In order to have an instrument to determine self-efficacy among Form two students in relation to Mathematics performance, the researcher had to setup a scale. The scale was
known as Mathematics Self-efficacy Scale (MSE) based on the Likert scale. An all-purpose measure of self-efficacy is too broad and is not a good method of determining self-efficacy in a discipline or a particular situation (Bandura, 1997a). Self efficacy is domain-specific so more accurate results are obtained when an instrument specific to the discipline is administered (Bandura, 1997a). Self-efficacy can be measured by asking subjects to report how confident they are about performing and succeeding in a particular situation (Pajares, 1996). Although task-specific judgments of self-efficacy are preferred in educational research grades or achievement test marks do not correspond well with such specific measurement. To compensate researcher’s word items to reflect the course rather than address specific course objectives, which subsequently results in a broader determination of self-efficacy (Pajares, 1996). In view of these factors, the instrument for the study was tailored to Mathematics in order to be domain specific.

The instrument for this study was self-reported confidential survey that measures student self-efficacy and demographics. Students responded to 15 self-efficacy items on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) and responded to six demographic questions using multiple choice format. High score indicated high self-efficacy. The survey construction was based on existing research instruments that measure self-efficacy in science, mathematics and college students (Baldwin, et al., 1999; Ellett, et al., 1997; Green & Miller, 1996; Miller et al., 1996; Pintrich & de Groot, 1990; Smist, 1993). Statements were phrased both positively and negatively to increase reliability and reduce ambiguity of answers.
3.6.2 Test Anxiety Inventory Questionnaire (TAIQ)

Test Anxiety Inventory (Spielberger, 1977) measures anxiety in test taking situations with reliability coefficients (x) range from 0.93 to 0.96 and its content validity is strong (Sarason, 1978). The Test Anxiety Inventory Questionnaire (TAIQ) was developed and used by Hodapp (1996) in Germany where it was used for study of the relationship between examination stage anxiety and performance had shown mixed findings, with some support for the influence of anxiety particularly if anxiety is measured after the test (Seipp, 1991). Hodapp’s (1996) TAIQ was designed to measure trait anxiety. However, by modifying the instructions given to the subjects from “Please indicate how you generally feel during examination” to “please indicate how you felt during the Mathematics test” (Hodapp & Henneberger, 1983; Hodapp, et al., 1995) it will measure state (test) anxiety.

Although, TAIQ consisted of four subscales (emotionality, worry, interference and lack of confidence) only the total score was used for the purpose of this investigation. In total, TAIQ consists of 20 items. The sums of scores were derived from various scores from responses to questionnaire items. For example, when measuring test anxiety the item “Did you fidget when waiting for this test?”

- Extremely 1 score
- Very much 2 scores
- A little 3 scores
- Not at all 4 scores
The lower the sum of scores on items the higher the test anxiety.

Academic performance was determined from students’ continuous assessment test and end of term examination scores in Mathematics.

3.7 Pilot study
Pilot study was done using 20 respondents from one randomly sampled school within the area of study. The instruments were administered to the respondents, the information collected was useful in addressing logistical challenges like establishing test schedules and material sourcing for the study. Piloting was also done to ascertain, reliability, and validity of the instrument items.

3.7.1 Validity
This is the degree of accuracy that collected data yields using a given instrument. In this study validation of the instruments was through piloting and peer reading by fellow graduate psychology students. Those items that were wanting; got improvement to make them serve the purpose. Random sampling of participants helped in increasing internal and external validity of the instruments. Similarly oral interview was conducted to ascertain validity of responses written by participants.

3.7.2 Reliability
Reliability is the degree of consistency of a measuring instrument to yield consistent results after repeated trials Mugenda and Mugenda (1999). During data collection clear instructions were given to participants to ensure they understood the procedure involved. This helped to reduce random error thereby improving reliability of collected data. The pilot study increased reliability of the instruments by providing mechanism for scrutiny.
and resolution of anticipated challenges. Reliability coefficient of the research instruments TAIQ and MSE were determined using internal consistency technique. After administering each instrument to respondents, items were divided into two groups one with odd-numbered items and another even numbered items. Each subject’s total score for each group was computed and correlated with scores obtained from other items in the instrument.

Kunder-Richardson (KR$_{20}$) formula was used to get reliability coefficient of each instrument.

$$KR_{20} = \frac{(K)(S^2 - \sum s^2)}{(S^2)(K - 1)}$$

Where:

$KR_{20}$ = Reliability coefficient of internal consistency

$K$ = Number of items used to measure the concept.

$S^2$ = Variance of all scores

$s^2$ = Variance of individual items

The reliability coefficient of TAIQ obtained was 0.891 and 0.591 while MSE Scale had coefficient of 0.845 and 0.468. This coefficients indicate homogeneity of data obtained because they correlate greatly among themselves.
3.8 Data collection techniques

Before test period, the mathematics teacher and head of the department verbally informed the students about the survey. Mathematics teachers checked with participants, to ensure all had necessary materials like geometrical sets and mathematical tables for the test.

Then MSE scale was administered to participants, three days before they sat for the mathematics test. Participants sat for a one and half hour test on topics covered during form two class mathematics lessons. Topics tested were trigonometry, equations of straight lines, Pythagoras theorem, indices and logarithms. Test Anxiety Questionnaire, TAIQ (Appendix B) was administered to students within the first five minutes upon completion of a mathematics test. All participants were expected to take only ten minutes to complete the instruments on either occasion.

c) Oral interviews were conducted on five randomly sampled participants for comparison of written and verbal answers soon after filling the questionnaires.

Due to the need for a survey identifier, later in the study to match student marks to student responses, signed consent forms were collected from randomly sampled students in the classrooms.
3.9 Logistical and Ethical considerations

A research permit was obtained from the ministry of education and permission sought from Bungoma District authorities before commencement of the study. Principals and heads of mathematics department in each school, along with affected classes and class teachers were involved. This ensured harmony between test schedules and research study process.

To ensure confidentiality and reduce research bias all questionnaires were coded then a separate list was created linking survey numbers to their admission numbers. The list was kept separate from survey data. No identifying information was given on the questionnaires. Permission to view the students’ scores was sought during the school holidays after report forms were dispatched to parents. The mathematics teachers together with the school principals witnessed as students signed consent forms (see appendix c). Then marks were linked to the survey responses to facilitate statistical analysis.

