A CRITICAL ANALYSIS OF STUDENTS' PHOBIA FOR MATHEMATICS IN 'O' LEVEL DAY SECONDARY SCHOOLS IN SENGEREMA DISTRICT MWANZA TANZANIA

BY

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This Thesis of Oscar Balandya Elikana has been submitted for examination with my approval as his Supervisor

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Rev. Dr. Chandy Ninan Mattatical

DEDICATION

This work is dedicated to all mathematicians, past and current.

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OBE

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ACRONYMS USED

MOEVT : Ministry of Education and Vocational Training

NECTA : National Examination Council of Tanzania

NGOs : Non- Governmental Organizations

SAT : Scholastic Aptitude Test

ABSTRACT

The study was meant to analyze why students have a phobia/fear for Mathematics in "O" Level secondary schools in Sengerema District Mwanza Tanzania. A survey research design was adopted and a self-administered questionnaire was used to collect data from 320 respondents. The study made five important revelations: First, Mathematical language and symbols greatly confuse and affect their performance in the subject. Second, majority of the students lack social and moral support from their relatives which negatively affect performance in Mathematics. Third, students study in unconducive learning environment. Fourth, the students teacher ratio is very high (207: 1). Fifth, long distance traveled/trekked by students to and from school affects their (students') performance in Mathematics. In order to overcome the foregoing anomalies and reduce students' phobia/fear the researcher recommended the followings: the need for teachers to train their students in the use of mathematical language and symbols by models using class card boards; creating a conducive learning environment that will enhance a desire for achieving better performance in mathematics; preparations of children for mathematics from childhood; provision of affordable means of transport to and from school and or building hostels nearby schools; and training and recruiting more teachers to narrow the students teacher ratio.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the study

The study of Science and Mathematics rocked the mathematics education community and the public. Statisticians in Tanzania judge that every year the number of students doing Science subjects of which Mathematics is the key subject, decreases in proportion to those doing arts subjects. The case is the same as was publicized in the United States of America in early 1980s. Oakes and Lipton (1999; p.141) argue,

> *"The curriculum simply wasn't rigorous enough and American teachers weren't pressing students to learn much Math as they could. The solution, on this conventional view was to establish high standard, upgrade teachers' knowledge, speed more school time on Math instruction and hold schools and teachers accountable".*

Most educators feel that the prescribed rules and methods for solving problems prevent students from understanding Mathematical principles, which in turn explains why so few students, remember and use the Mathematics they are taught. It might be true that even students who score well in tests understand little of the subject matter (Oakes and Lipton, 1999).

Questions are now being asked why students are afraid of learning Mathematics or whether the teachers assigned to this course have little to teach?

Woolfolk et al (2004) assert that, critics of direct instruction believe that traditional Mathematics often teaches students unintended lesson-that they cannot understand the subject, or worse, that Mathematics doesn't have to make sense, you just have to memorize the formulas. This is to say, most likely, the methods used in teaching mathematics in schools have changed the attitude of many students and caused fear towards the subject. But is this the sole problem to erupt such fear to most of them?

Many surveys have shown that students fail to learn the fundamental essentials of arithmetic even though they have sufficient ability and are not hampered by emotional disturbances. Blair et al (1975) opine, student's failure in mathematics is due to the attitude that " I just can't get arithmetic". This psychological phenomenon is very common among college students and particularly those in lower grades who face arithmetic problems daily. A good number of students in schools have been developing fear and a habit of avoiding any problem or situation involving even a simplest arithmetic. They are developing math anxiety! Carter et al (2003) define math "anxiety as the uncomfortable feeling associated with quantitative thinking". Quantitative thinking involves measurement of amount or number. Math anxiety is often based on misconceptions about math, such as the notion that other people are born with or without an ability to think quantitatively or the idea that real quantitative thinkers solve problems in their heads. Some students feel that they can't do mathematics at all. They cannot even seek assistance for math because of the fear toward the subject.

According to IPP Media (2008), as she was announcing the national Form Four 2007 results, the Secretary General of the National Examination Council of Tanzania (NECTA) said, "Candidates did not perform well in Basic Mathematics, whereby only 31.32 percents passed, 23.42% being girls and 37.69% boys. Mukua and Githui (2007) say, in Kenya between 2001 and 2006 the performance score in mathematics in the certificate of Secondary Education was between 18.51 and 19.49 percent. This signifies that there is a big mathematics problem for which researchers should continue finding out the solution.

1.2 Statement of the problem

Experience in Tanzania shows that a student who fails mathematics in his/her national examination is penalized to lower grade. The NECTA therefore, has imposed by-laws as far as mathematics is concerned so that students can do well in the subject. The by-laws states; Mathematics is a compulsory subject to all students in 'O' – level; Failure of mathematics results into penalty to the victim.

In fact, lack of Math's expert in the country means forcing the nation to incur expenses to hiring ones from abroad. Engineers, accountants, pharmacists, medical doctors, economists most of them would be hired.