From the outlined methodology this study focused on interrelationships of self efficacy, test anxiety and individuals in performance in an evaluation situation.
CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

This chapter discusses methods of data analysis used in the study, it also presents results of the research in tables, figures and discusses them in line with the set hypotheses. Both correlation analysis and one way analysis of variance were used to test the hypotheses.

4.1 Methods of Data analysis

The collected data was coded, tabulated, scored and keyed into the computer. Analysis was done using Statistical Package for the Social Sciences (SPSS). Descriptive statistics which includes computing means, frequencies and standard deviation Inferential statistics used were correlation analysis and one Way analysis of variance, of data all hypotheses were tested at level of significance alpha=0.05.

4.2 General characteristics of the study sample

A total of 115 students were sampled in the study consisting of 39 from boys only school, 41 from girls only school and 35 from mixed (co-educational) school (Table.1). There were 16 girls and 19 boys from the co-educational school giving a total of 57 (49.6%) females and 58 (50.4%) males which represent a fairly gender balanced sample.

Table 1: Number of Students per sampled school

<table>
<thead>
<tr>
<th>School Type</th>
<th>Frequency</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Total</td>
</tr>
<tr>
<td>Boys Only</td>
<td>-</td>
<td>39 (33.9%)</td>
<td>39 (33.9%)</td>
</tr>
<tr>
<td>Girls Only</td>
<td>41 (35.7%)</td>
<td>-</td>
<td>41 (35.7%)</td>
</tr>
<tr>
<td>Co-educational (mixed)</td>
<td>16 (13.9%)</td>
<td>19 (16.5%)</td>
<td>35 (30.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>57 (49.6%)</td>
<td>58 (50.4%)</td>
<td>115 (100%)</td>
</tr>
</tbody>
</table>
The respondents were aged between 13 and 19 years old with majority (65.3%) between 16 and 17 years old (Table.2). Almost half the students were 16 years old. There were only 6 representing 5.2% students below 15 years old while 5 representing 4.4% over 17 years old.

Table 2: The general ages of the respondents

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>14</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>15</td>
<td>29</td>
<td>25.2</td>
</tr>
<tr>
<td>16</td>
<td>57</td>
<td>49.6</td>
</tr>
<tr>
<td>17</td>
<td>18</td>
<td>15.7</td>
</tr>
<tr>
<td>18</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Total</td>
<td>115</td>
<td>100</td>
</tr>
</tbody>
</table>

Most students (74.8%) had been in their respective schools for three terms by the time the survey was undertaken (Table.3). Students who had been in their respective schools for more than 3 terms were 27 representing 23.5% while those who had been in their respective schools for two terms were 2 representing 1.7%. There was only one case of a student repeating among the respondents (Table.4).

Table 3: Number of terms spent in school by respondents

<table>
<thead>
<tr>
<th>Number of terms in school</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>3</td>
<td>86</td>
<td>74.8</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>8.7</td>
</tr>
<tr>
<td>5</td>
<td>14</td>
<td>12.2</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>Totals</td>
<td>115</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 4: Class Repetition status

<table>
<thead>
<tr>
<th>Repetition status</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non repeater</td>
<td>114</td>
<td>99.1</td>
</tr>
<tr>
<td>Repeaters</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>115</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Parents of most respondents were peasant (47) and teachers (31) accounting for 40.9% and 27% respectively (Table 5). Others parents were: businessmen (7%), Doctors (7.8%), Security Officers (2.6%), Managers (2.6%), Nurses (1.7%), Engineers (3.5%), and Accountants (2.6%).

Table 5: Parental occupation

<table>
<thead>
<tr>
<th>Parent occupation</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>31</td>
<td>27.0</td>
</tr>
<tr>
<td>Peasant</td>
<td>47</td>
<td>40.9</td>
</tr>
<tr>
<td>Businessmen</td>
<td>8</td>
<td>7.0</td>
</tr>
<tr>
<td>Doctors</td>
<td>9</td>
<td>7.8</td>
</tr>
<tr>
<td>Security officers</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>Managers</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>Nurses</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>Engineers</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>Accountants</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>115</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

4.3 Self-efficacy in mathematics among the respondents

Most of the respondents exhibited high self efficacy in mathematics (Table 6). On a scale of 1 (lowest self efficacy) to 5 (highest self efficacy), the average score ranged between 3.83 (0.993SD) and 4.77 (0.535SD) for 12 items in the questionnaire indicating a very high level of self efficacy. While 59.1% of the respondents strongly agreed, 35.7% agreed that they were confident they could learn mathematics. Similarly, 51.3% strongly agreed and 38.3% agreed that they could perform as well as other students in mathematics. Most students also felt that they could understand topics taught in
mathematics with 48.7% strongly agreeing and 37.4% agreeing. Most students were optimistic that with enough effort, they could succeed in mathematics (80.0% strongly agreed and 18.3% agreed). Majority also felt that they posses good mathematics study skills and could perform well in mathematics tests. Participants felt confident that they could do well in topics taught in mathematics, related exercises, mathematics homework and could explain the same to others. Most were confident that they could do well in mathematics (61.7% strongly agree while 32.2% agree) and most expect to obtain a minimum of grade C in mathematics (60.9% strongly agree and 32.2% agree).

Most subjects strongly disagreed (73.0%) or disagreed (21.7%) that they could not succeed in mathematics (Table 7). When asked to compare their abilities with others, participants who agreed to be ignorant were 15.7%, while 33.9% disagreed and 34.8% strongly disagreed. A small number (10.4%) were non committal. Most participants strongly disagreed (68.7%) and disagreed (26.1%) that they would not expect good grade in mathematics. Very few students (0.9%) expected to get a poor grade in mathematics.
**Table 6: Responses on positive questions on self efficacy in mathematics among students**