The above statement shows that Mathematics has a joint venture in all above-mentioned professional disciplines. The implication is that without mathematics, no going ahead in those technical subjects. It is also true that, poor performance in

mathematics cause worry because the subject is 90% of careers. This is to say, that, those who neglect the subject end up crowding in the remaining 10%. However, besides the by-laws from the NECTA and knowing the consequences of failing, the subject performance in mathematics is still poor. This is because most students fear mathematics. It is therefore necessary to examine the reasons that cause fear of the subject; hence the appropriate methodology in Math's education which result into poor performance for the subject improvement should be taken into account.

1.3 Purpose of the study

Is to carry out "diagnosis" to investigate as to why students fear mathematics in day secondary schools and hence to reveal the discrepancies of mathematics performance in day secondary schools. After conducting the diagnosis, the researcher found it useful to compile a synthetic report of diagnosis. This would help him to predict the situation of technical personnel in his country as far as mathematics is concerned.

1.4 Specific objectives

The study was guided by the following objectives in "O" Level secondary schools in Sengerema District:

(a) To find out the impact of mathematical language and symbols on students performance of mathematics.

(b) To find out the relationship between students' social background and performance on mathematics.

(c) To determine the effect of learning environment when learning mathematics.

(d) To find out the relationship between class enrolment and performance in mathematics.

(e) To find out the impact of long distance trekking students' from home to school on math performance.

1.5 Research questions.

The following are research questions used to detect the sources of fear of students for mathematics in "O" Level in day secondary schools in Sengerema District.

(a) What is relationship between mathematical language and symbols and student performance?

(b) Does moral support from home have an impact in learning mathematics?

(c) What are the effects of learning environment on mathematics learning?

(d) What effects are there when learning mathematics if the class is highly populated?

(e) How does long trekking of student to school affect the math performance?

1.6 The scope of the study

The study was in Sengerema district of Mwanza Tanzania and it covered four schools i.e. School A, School B, School C and School D which are situated in Sengerema both urban and rural. Schools were purposively sampled. In each of these schools the study content covered mathematical language and symbols, learning environment, student's social background, distance from home to school, and students – teacher ratio.

1.7 Significance of the study

The study is presumably going to benefit the following stakeholders;

(a) ***The government – Ministry of Education in particular.*** This will prompt to look on the teaching and learning programs like curriculum and relevance books, syllabi et cetera.

(b) ***Parents.*** They will have to know that they have a great contribution too by providing motivation to their children in learning mathematics and its day to day application.

(c) ***Teachers.*** The study will encourage and empower the classroom teachers to learn and change the teaching methodology hence use proper of mathematics vocabularies.

(d) ***Students.*** The study also is assumed to benefit students by encouraging them not to fear mathematics and look at it as other subjects which they would willingly welcome new methods introduced to motivate them by applying math in day to day environment.

(e) ***Board of Governors***. Having revealed of the real situation in schools, Board of Governors will provide all necessary requirements for the excellence of students' Mathematics performance in their schools, and provide funding allocated for math workshops, math societies etc.

(f) ***Researchers.*** The study will encourage researchers to pay more attention on the teaching learning of Mathematics and its improvement and discover methods to teach the subject.

(g) ***Non Governmental Organizations (NGOs).*** They would be convinced to bring donation for relevant societal academic needs, particularly materials and report from those countries where such work conducted in improving mathematics performance in schools.

CHAPTER TWO

2.0 REVIEW OF RELATED LITERATURE

2.1 Theoretical Framework

Different Mathematics scholars have identified some important and useful factors as to why students tend to develop fear of mathematics hence neglect it. It is those factors have enforced the researcher to look unto them more critically.

These themes helped the researcher to further investigate, understand and discover why most students fear mathematics in day secondary schools. The below mentioned studies and themes prompted the researcher to predict the future outcomes of his study.

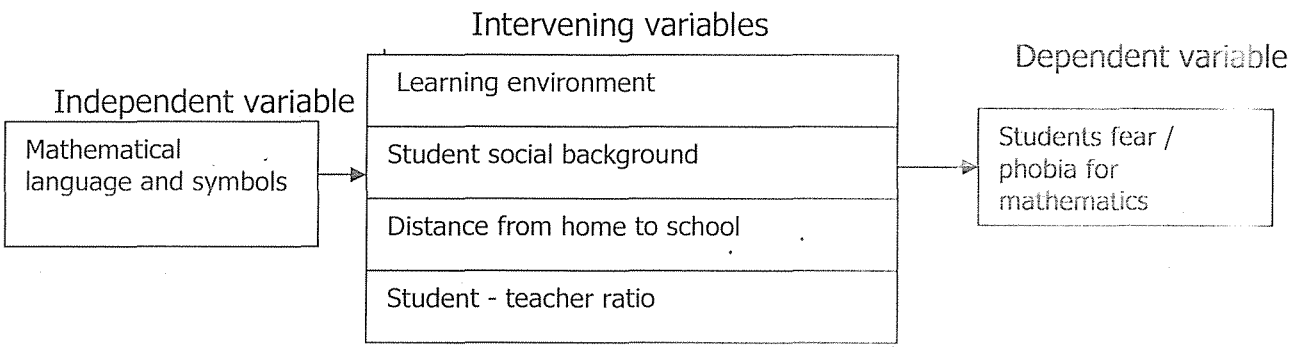
It is assumed that these themes i.e., mathematics language and symbols, learning environment, student social background, distance to and fro school, and students-teacher ratio have impact on students' competence on the subject.