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Score</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Can learn mathematics</td>
<td>4.50 (0.720)</td>
<td>59.1</td>
</tr>
<tr>
<td>Can do well in mathematics</td>
<td>4.53 (0.692)</td>
<td>61.7</td>
</tr>
<tr>
<td>Can perform as well as others in mathematics</td>
<td>4.37 (0.766)</td>
<td>51.3</td>
</tr>
<tr>
<td>Can understand mathematics</td>
<td>4.29 (0.866)</td>
<td>48.7</td>
</tr>
<tr>
<td>Can succeed in mathematics with effort</td>
<td>4.77 (0.535)</td>
<td>80.0</td>
</tr>
<tr>
<td>Posses good Mathematics study skills</td>
<td>3.83 (0.993)</td>
<td>27.0</td>
</tr>
<tr>
<td>Can perform well in Mathematics test</td>
<td>4.29 (0.685)</td>
<td>39.1</td>
</tr>
<tr>
<td>Can do well in topics taught in mathematics</td>
<td>4.33 (0.734)</td>
<td>45.2</td>
</tr>
<tr>
<td>Can do well in Mathematics exercises</td>
<td>4.42 (0.675)</td>
<td>49.6</td>
</tr>
<tr>
<td>Can do well in Mathematics homework</td>
<td>4.50 (0.667)</td>
<td>57.4</td>
</tr>
<tr>
<td>Expect a minimum of grade C</td>
<td>4.49 (0.799)</td>
<td>60.9</td>
</tr>
<tr>
<td>Can explain to others</td>
<td>4.43 (0.677)</td>
<td>51.3</td>
</tr>
</tbody>
</table>

N=115  
Numbers in brackets represent standard deviations.

**Table 7: Responses on negative questions on self efficacy in mathematics among students**

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Score</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Can not succeed in Mathematics</td>
<td>1.37 (0.755)</td>
<td>0.9</td>
</tr>
<tr>
<td>Ignorant about mathematics compared to others</td>
<td>2.23 (1.229)</td>
<td>5.2</td>
</tr>
<tr>
<td>Not good in mathematics compared to others</td>
<td>1.90 (1.000)</td>
<td>1.7</td>
</tr>
<tr>
<td>Do not expect a good grade in Mathematics</td>
<td>1.40 (0.711)</td>
<td>0.9</td>
</tr>
</tbody>
</table>

N=115  
Numbers in brackets represent standard deviations.
4.4 Anxiety of students during mathematics test

Triggers of anxiety during mathematics among subjects are shown in Table 8. According to findings, 4.8% of respondents (mean 2.7, Fig. 3) were extremely worried about failing the test, 41.7% were a little worried while 24.3% of the subjects did not worry at all. Most respondents were extremely worried (44.3%) and (46.1%) were very much worried (Mean 1.7, Fig. 3) about their subject teacher’s opinion of their test performance respectively. Only (4.3%) of the subjects did not worry at all.

Table 8: Triggers of anxiety among students during mathematics test

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Frequency (%) N=115</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Extremely</td>
</tr>
<tr>
<td>Worry about failing in the test</td>
<td>14.8</td>
</tr>
<tr>
<td>Worry about peers opinion</td>
<td>20.9</td>
</tr>
<tr>
<td>Worry about others disapproval</td>
<td>13.9</td>
</tr>
<tr>
<td>Worry about parent’s opinion</td>
<td>40.9</td>
</tr>
<tr>
<td>Worry about subject teacher’s opinion</td>
<td>44.3</td>
</tr>
<tr>
<td>Upset on error commission</td>
<td>39.1</td>
</tr>
<tr>
<td>Expect the worst</td>
<td>0.9</td>
</tr>
<tr>
<td>Insensitive about peer opinion</td>
<td>14.8</td>
</tr>
<tr>
<td>Apprehensive about making errors</td>
<td>5.2</td>
</tr>
<tr>
<td>Confidence of good impression on others</td>
<td>23.5</td>
</tr>
</tbody>
</table>
There were signs of anxiety among participants during mathematics tests. Table 9 indicates that (0.9%) of the participants extremely panicked (Mean score of 3.5, Fig. 4) while (4.3%) panicked very much. During the test (37.4%) of the subjects panicked while (57.4%) reported no panic at all. Subjects reported to have trembled a little (32.2%) while (64.3%) did not experience this sign during the test (Mean 3.6, Fig. 4). Extreme cases of trembling were (2.6%) of the subjects.
Figure 4: Mean score on signs of anxiety among students during mathematics test
Horizontal bars indicate standard deviation (SD), N=115

Table 9: Responses on signs of anxiety among students during mathematics test

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Frequency (%) N=115</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Extremely</td>
</tr>
<tr>
<td>Panic</td>
<td>0.9</td>
</tr>
<tr>
<td>Muscle ache</td>
<td>1.7</td>
</tr>
<tr>
<td>Tremble</td>
<td>2.6</td>
</tr>
<tr>
<td>Tired (fatigue)</td>
<td>4.3</td>
</tr>
<tr>
<td>Difficult to relax</td>
<td>9.6</td>
</tr>
<tr>
<td>Fidget</td>
<td>5.2</td>
</tr>
<tr>
<td>Restlessness</td>
<td>5.2</td>
</tr>
<tr>
<td>Upset stomach</td>
<td>1.7</td>
</tr>
<tr>
<td>Cold clammy hands</td>
<td>1.7</td>
</tr>
<tr>
<td>Dry lump in the throat</td>
<td>2.6</td>
</tr>
</tbody>
</table>
4.5 Influence of sex on anxiety in mathematics test

Sex differences did not influence the anxiety of students during the test (Table 10).