2.2 Conceptual framework

The diagram presented below indicates five themes expected to have impact on student's fear in Mathematics. The first one relates to language and symbols in the subject. The second one stands for the environment when the teaching - learning process is undertaken. The third one represents the student's social background; the fourth one is the catchment's area and lastly is the students-teacher ratio.

It is generally conceptualized that the above variables have impacts in the performance of mathematics as shown in table of conceptual framework below.

Figure 2.1.1: Conceptual frame work.



Source: Generation by the researcher

2.3 Mathematical language and symbols

The specialized language in mathematics requires students to comprehend the meaning of words, syntax and contextual knowledge in a mathematical problem, then they can make logical inference to solve them. Language in every culture is a basic tool or vehicle used to transfer knowledge from one generation to another.

What is language and what is its importance? Many scholars have defined the term in many ways. Schaefer (2004) defines it as an abstract system of word, meaning and symbols for all aspects of culture. It includes speech, written character, numerals, symbols and gestures. Language so to say, is based on arbitrary, learned association between words and things for which they stand.

Language in mathematics to students is like kids who had been never exposed to language in their lives; they cannot understand if the teacher doesn't associate signs (symbols) with words (Kottatk, 2002). Rosman and Rubel (2001) suggest that only humans have the biological capacity for language, which allows them to communicate ideas and symbolic meanings from one to another.

If the language does not communicate the idea and meaning of mathematical problems it will definitely result into undesirable end results. In the seminar which was conducted in Nairobi – Kenya that was attended by different mathematicians from Kenya, Tanzania, Uganda, Nigeria, Zambia, Malawi Japan and the United States of America it was said "language make math rough ride for students". On the related ideas, they observed that math has internationally recognized vocabularies where some words do not mean the same thing as they do in normal usage. Such words cause confusion in the learners' mind. For instance, similarity, base, parallels have different meaning in mathematical language. When students first learn the ordinary meaning of those words and they are introduced to the mathematical meaning, they become confused. Words like vulgar, improper fraction, negative and irrational numbers may not appeal to students due to their derogatory connotation in ordinary English. Other words like isosceles, hypotenuse and coefficient are rarely used in every day experience and most students learn of them from teacher or textbooks. Kumar and Ratnalikar (2001) opine, generally students fail to understand some mathematical procedure or process simply because of their inability to understand the symbols used. In the absence of any clear understanding, they try to cram the statements and try to use these symbols

mechanically, without much understanding. They begin to lose interest in the subject which appears to them, dull and boring. Difficult words therefore, make the process of comprehension of the subjects hard. But the situation in mathematics is much more complex. It hardens the mathematics learning environment to students.

2.4 Learning environment

The word ecology is usually associated with nature. Classrooms are ecological too. However, schools also open systems as the teacher interact with the environment and vise versa. The environment of the classroom and the inhabitants of that environment (students and teachers) are constantly interacting. Each aspect of the system affects others. Woolflok, Winne and Perry (2004: p. 402) assert that, classes are particular kinds of environments. They have a destructive property affecting participants, regardless of how students are organized for learning or what educational philosophies the teacher espouses. A student to learn better, there must be conductive and friendly learning environment. Sometimes students become disruptive because the work assigned to him / her is too difficult. And students who are bored by lesson well below their ability level may be interested in finding more exciting activities to fill their time. Conducive learning environment motivate students. A student involved in learning usually is not in clash with the teacher or other students at the same time. Ormrod (2003) opines, teachers should create a classroom in which students are consistently engaged in classroom activities and tasks and in which few students' behaviors interfere with those tasks and activities. He brought six strategies useful and which all mathematics educators can adopt. These are:-

(a) Physically arrange the classroom in a way that will facilitate the interaction and move around helping students with difficulty in attempting mathematical problems.

(b) Create a classroom climate in which students have a sense of belonging and an intrinsic motivation to learn mathematics.

(c) Set reasonable limits from students'. behavior. That there should a well structured students teacher relationship

(d) Plan classroom mathematics activities that encourage on task behavior.

(e) Continually monitor what students are doing.

(f) Modify instructional strategies when they are clearly ineffective.

These strategies when applied in classroom will allow the learning process to run and bring positive attitude to math. Getzels in Haladyan, Shaughnessy, and Shaughnessy (2007) suggest that, classroom environment and the atmosphere may prove to be among the most powerful indicators of student's outcome.

Classrooms are multidimensional. Many students with different goals, preferences and abilities must share resources to accomplish various tasks, use and reuse materials without losing them, move in and out of the classroom, keep track of what is happening et cetera. In a classroom things happen simultaneously. As a teacher explains a concept, he / she must also notice and examine the attitude of students if they follow the explanation. Haladyan et al. (2007) define attitude toward mathematics as the disposition towards the subject of mathematics. They pointed out that a positive attitude towards mathematics is valued for the following reasons:-

(a) A positive attitude is an important outcome in and out of itself.

(b) Attitude is often positively, although slightly related to achievement.

(a) Positive attitude may increase tendency to select mathematics courses and or relevance mathematics related fields.

Good learning environment creates attitude that eradicates fear of students towards any subject, Mathematics in particular. However, learning environment is cultivated by students' social background.

2.5 Students social background

Most parents do not know that, treatment of the child at home, both before and during the school hours has ear marked effects of a child's personality and response at school. Sometimes parents use derogatory words to their children at home. For instance, a child comes with a problem from school trying to find a solution from the father; and the father answers *"don't bother me, can't you see I am busy?"* Such statement will by in no means, demoralize the child. He feels ignored and no one to help. If a child is not motivated at home, can the society encourage him / her? Obvious the child will automatically feel desperate and miss the sense of belonging.

Hilard and Spalding (1933) say that, the child motivated to achieve, enjoys challenges, intellectual or non-intellectual. He competes vigorously, puts forth effort beyond that demand, persists when a task is difficult. Thus, the pre-existing condition of a child has at home has a subsequent effect in group in his/her future or school life. Blair, Jones

and Simpson (1975: 56) put it this way, "Conditions they exist in homes, from which children come, have been shown to have marked effects on children's behavior and personality". It is therefore shown that democratic homes have produced children who are active, fearless, playful, curious and non conforming (Blair 1975). Mathematics from practical experience is the subject that needs curiosity from learners who are eagerly ready to find solutions to mathematical problems. Parents are psychological mentors to their children. Mentors give their mentorees a sense of personal connection and encouragement to function well academically and socially. Poor moral support is a weak foundation of children in their future prospects.

2.6 Distance to and from school

The distribution of school network has a far-reaching effect on the participation rate of students' performance in schools. If the home is too far from the school, the student get exhausted and worn out before reaching the school. Therefore, concentration on the lesson is very difficult and is adversely affected. Owolabi (2006) comments, students should not be made to cover a distance that would make him too physically exhausted to attend the first lesson. The ideal for a student to trek from home to school should at most be five kilometers. The location of the school will enhance the accessibility to a student. A distance of more than 5km forced a student to think otherwise. Truancy may develop and this cause incompetence in subjects. Student therefore developed fear towards mathematics which results into poor performance.

2.7 Students-teacher ratio

So far it is undoubtedly that there is rampant increase of secondary schools in the country. But it varies as the inverse of the industries producing teachers. Schools are rapidly increasing whereas the number of teachers is somehow stagnant. Classes are excessively populated than normal. This makes the teaching to be more tiresome. The performance is affected especially science subjects and mathematics. Too many students make the task of marking, assignments and exercises, assessment and even supervision to be difficult. The high the number of students in a class the more the quality of teaching suffers. The teacher gets more exhausted. Thus, there is poor preparation, which in turn it resulted into poor teaching techniques and incompetence. The value of students – teacher ratio is influenced by what can guarantee good classroom teaching. Nkata (2005) argues, the expansion of schools in most developing countries, Tanzania in particular, has caused relative situation whereby classes are large in size, diverse student population, and inadequate teaching – learning resources. Tension between the expansion of education and quality of education is now perceived as one of the challenges in those countries of the 21st century to the teaching profession.

Mathematics, as per Tanzania's norms has six periods per week per stream. Most of secondary schools in Sengerema district have at least four streams of 50 students each. Mathematics has to feature more prominently than other subjects because covering the course content in mathematics requires more time. It should be remembered that teaching is not just limited to talking only; marking exercises, assignments, assessments and supervision are part and parcel of teaching process. People are

running away from the subject. This means the available mathematics personnel are utilized repeatedly. A teacher who teaches the subject in four or five streams is likely to carry heavier teaching load than others. Mathematics teachers are a few populations because many students fear and run away from it. This accounts for the available teachers to be over – utilized which is not good academic health.

CHAPTER THREE

3.0 METHODOLOGY.

3.1 Research design

The study undertaken was conducted using survey research design. This is due to the fact that;

(a) The accumulation of information from the individuals was done at relatively low cost.

(b) This research design allows any data collection techniques from sample selected. The data collection technique used was questionnaire method. Students were asked to fill the questionnaire that were disseminated to them..

(c) Large number of respondents was involved in that survey. This enabled the generalizing to be legible.