Table 10: Scores of various aspects of anxiety by the sexes.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Mean (SD) Anxiety Score</th>
<th>F</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>Worry of failure</td>
<td>2.8 (0.9)</td>
<td>2.8 (1.1)</td>
<td>0.001</td>
</tr>
<tr>
<td>Worry of peer opinion</td>
<td>2.5 (1.1)</td>
<td>2.6 (1.2)</td>
<td>0.398</td>
</tr>
<tr>
<td>Feel upset</td>
<td>1.8 (0.8)</td>
<td>1.9 (0.9)</td>
<td>0.305</td>
</tr>
<tr>
<td>Expected the worst</td>
<td>3.6 (0.6)</td>
<td>3.6 (0.6)</td>
<td>0.043</td>
</tr>
<tr>
<td>Afraid of peer approval</td>
<td>2.8 (1.0)</td>
<td>2.7 (1.1)</td>
<td>0.005</td>
</tr>
<tr>
<td>Insensitive to peer opinion</td>
<td>2.7 (1.0)</td>
<td>2.8 (1.1)</td>
<td>0.213</td>
</tr>
<tr>
<td>Apprehensive of making mistakes</td>
<td>3.4 (0.9)</td>
<td>3.3 (0.8)</td>
<td>0.227</td>
</tr>
<tr>
<td>Worry about parents opinion</td>
<td>1.9 (0.7)</td>
<td>1.7 (0.8)</td>
<td>2.646</td>
</tr>
<tr>
<td>Worry about teachers opinion</td>
<td>1.7 (0.7)</td>
<td>1.7 (0.8)</td>
<td>0.162</td>
</tr>
<tr>
<td>Panicked</td>
<td>3.6 (0.6)</td>
<td>3.5 (0.6)</td>
<td>0.672</td>
</tr>
<tr>
<td>Had muscle aches</td>
<td>3.7 (0.6)</td>
<td>3.6 (0.7)</td>
<td>0.630</td>
</tr>
<tr>
<td>Trembled</td>
<td>3.6 (0.7)</td>
<td>3.6 (0.6)</td>
<td>0.120</td>
</tr>
<tr>
<td>Fatigued</td>
<td>3.7 (0.8)</td>
<td>3.7 (0.6)</td>
<td>0.093</td>
</tr>
<tr>
<td>Had difficulty in relaxing</td>
<td>3.1 (1.0)</td>
<td>3.2 (1.0)</td>
<td>0.134</td>
</tr>
<tr>
<td>Fidgeted</td>
<td>3.3 (0.9)</td>
<td>3.4 (0.8)</td>
<td>0.379</td>
</tr>
<tr>
<td>Was restless</td>
<td>3.2 (0.9)</td>
<td>3.4 (0.9)</td>
<td>0.501</td>
</tr>
<tr>
<td>Had stomach upset</td>
<td>3.6 (0.8)</td>
<td>3.7 (0.6)</td>
<td>1.291</td>
</tr>
<tr>
<td>Cold, clammy hands</td>
<td>3.6 (0.7)</td>
<td>3.6 (0.7)</td>
<td>0.035</td>
</tr>
<tr>
<td>Dry lump in throat</td>
<td>3.7 (0.7)</td>
<td>3.7 (0.7)</td>
<td>0.007</td>
</tr>
<tr>
<td>Felt confident</td>
<td>2.4 (0.9)</td>
<td>2.2 (1.0)</td>
<td>0.644</td>
</tr>
</tbody>
</table>

Numbers in brackets represent standard deviations $\alpha = 0.05$

The scores for anxiety on 20 items ranged between 1.7 to 3.7 for boys and girls. On a scale of 1 (highest anxiety) to 4 (lowest anxiety), the scores on signs of anxiety (panic, muscle aches, trembling, fatigue, difficulty in relaxing, fidgeting, restless, stomach upset,
cold/clammy hands and lump in throat) were generally above 3 indicating very low level of anxiety among both sexes. Both sexes were equally concerned about what their teachers or parents would think about them if they did not perform well. They also felt upset to equal extent when they made mistakes in the test. Sex differences were insignificant, one- way analysis of variance (ANOVA) indicate F-values were insignificant at 5percent level. Therefore, the hypothesis that girls experience more anxiety than boys during mathematics test is not acceptable. Instead we hypothesize , that girls do not experience more anxiety than boys during mathematics test.

4.6 Influence of sex on self efficacy in mathematics test

The efficacy level in the test did not vary between the sexes (Table 11). One way analysis of variance ( ANOVA ) indicate insignificant F-values at 5 percent level. For instance when competence in handling class exercises is considered both males and females mean 4.4,S.D 0.6 and mean 4.4, S.D0.7;F 0.111,p= 0.740 are insignificant at 5 percent level . We can observe that sex differences do not influence self efficacy among form two students when handling mathematics tasks. The hypothesis suggesting that, boys have high self efficacy than girls in mathematics tasks is not acceptable.
Table 11: Scores of various aspects of self efficacy by sex

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Mean Score (SD)</th>
<th>F</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>Have ability to learn</td>
<td>4.5 (0.6)</td>
<td>4.5 (0.8)</td>
<td>0.004</td>
</tr>
<tr>
<td>Confident to do well in math</td>
<td>4.5 (0.6)</td>
<td>4.5 (0.8)</td>
<td>0.004</td>
</tr>
<tr>
<td>Can do well than others</td>
<td>4.3 (0.8)</td>
<td>4.5 (0.8)</td>
<td>1.683</td>
</tr>
<tr>
<td>Uncertain of success</td>
<td>1.4 (0.8)</td>
<td>1.3 (0.7)</td>
<td>0.829</td>
</tr>
<tr>
<td>Can understand taught topics</td>
<td>4.3 (0.9)</td>
<td>4.3 (0.9)</td>
<td>0.006</td>
</tr>
<tr>
<td>Can succeed with effort</td>
<td>4.8 (0.4)</td>
<td>4.8 (0.6)</td>
<td>0.018</td>
</tr>
<tr>
<td>Feel unable</td>
<td>2.4 (1.3)</td>
<td>2.1 (1.2)</td>
<td>1.929</td>
</tr>
<tr>
<td>Have good study skills</td>
<td>3.6 (1.0)</td>
<td>4.0 (1.0)</td>
<td>3.670</td>
</tr>
<tr>
<td>Feel good than others in math</td>
<td>2.0 (1.0)</td>
<td>1.8 (1.0)</td>
<td>1.035</td>
</tr>
<tr>
<td>Confident of passing than others</td>
<td>4.2 (0.6)</td>
<td>4.3 (0.8)</td>
<td>0.833</td>
</tr>
<tr>
<td>Able to handle taught topics</td>
<td>4.3 (0.7)</td>
<td>4.3 (0.8)</td>
<td>0.045</td>
</tr>
<tr>
<td>Can handle class exercises</td>
<td>4.4 (0.7)</td>
<td>4.4 (0.6)</td>
<td>0.111</td>
</tr>
<tr>
<td>Can do well in home work</td>
<td>4.5 (0.7)</td>
<td>4.5 (0.7)</td>
<td>0.122</td>
</tr>
<tr>
<td>Can get C or better grade</td>
<td>4.6 (0.6)</td>
<td>4.4 (1.0)</td>
<td>2.147</td>
</tr>
<tr>
<td>Cannot get good grade</td>
<td>1.4 (0.7)</td>
<td>1.4 (0.7)</td>
<td>0.098</td>
</tr>
<tr>
<td>Can explain what is learnt to others</td>
<td>4.3 (0.7)</td>
<td>4.5 (0.7)</td>
<td>2.572</td>
</tr>
</tbody>
</table>