(d) This data collection technique was useful and allowed the researcher to verify the theory.

3.2 Sampling procedure

The sampling procedure was done as follows;

(a) Schools were purposively selected from the urban and rural because the researcher knows the heads of those schools and he expected that they would provide a deemed assistance for his study..

(b) From each school the sample was select randomly as shown in table 3.3.1.

3.3 Sample

Schools.

There were four day - schools namely: School A, School B, School C and School D as shown in the table below.

Table 3.3.1: The school characteristics, ownership and location

School.	Characteristics	Ownership	Location.
A	Mixed School	Government	Urban
B	Mixed School	Private	Urban
C	Mixed School	Private	Urban
D	Mixed School	Government	Rural

Students

There were four secondary schools in the survey. There were 320 respondents who participated in as it was expected.

Table 3.3.2 Sample distribution.

S/n	Category	Parent population	Sample population	Technique employed
1	**Schools**	11	4	Purposeful
2	**Students**	3300	320	Random sampling

3.4 Instrument

The instrument used was questionnaire. This according to the study taken was a valid instrument to produce findings that are in theoretical or conceptual value. They produced accurate results to measure what is supposed to be measured.

3.4.1 Reasons for choosing questionnaire method

Questionnaire method produced quick results from respondents, and allowed students provide information without fear (Amin, 2005). Therefore the content scope i.e. mathematical language and symbols, learning environment, student social background, distance from home to school and students – teacher ratio was covered. The response format was YES / NO response and ranking from the following: strongly agree (SA), agree (A), disagree (D) and strongly (SD). There were two sections. Section A; was demographic information, Section B; Data analysis and interpretation.

3.5 Procedure

After preparation of his research proposal, the researcher submitted it to his supervisor who analyzed critically and did all corrections. Once his proposal was approved ready for field work, he sought for a permission letter from the Director of Post Graduate Studies and Research who introduced him to the field of study. The permission letter backed-up the researcher as he was going to plan for action from the population for data collection. After the date for the data collection was confirmed, the researcher visited each sample population to administer the questionnaire to collect data for his study.

3.6 Data analysis.

The data was analyzed using frequency and percentages using manual way Thereafter the researcher went ahead to get the frequency and percentage in order to determine students' fear towards the mathematics in day secondary schools.

3.7 Validity and Reliability of the Instrument.

3.7.1 Validity of the instrument.

According to Amin (2005), the valid measurement is an essential to successful and scientific activity which is accepted by researchers. This is very vital when preparing an instrument for research. To establish this, the researcher used expert judgment which is recommended by Amin (2005). Having constructed the questionnaire, the researcher contacted the supervisor to validate the instrument. The validity of the instrument was established using the formula:

Content Validity Index = Number of items declared valid/ Total number items.

Thus, CVI = 8/10 = 0.8.

Therefore the questionnaire was valid for administration.

3.7.2 The Reliability of an Instrument.

To test the reliability of an instrument, the researcher did a pre test and then the post test after two weeks. i.e. 14 days on the same respondents in the same schools. There was an internal consistency or stability of measuring device over the given period of time.

3.8 Ethical consideration.

This refers to moral justification of the investigation. The names of the schools A, B, C, and D used are pseudonyms; hence the schools are safe from undue criticisms from the community where the schools are distributed. The researcher sought the consent from the Heads of the respective schools for the study. Hence the study was justified.

3.9 Limitations.

Representativeness of sample could be inadequate as only 4 schools out of 11 schools were chosen as sample on the research. However, the researcher finds that most of these are established urban schools, they could represent the population.

3.10 Problems encountered in the study but they were resolved

(a) The teachers in relative school did not show a positive cooperative. They demanded payment for them to assist the researcher to collect respondents.

(b) Lack of sufficiency fund. The researcher did not receive any fund assistance from those who promised him. He had very little money that could not cater for all research requirements as is supposed to be.

CHAPTER FOUR

4.0 DATA PRESENTATION, ANALYSIS AND INTERPRETATION.

4.1 Overview.

This section is divided into two sections. Section A and B. Section A, the researcher would like to show the demographic categories of the respondents involved in the study. This would reveal age, class, gender, number of students studying the subject, types of mathematics, distance traveled by students, means of transport for students' use, time they spend form home to school. Tables were used to show the frequency of respondent's participation in each category.

4.2 Biographic presentation.

The age distribution of the respondents is given in the form of grouped so as to determine the frequency easily.

Table 4.2.1: Category of students by age distribution.

Age(in years)	13 – 15	15 – 17	17 – 19	19 – 21	Total.
Frequency	33	123	110	54	320
Percentage	11	38	43	16	100

Majority of the respondents range between the age of 15 – 19 which constitute 72.92% years

The researcher wanted to know the classes that respondents were studying so that the generalization would be viable. The participants in the study were shown hereunder

Table 4.2.2: Category of students by class – wise.

Class (Form)	I	II	III	IV	Total
Frequency	65	79	96	80	320
Percentage	23.31	24.69	30.00	25.00	100

This shows that at least there were enough respondents from each class.

The school characteristics, ownership, and location are shown in table 3.3.1. All schools that the researcher went for data collection were mixed day secondary schools. The number of respondents is shown in the table below.

Table 4.2.3: Category of students by gender.

	Female	Male	Total
Frequency	171	149	320
Percentage	54	46	100

The findings show that majority of the respondents were girls.

The researcher wanted to know if all students do study mathematics in their respective schools.

Table 4.2.4: Category of students by subject distribution.

	YES	NO	Total
Frequency	316	04	320
Percentage	98	02	100

From above table, 98.% do study the subject, 1.83% do not study the subject. However, according to the Ministry of Education and Vocational Training in Tanzania

(MOEVT), mathematics is a compulsory subject for all students in "O"- Level. Thus, it seemed that that 1.83% of the respondents did not understand the question which was asked.

Mathematics has a lot of values. Its values presupposing would let each student to know what type of mathematics he / she is studying. The results were shown on the table bellow.

Table 4.2.5: Category of students by Types of Mathematics they study.

	Basic Mathematics	Traditional Mathematics	Modern Mathematics	Pure Mathematics	Total
Frequency	310	06	01	03	320
Percentage	97.58	1.88	0.03	0.90	100

The MOEVT passed a by–law for all Secondary schools that all students should Study Basic Mathematics. That is, Pure, Traditional, Modern Mathematics are not taught in "O" – Level. This is to say, some respondents did not know what type of mathematics they are studying. As the results of fear, some students do not even know what type of mathematics they study.

For the purpose of good performance in the subjects, there is reasonable distance a student has to travel to and from school. He should not be made to travel a distance that will make him exhausted to attend the first period of which usually is mathematics.

The table below shows the distance distribution of students from their homes to school.

Table 4.2. 6: Category of Students by distance in Kilometers

	Less than 5	Between. 5 - 10	More than 10	Total
Frequency	160	127	33	320
Percentage	50	39.69	10.31	100

The table shows that a half of the school travel more than five kilometers to and from the school.

The table below shows the distribution of means of transport that student use to and from school.

Table 4.2.7: Category of students by means of transport.

	On Foot	By Bicycle	By Motor Transport
Frequency	250	67	03
Percentage.	78.13	20.94	0.94

The response shows that, large number of students, about 78.13% trek on foot to and from school.

The table below shows the distribution of time students spend as they go to school.

Table 4.2. 8: Category of student by time they spend to reach their schools.

	Less than 45 minutes	Between 45 - 60 minutes	More than 60 minutes
Frequency	77	199	44
Percentage	24.06	62.19	13.75

From the table above we find that about 62% of the respondents spend 45 to 60 minutes from home to schools. They are followed by 20% of those who spend less than 45 minutes. Lastly they are those who spend more than 60 minutes (about 14%). We can therefore conclude that, most of students trek more than 45 minutes to schools. This is to say, they arrive at school late or tired

4.3 Section B Research questions .

Research Question 1. What is the relationship between mathematical language and symbols and students' performance?

This question is derived from research objective one, which intended to find out the impacts of mathematical language and symbols on performance of students on mathematics.

The results as far as vocabularies is used in mathematics subject were as follows:-

Table 4.3.1: The impact of vocabularies on mathematics.

	Agree	Disagree	Total
Frequency	210	110	320
Percentage	65	35	100

The table 4.2.1 shows the response of students as far as vocabularies used in the subject are concerned .65% of the respondents agree that vocabularies used in the mathematical language are difficult. They do not understand them. They fail to integrate ideas from with their understanding. The whole concept then is not grasped. Hence, students run away from the subject. 35% disagree that vocabularies can affect their understanding.

The table below shows the impact of mathematical symbols on learning mathematics.

Table 4.3.2: Mathematical symbols create confusions.

	Agree	Disagree	Total
Frequency	194	126	320
Percentage	61	39	100

The table 4.2.2 shows the response of the respondents' views on symbols used in mathematics to express a certain idea or word. 61% agreed that symbols bring confusion during the learning process of the subject. 39% disagreed. However, using his teaching experience, the researcher concurs with those who are confused by symbols. Students never connect the symbol applied when explaining a certain mathematical concept. They are easily forgotten.

Research question 2. Does moral support from home have an impact on learning mathematics?

This research question derived form the research objective two sought to find out the relationship between student's social background and performance in mathematics.

Table 4.3.3: Students Study Mathematics at home

	Agree	Disagree	Total
Frequency	186	134	320
Percentage	58	42	100

It is obviously known that practice makes perfect success. However, the response as far as reading mathematics at home is concerned after a school hours is poor. 58% agreed that the do not have time to do mathematics at home. Could it be lack of time for parents to make a follow – up on whatever their children do at school? Do parents never see the importance of their moral support for their children on the very subject? Normally humán development is an emergence reality, a resultant of the interactions between personality and its environment whereby potential structures of the personality

are given particular and varied shapes over the course of lifetime. Parents therefore, have a role to make sure that their children are give a moral support right form their homes so as to prepare future potential structures of their children.42% disagree. This to say they at least have time to math at home.