Numbers in brackets represent standard deviations

4.7 Interaction among school type, self efficacy and performance in mathematics test

When all the responses were considered there was a significant (p=0.002) positive correlation between efficacy and performance in the mathematics test (Table 12). However, with a coefficient of 0.267 the relationship is rather weak. There were differences in the relationship between efficacy and performance among the three school types. The relationship was positive for Boys only and coeducational schools while it was negative for the Girls only school. However, the relationships were generally low and insignificant (p>0.05). A correlation analysis indicate the coefficient of 0.091 for
coeducation school is rather weak. The hypothesis that students in coeducation schools have low efficacy in mathematics is not acceptable.

**Table 12: Relationship between school type, self-efficacy and performance in mathematics**

<table>
<thead>
<tr>
<th>School Type</th>
<th>N</th>
<th>Efficacy</th>
<th>Marks</th>
<th>Coefficient</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys Only</td>
<td>39</td>
<td>4.27</td>
<td>49.59</td>
<td>0.243</td>
<td>0.068</td>
</tr>
<tr>
<td>Girls Only</td>
<td>41</td>
<td>4.178</td>
<td>58.78</td>
<td>-0.145</td>
<td>0.183</td>
</tr>
<tr>
<td>Coed</td>
<td>35</td>
<td>3.75</td>
<td>33.31</td>
<td>0.091</td>
<td>0.302</td>
</tr>
<tr>
<td>Overall</td>
<td>115</td>
<td>4.08</td>
<td>47.91</td>
<td>0.267</td>
<td>0.002</td>
</tr>
</tbody>
</table>

**4.8 Interaction among school type, anxiety and performance in mathematics test**

For all the responses combined there was a significant (p = 0.001) positive correlation between anxiety and performance in the mathematics test (Table 13) although with a coefficient of 0.316 the relationship is rather weak. There were differences in the relationship between anxiety and performance among the three school types. Only the Boys only School had a significant (p = 0.037) relationship between anxiety and performance. However, all relationships were generally weak with coefficients ranging between 0.098 and 0.29.

**Table 13: Relationship between school type, test anxiety and performance in mathematics**

<table>
<thead>
<tr>
<th>School Type</th>
<th>N</th>
<th>Anxiety</th>
<th>Marks</th>
<th>Coefficient</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>39</td>
<td>3.69</td>
<td>49.59</td>
<td>0.29</td>
<td>0.037</td>
</tr>
<tr>
<td>Girls</td>
<td>41</td>
<td>3.64</td>
<td>58.78</td>
<td>0.189</td>
<td>0.118</td>
</tr>
<tr>
<td>Coed</td>
<td>35</td>
<td>3.197</td>
<td>33.31</td>
<td>0.098</td>
<td>0.287</td>
</tr>
<tr>
<td>Overall</td>
<td>115</td>
<td>3.52</td>
<td>47.91</td>
<td>0.316</td>
<td>0.001</td>
</tr>
</tbody>
</table>

**4.9 Relationship between anxiety and performance in mathematics test**

There is a highly significant relationship between test anxiety and subjects performance in mathematics test one-way analysis of variance (ANOVA), as shown in Table 14.
High anxiety affects students’ performance negatively. This finding does not support the hypothesis that test anxiety does not affect students’ performance in Mathematics. It can be hypothesized that high test anxiety lowers students’ performance in mathematics.

One-way analysis of variance indicates a positive highly significant relationship between self-efficacy and students’ performance in mathematics test as shown in Table 15 (F = 5.493, p < 0.005, mean = 59.50, SD ± 12.02). The results support the hypothesis that students with lower personal efficacy do not perform well in mathematics.
Table 14: Performance in mathematics test of respondents by levels of anxiety measured by various aspects

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Df</th>
<th>F</th>
<th>P</th>
<th>Mean (SD) Mark</th>
<th>Extremely</th>
<th>Very much</th>
<th>A little</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worry of failure</td>
<td>3,111</td>
<td>0.275</td>
<td>0.843</td>
<td>45.5 (25.16) 46.8 (24.91) 47.4 (20.75) 51.1 (23.57)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worry of peer opinion</td>
<td>3,111</td>
<td>3.212</td>
<td>0.026*</td>
<td>35.2 (23.54) 52.1 (21.19) 48.6 (23.50) 51.8 (21.00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feel upset</td>
<td>3,111</td>
<td>0.79</td>
<td>0.502</td>
<td>46.7 (23.78) 48.1 (21.78) 53.7 (22.70) 38.3 (22.94)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected the worst</td>
<td>3,111</td>
<td>1.689</td>
<td>0.173</td>
<td>4.0 40.2 (29.42) 46.1 (23.68) 49.7 (21.64)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Afraid of peer approval</td>
<td>3,111</td>
<td>0.817</td>
<td>0.487</td>
<td>51.0 (22.51) 43.0 (25.84) 51.2 (23.14) 47.7 (19.28)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insensitive to peer opinion</td>
<td>3,111</td>
<td>0.795</td>
<td>0.499</td>
<td>54.5 (23.33) 48.1 (21.93) 43.8 (21.32) 48.0 (24.37)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apprehensive of making mistakes</td>
<td>3,111</td>
<td>0.216</td>
<td>0.885</td>
<td>45.5 (28.42) 47.2 (30.72) 45.9 (22.68) 49.5 (21.21)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worry about parents opinion</td>
<td>3,111</td>
<td>1.507</td>
<td>0.217</td>
<td>51.4 (22.01) 43.1 (22.85) 54.9 (24.99) 49.8 (18.65)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worry about teachers opinion</td>
<td>3,111</td>
<td>1.930</td>
<td>0.129</td>
<td>51.2 (21.25) 44.0 (24.16) 61.7 (16.61) 38.8 (20.01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panicked</td>
<td>3,111</td>
<td>6.422</td>
<td>0.000**</td>
<td>17.0 29.2 (14.08) 40.0 (22.64) 55.0 (20.68)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had muscle aches</td>
<td>3,111</td>
<td>0.751</td>
<td>0.524</td>
<td>42.5 (36.06) 38.3 (27.51) 44.2 (24.18) 50.0 (21.91)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trembled</td>
<td>3,111</td>
<td>0.540</td>
<td>0.650</td>
<td>46.3 (26.63) 53.0 44.1 (23.76) 49.8 (22.28)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatigued</td>
<td>3,111</td>
<td>3.074</td>
<td>0.031*</td>
<td>24.4 (25.433) 09.0 48.6 (22.53) 49.5 (21.91)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had difficulty in relaxing</td>
<td>3,111</td>
<td>5.84</td>
<td>0.001**</td>
<td>39.9 (21.04) 29.1 (22.51) 49.2 (21.25) 54.0 (21.26)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fidgeted</td>
<td>3,111</td>
<td>4.45</td>
<td>0.005**</td>
<td>44.2 (26.16) 26.4 (19.45) 45.9 (19.33) 52.7 (22.88)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was restless</td>
<td>3,111</td>
<td>1.148</td>
<td>0.333</td>
<td>50.5 (31.43) 39.4 (23.00) 52.4 (20.22) 47.2 (23.01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had stomach upset</td>
<td>3,111</td>
<td>1.836</td>
<td>0.145</td>
<td>37.0 (28.284) 32.0 23.385 45.3 (26.91) 50.1 (21.47)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cold, clammy hands</td>
<td>3,111</td>
<td>2.659</td>
<td>0.052</td>
<td>10.5 (09.91) 40.0 (20.25) 44.8 (19.76) 50.3 (23.10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry lump in throat</td>
<td>3,111</td>
<td>3.768</td>
<td>0.013*</td>
<td>28.0 (21.70) 25.9 (25.78) 45.3 (20.42) 50.8 (21.90)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Felt confident</td>
<td>3,111</td>
<td>1.836</td>
<td>0.145</td>
<td>51.6 (24.48) 49.7 (23.39) 48.0 (19.90) 35.1 (20.76)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Numbers in brackets represent standard deviations.