Table 4.3.4: The parents' academic concern.

	Agree	Disagree	Total
Frequency	193	127	320
Percentage	60	40	100

Freedom is one of the basic human rights. However, freedom without law is anarchy. And discipline is just as important on the playing fields as in the studying mathematics. The table above shows that 60% of the students are free. Majority of parents or guardians never bothers about the academic welfare of their kids. This actually hampers the future prospects for students. 40% shows that parents are concerned with performance of the subject.

The role of parents in their children's education has long been recognized as significant factor in educational success and school improvement. They are given right to shop for their children's education in the school of their choice. An alternative view of parents is that they can be seen as a 'problem' to their children. In particular children are frequently judged to come from 'poor background,' from a home environment, which is unsupportive at their schools and unsupportive at their children's educational process. Therefore, parents potters of future academics prospects of their children.

Research question 3. What are the effects of unconducive environment on learning mathematics?

This question is derived from research objective three which wanted to determine effect o unconducive environment when learning.

Table 4.3.5: Accessibility to mathematical equipments.

	Agree	Disagree	Total
Frequency	224	96	320
Percentage	70	30	100

Mathematics is the subject which needs much more practices . Mathematical equipments are part and parcel of learning the subject. They should be made available so that students have enough access to them. The findings show that 70% of them never have access to them. Things like:-

(a) Mathematical modals – Pyramids, prism, cones, cylinders.

(b) Graph paper.

(c) Geometrical instruments

(d) Four figure tables

(e) Dice, playing cards.

(f) Plastic spheres.

(g) Manila sheets and marker pens et cetera.

On the other hand, research shows that 30% are have access to mathematical equipments The researcher comments that lack of mathematical equipments put students at a very difficult learning environment of the subject.

Table 4.3.6: Classroom setting.

	Agree	Disagree	Total
Frequency	175	145	320
Percentage	55	45	100

From the table above we find that 55% of the respondents agree that their learning process is affected by classroom setting. Whenever the classroom is not well set, the possibility of being disrupted is there, as is responded. 45% of them agreed that learning process could just continue in any environment in the classroom. The researcher, however, concurs with those affected by poor environment. If the school has best and friendly environment for studies, students will never get bored reading and doing mathematics. Students – Teachers' friendly social interactions create a conducive environment for studies. Mathematics needs good-disciplined learners who are ready to create cooperation among them in the focus of academic career as far as mathematics is concerned. The availability of materials necessary for learning the subject would enhance the doing mathematics network.

Research question 4. What effect is there when learning mathematics if the class is highly populated?

This question is derived form research question objective four which seeks to find out the relationship between class enrolment and math performance

Table 4.3.7: Students' work from teachers.

	Agree	Disagree	Total
Frequency	176	144	320
Percentage	55	45	100

Lack of mathematics teachers in schools is an acute tragedy. It has been observed that, in schools these personnel are a few products. You find in a school, there is one or two or even completely non. For instance, using the sample data,; School A, a government school, has 420 students, there are two mathematics teachers. The ratio of teachers to students is 1 : 200, School B, a private urban school has a population of 1000 students, there are 4 mathematics teachers. The ratio is of teachers to students is 1: 250. School C a private urban school has a population of 440 students, there are 4 mathematics teachers. The ratio is 1: 110. School D, a government has school a population of 400 students, but there is only one untrained teacher teaching the subject.

The table 4.2.7 provides the research finding that 55% agree that they never get prompt feedback of the work they do and submit to their teachers for marking and assessment. 45% receive feedback. Nevertheless, the observation done by the researcher, it is very possible that students never get feedback of what they do because the number of mathematics teachers is inversely proportional to the number of students' population. Teachers in the very subject studied are intensively used.

Table 4.3.8: Students involvement in Mathematics Clubs.

	Agree	Disagree	Total
Frequency	226	94.	320
Percentage	71	29	100

There are different activities that are done as far as mathematics clubs are concerned. For instance, measuring of football pitch, finding the area where the goalkeeper stands. Mathematics clubs are also very important due to the fact that:-

(a) They are useful in arousing and maintaining interest in mathematics.

(b) They stimulate the active participation of the study.

(c) They develop in the studies a habit of selective study.

(d) The knowledge gained by student in various functions in such activities of such clubs supplements the class teaching. It provides the students opportunity to be free in discussion and they are benefited for one another's view.

(e) They give the students' basic training in organizing such program.

(f) They are helpful in proper utilization of leisure time.

However the findings show that 71% of respondents agree that they do not attend mathematics clubs at their schools. 29% of them disagreed, meaning that they do attend mathematics clubs.