**- Highly significant  \( \alpha = 0.05 \)

*- Significant
Table 15: Performance in mathematics test of respondents by levels of efficacy measured by various aspects

<table>
<thead>
<tr>
<th>Aspect</th>
<th>df</th>
<th>F</th>
<th>P</th>
<th>Mean (SD) Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>Ability to learn</td>
<td>4,110</td>
<td>4.012</td>
<td>0.004**</td>
<td>68</td>
</tr>
<tr>
<td>Excel in math</td>
<td>3,111</td>
<td>5.283</td>
<td>0.002**</td>
<td>-</td>
</tr>
<tr>
<td>Excel than others</td>
<td>3,111</td>
<td>2.23</td>
<td>0.089</td>
<td>-</td>
</tr>
<tr>
<td>Uncertain of success</td>
<td>4,110</td>
<td>1.405</td>
<td>0.237</td>
<td>50.4 (21.34)</td>
</tr>
<tr>
<td>Understand taught topics</td>
<td>4,110</td>
<td>3.343</td>
<td>0.013*</td>
<td>29.00</td>
</tr>
<tr>
<td>Succeed with effort</td>
<td>2,112</td>
<td>5.493</td>
<td>0.005**</td>
<td>-</td>
</tr>
<tr>
<td>Feel unable</td>
<td>4,110</td>
<td>1.178</td>
<td>0.325</td>
<td>50.5 (21.47)</td>
</tr>
<tr>
<td>Good study skills</td>
<td>4,110</td>
<td>1.524</td>
<td>0.0200</td>
<td>39.6 (29.00)</td>
</tr>
<tr>
<td>Good than others in math</td>
<td>4,110</td>
<td>0.269</td>
<td>0.897</td>
<td>49.5 (19.76)</td>
</tr>
<tr>
<td>Pass than others</td>
<td>3,111</td>
<td>2.141</td>
<td>0.099</td>
<td>-</td>
</tr>
<tr>
<td>Solve problems</td>
<td>3,111</td>
<td>1.098</td>
<td>0.353</td>
<td>-</td>
</tr>
<tr>
<td>Can do class tasks</td>
<td>3,111</td>
<td>0.657</td>
<td>0.580</td>
<td>-</td>
</tr>
<tr>
<td>Handle home work</td>
<td>3,111</td>
<td>2.89</td>
<td>0.039*</td>
<td>-</td>
</tr>
<tr>
<td>Can get C or better grade</td>
<td>4,110</td>
<td>1.050</td>
<td>0.385</td>
<td>42.4 (40.00)</td>
</tr>
<tr>
<td>Cannot get good grade</td>
<td>4,110</td>
<td>3.687</td>
<td>0.007**</td>
<td>52.5 (21.81)</td>
</tr>
<tr>
<td>Can explain to others</td>
<td>3,111</td>
<td>0.862</td>
<td>0.463</td>
<td>-</td>
</tr>
</tbody>
</table>

Numbers in brackets represent standard deviations. \( \alpha = 0.05 \).

** - Highly significant
* - significant

Results of the study indicate that self efficacy and test anxiety affected performance of mathematics of participants.
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Chapter five of this thesis provides a summary of study findings, in relation to research questions and objectives. It ends with conclusion recommendations and limitations. The goal of this study was to find out the influence of self efficacy and test anxiety on mathematics performance.

5.1 Anxiety among Students Taking Mathematics Test

The study findings established that students are affected by test anxiety during mathematics test as shown in table14. From the signs of anxiety findings, 0.9 % of the respondents extremely panicked while 4.3 % panicked very much during the test. It has been suggested by some writers that a small degree of worry appears to be beneficial in helping a person prepare for a particular situation, such as taking a test or being interviewed. Some components of worry appear to have a positive proactive function in that they enable an individual to anticipate and solve real or potential problems a head of time and thus avoid difficulties (Mathews, 1990). Some respondents (37.4%) panicked a little during mathematics test. According to Barlow (1991) and DeCatanzaro (1999), too much worrying can be detrimental because it impairs the ability to concentrate and to work efficiently. School counseling services need to closely monitor the stress levels exhibited by students when it is close to examination times.

5.2 Sex Influence on Test Anxiety among Students

The findings in table 10 from the study indicate no significant difference in test anxiety levels between males and females. In a performance related situation both males and
females showed that test anxiety has a minor effect on problem solving (Zinta, 2006). In test situations students are likely to be anxious regardless of sex differences.

5.3 **Self Efficacy among Students Taking Mathematics Course**

In table 6 the mean self efficacy rating among the subjects was above 4.0 on the 5-point rating. The findings indicate very high level of self efficacy across a broad range of competencies. The respondents had high self efficacy towards the mathematics course and were optimistic in performing well in the test. Students with high self efficacy are likely to engage in practices such as group discussion and solving mathematics problems that promote good performance.

Self efficacy expectations help to determine such important outcomes as people’s choice of activities, effort expenditure and persistence in the face of obstacle (Bandura, 1986).

5.4 **Sex Influence on Self Efficacy among Students**

The human differentiation on the basis of gender is a fundamental phenomenon that affects virtually every aspect of people’s daily lives. Sex differences operate in concert with motivational and self-regulatory mechanism and its conception and roles are the products of broad network of social influences operating independently in varieties of the societal subsystem (Mischel, 1970). According to the study findings table11, sex differences influence on self efficacy was negligible. The male’s mean 4.0SD 0.5 and female’s mean 4.0 SD 0.39 indicate no significant difference in self efficacy between sexes. Findings imply that teachers and parents should not have stereotypes in relation to student confidence and ability to handle mathematical task. All students regardless of gender can handle mathematics provided favourable learning atmosphere is available. The study findings support the hypothesis that predicted that, boys do not have higher
self efficacy than girls in Mathematics tasks. The discrimination and differentiation on the basis of sex which are causing inferiority complexes among the females in both rural as well as in urban settings and are resulting in disparities in achievement (Zinta, 2006).

In a study (Dona, Scholz, Schwarzer and Sud, 2002) have reported a superiority of males with regard to self efficacy as compared to females in various cultures. This sex difference can disappear when women judge their efficacy to perform the same activities in everyday situation in stereotypically feminine tasks than in context of male dominated occupation (Junge &Dretzke, (1995). Schools should give equal opportunities to all regardless of sex, to enable them excel or nurture talents..

5.5 School type Influence on Test Anxiety, Self-Efficacy and students’ Academic Performance

From table 12 the study established that there was a positive correlation between self efficacy and mathematics performance. Self efficacy across schools showed a positive trend. Subjects had high levels of self efficacy as indicated by the school type overall Mean 4.0 out of a 5-point scale. There was significant relation in self efficacy and performance between coeducational and single sex schools. The overall p<0.002 value indicates significant relation between school type and variables. Subjects in coeducation school had lower mean of self efficacy and performance as compared to single sex schools .Other underlying factors such as poor physical facilities, worry about peer opinion, differences in students’ support service like counseling, may explain influence of school on self efficacy and test anxiety among students.

As Bandura (1997) points out, learners who experience satisfying outcomes from their efforts develop positive believes about their own abilities. Some studies have not found
difference in high and low level of self efficacy groups in the measure of performance . (Bandalos, Yates & Thorndike, 1995; Vancouver, Thompson, Tischner & Putka, 2002). Subjects in male’s school significantly performed moderately in mathematics test (F =3.69, p<0.037), their anxiety levels are facilitating as compared to low performance of coeducational subjects. In table 13 the results indicate significant relation between performance and test anxiety (F = 3.52, p < 0.001) 5 percent level. The results show that test anxiety, may provide a facilitative motivational force in academic performance. On the other hand the debilitating influence of anxiety is less straight forward. While students with low debilitating anxiety performed well, those with high anxiety performed better than those who have medium level of anxiety (Cheung & Lee, 1984). Since self efficacy and test anxiety have varying influence on performance their role is vital but not easy to point out.

5.6 Self-Efficacy and Performance in Mathematics Test

Table 15 shows there was a weak significant positive association found between efficacy and performance in mathematics test. A slight tendency existed for subjects with high efficacy to obtain good scores in the test (r =0.267, p<0.002). Studies in Hong Kong indicate that there is indeed an association between achievement and self efficacy ( r = 0.31 ), among primary school students although not a powerful relationship ( Cheng & Westwood , 2007 ). Individuals gain confidence once they realize that their efforts enable them solve tasks at hand with reasonable chances of success. This may support the findings of this study where students with high self efficacy performed well in Mathematics test.
5.7 Implications of the findings

Since students experience anxiety during mathematics tests their performance may be negatively affected. The anxiety may be even generated during mathematics lessons interfering with learning the subject. Similarly high self efficacy was associated with relative high performance this means efficacy may counter negative effects caused by test anxiety, self efficacy and test anxiety did not vary with sex differences. Any form of sex discrimination should be discouraged.

CONCLUSIONS

From the study findings it is concluded that students experience test anxiety during mathematics test. The anxiety is triggered mainly by authority figures specifically teachers and parents. Most students were worried about negative comments from teachers and parents in relation to test performance. Peer opinion was cited as an important contributor to generating test anxiety. The relationship between test anxiety and academic performance was not so strong .This relationship could be both facilitative as well as debilitating .Students in coeducational school performed poorly in the test therefore school type had a role in performance. Social relationships among students in coeducational schools may be a contributor to low scores in Mathematics.

Both males and females experienced similar levels of self efficacy and test anxiety performance was comparable. The influence of sex was negligible in relation to test anxiety and self efficacy. Students with high self efficacy had a relatively high performance levels in mathematics test. Test anxiety and self efficacy influence student performance in mathematics.
RECOMMENDATIONS

The study therefore, recommends that;

- Teachers should give assignments that students can do with high chances of succeeding.
- Students should be taught study skills and problem solving approaches that promote self confidence this includes allowing slow learners to work at own pace when tackling class work.
- Parents and teachers should praise and encourage students to strengthen their self belief hence motivate them.
- Teachers should not have stereotypes while teaching mathematics to encourage both males and females excel in mathematics.
- Students should be taught self control, relaxation techniques and systematic desensitization to manage examination stress so as to deliver effective performance.
- Peer counseling should be encouraged to enable students share experiences about their efficacy and anxiety feelings. This will enable them have collaborative problem solving approach.
- Policy makers should set up guidance and counseling structures at various levels to provide impact assessment on whatever reforms to be implemented in education sector. This will reduce stress to teachers and students that may be generated by the reforms.
- Students with neurotic anxiety traits should be advised to seek medication in appropriate hospitals.
Several limitations must be acknowledged in this study. The study sample of students was reasonably large (n = 115) but it was only taken from three secondary schools.

**Further research**

Further research would be necessary across several schools to confirm the findings. There is need for further research involving coeducation schools in relation to self efficacy and anxiety to exhaustively look at their influence on performance. Studies on self efficacy and test anxiety should be carried out over along time and performance be derived from tests administered during each study. More research should be carried out to find out how self efficacy and test anxiety relate with performance in other subjects.
REFERENCES


Social Cognitive bases of Consistency, Variability and Organization (pp. 3-33) New York: Guilford.


Green, B.A & Miller, R.B (1996). Influences on Achievement: Goal, perceived ability and cognitive Engagement; *Contemporary Educational Psychology, 21,* 181-192.


Appendix: A  

Questionnaire MSE Scale

Form/class………….. Date…………….. Survey Number………………

Section A: Biodata

Please provide responses to the following items. Your answers will remain strictly confidential and WILL NOT affect your grade in this subject.

1. School name

2. Type of School (tick one)  Girls’ School  Boys’ School  Mixed School

3. Gender (tick one)  Male  Female

4. Age (in years) (fill in): ………………………

5. What is your guardians/parents occupation?

………………………………………………

6. Number of terms completed in high school (can be this school or another). Do not include this term (fill in). ………………………

7. Are you repeating this class? (tick one)  Yes  No

Section B: Level of Confidence in Mathematics

1. I am confident I have the ability to learn the material taught in Mathematics (tick one)
   - Strongly disagree  - Disagree  - Neutral  - Agree  - strongly agree

2. I am confident I can do well in Mathematics (tick one)
   - Strongly disagree  - Disagree  - Neutral  - Agree  - strongly agree

3. I think I will do as well or better than other students in Mathematics (tick one)
   - Strongly disagree  - Disagree  - Neutral  - Agree  - strongly agree

4. I don’t think I will be successful in Mathematics (tick one)
   - Strongly disagree  - Disagree  - Neutral  - Agree  - strongly agree

5. I am confident that I can understand the topics taught in Mathematics (tick one)
   - Strongly disagree  - Disagree  - Neutral  - Agree  - strongly agree

6. I believe that if I exert enough effort, I will be successful in Mathematics (tick one)
   - Strongly disagree  - Disagree  - Neutral  - Agree  - strongly agree

7. I feel like I don’t know a lot about Mathematics compared to other students in this class (tick one)
   - Strongly disagree  - Disagree  - Neutral  - Agree  - strongly agree

8. Compared with other students in this class, I think I have good Mathematics study skills (tick one)
9. Compared with other students in this class, I don’t feel I’m a good student in Mathematics (tick one)

10. I am confident I can do well in the Mathematics test (tick one)

11. I am confident I can do well in the taught topics test in Mathematics (tick one)

12. I am confident I can do well in Mathematics assignments (tick one)

13. I think I will receive a C or better in Mathematics (tick one)

14. I don’t think I will get a good grade in Mathematics (tick one)

15. I am confident that I could explain something learnt in this class to another person (tick one)

Thank You for Answering these Questions
Appendix: B  Questionnaire TAIQ

Instructions

Please spare some time to complete this questionnaire. All the information given will remain confidential.

Q1. Were you worried about failing this test?
   - Extremely
   - Very much
   - A little
   - Not at all

Q2. Were you worried about what other students will think of you if you fail this test?
   - Extremely
   - Very much
   - A little
   - Not at all

Q3. Did you feel upset when you committed errors in this test?
   - Extremely
   - Very much
   - A little
   - Not at all

Q4. Did you expect the worst from this test?
   - Extremely
   - Very much
   - A little
   - Not at all

Q5. Were you afraid that others will not approve of you if you get low marks in this test?
   - Extremely
   - Very much
   - A little
   - Not at all

Q6. Did you think that other students’ opinions of you did matter during this test?
   - Extremely
   - Very much
   - A little
   - Not at all

Q7. Did you feel that you can’t help making mistakes in tests so why worry about it during this test?
   - Extremely
   - Very much
   - A little
   - Not at all

Q8. Were you worried about what your parents would think of you if you get low marks in this test?
   - Extremely
   - Very much
   - A little
   - Not at all

Q9. Were you worried about what your subject teacher would think of you if you score low marks in this test?
   - Extremely
   - Very much
   - A little
   - Not at all

Q10. Did you know in advance that you were going to take this test?
     - Yes
     - No

Q11. Did you panic when you were about to do this test?
     - Extremely
     - Very much
     - A little
     - Not at all

Q12. Did you tremble when you were about to do this test?
     - Extremely
     - Very much
     - A little
     - Not at all

Q13. Did you feel tired when you were about to do this test?
     - Extremely
     - Very much
     - A little
     - Not at all

Q14. Did you find it difficult to relax when you were about to do this test?
     - Extremely
     - Very much
     - A little
     - Not at all

Q15. Did you feel uneasy while awaiting this test?
     - Extremely
     - Very much
     - A little
     - Not at all
Q16. Did you feel restless when awaiting this test?
   Extremely  Very much  A little  Not at all

Q17. Did you have a stomach upset when you were about to do this test?
   Extremely  Very much  A little  Not at all

Q18. Did you have cold, clammy hands when you were about to do this test?
   Extremely  Very much  A little  Not at all

Q19. Did you experience a dry lump in your throat when you were about to undertake this test?
   Extremely  Very much  A little  Not at all

Q20. Did you feel confident that others will have a favourable impression of you after this test?
   Extremely  Very much  A little  Not at all

Thank you for taking time to complete these questions.
Appendix: C  Consent Form

I understand that my participation in this study is strictly voluntary and I may discontinue my participation at any time without fear of negative outcome to me.

That any information collected about me during the study will be held in confidence and will not be part of a permanent record nor will it affect my grade in Mathematics. I also understand that the research can only succeed if certain personal information is collected and that only the researcher will have access to the confidential information.

Sign:………………………………………………………………..Date…………………………….