Research question 5. How does long trekking to school affect students' math performance?

This question is derived from research objective five, which seeks to know the impact of long distance trekking from to home to on math performance.

Table 4.3.9: Students Catchment Area.

	Agree	Disagree	Total
Frequency	175	145	320
Percentage	55	45	100

The result from table 4.2.9 that 55% of the respondents agree that they do not enjoy the first lesson because they always arrive already exhausted. 45% disagreed that they are not affected by their living away from the catchment area.

Table 4.3.10: Students private revision at home.

	Agree	Disagree	Total
Frequency	183	137.	320
Percentage	58	42	100

Proper preparations prevent poor performance. The table above provides the finding, which shows that over 58% do not have enough time to do revision or extra time for preparation at their home. They arrive at their home already tired. 42 % said, they have time for revision or have extra time for preparation at their homes

CHAPTER FIVE

5.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

Mathematical Language and symbols.

Most of the students face the mathematical language and symbols difficulties in studying and learning mathematics. The sentences/structures cause problems; the correspondences and noncorrespondence of words and symbols affect mathematics learning. Characteristics of word problems sometimes make the comprehension difficult and so forth.

In her research about teaching math to "English Language learner: can Research Help" Irujo (2007) says, difficulties in the very subject are as shown hereunder:-

(a) Vocabularies and semantic difficulties.

(i) Words with math meaning that are different from their everyday meaning viz. set, point, field column, random, table, altogether, round, equals, radicals etc.

(ii) Words or phrase that is conceptually dense in that they convey complex meaning e.g. Exponent, coefficient, congruent, perpendicular, surd form.

(b) Vocabularies and syntax difficulties.

Understanding a concept is harder when it is made up of the relationship between two words. e.g. All numbers greater then x, Mary is earning 5 times as much as John, Two numbers whose product is 1 are reciprocal of each other etceteras.

(c) Discourse difficulties

(i) Logical connectors (If ....then, if and only if, because, that is, for example such that, but, consequently, either ....or). These may signal similarity, contradiction, cause and effect, chronological, sequences or logical sequence.

(ii) Reference of variables. There are 5 times as many students as teachers in the math department. Here the correct equation is $5t = s$, not $5s = t$. Three times a number is 2 times more than 2 times the number. Actually the number refers to the number both times.

In order to solve mathematical problem, students must be able to understand the language used in the problem, interpret that language so that they can identify the math relation and understand what the problem is all about, and convert the language and the math relations to abstract symbols. In fact students' fear is actualized when a mathematics learner meet with word problem. All this is made more difficult by the fact that, word problems are artificial situations described using the mathematical language of problem solving, which makes it difficult to use reading skills learned in other context to help understand the problem.

Students who have difficulty in understanding the subject often find strategies that may help not to meet with mathematics in their respective studies. They tend to pay attention to other subjects relative to their compensation. They look for key subjects relative to their prospective careers. Instruction in solving mathematical problem that

breaks down into strategies that specific to math problem could help students understand and thus be better able to solve them.

Learning Environment.

One of the most critical physical characteristics of the classroom is room environment. The importance of an appropriate physical environment for learning tasks deserves careful consideration. The visual environment for instance, affects a learner's ability to perceive. This visual stimulus affects his / her mental attitude and hence poor performance in the subjects, mathematics being the most affected. Any awkward learning environment cultivates fear to most of the students. Lackney and Jacobs (2008) opine, the classroom temperature, lightning and air quality would appear to have some effects on the mathematics learning environment. The arrangement of furniture and allocation of spaces with the classroom can greatly affect what can be accomplished with a given instructional setting. Mathematics teachers are believed to have some influence responsibility and control over students' mathematics learning environment. A more systematic model is needed to be implemented by the teachers to maximize students' potentials and opportunities that the physical setting could afford to enhance the efficacy of their learning mathematics.

Many teachers tend to focus on pedagogical and interpersonal issues ignoring the physical – spatial context in which the teaching learning process takes place. The physical environment of the classroom is neglected as an integral component of the institutional design that should reflect learning objects and teaching methods of

mathematics. Disorganization of classroom promotes the under utilization of mathematical equipment.

Lack of learning books and other learning materials, group discussion due to school lonely life at home, mathematical oriented activities, mathematical projects works, culminate into poor mathematical learning environment.

Students – Teacher Ratio

For sure it is true that, students – teacher ratio and class size are regarded as very important indicators of the quality education. Owolabi (2006) suggests, increasing average class size from 30 to 40 students may not involve any significant change in teaching conditions, but the effect of increasing from 40 t0 70 shows significant changes. Teaching a very large class is very stressful. It amounts to over- utilization of a teacher, which can be telling the effect on the health of the teacher. From practical experience of the researcher, when he was teaching over 36 periods a week in his school because of shortage of mathematics teachers, he developed over - sleeping sickness during office hours. This implied, his brain was over – utilized because of having too much session to teach for a day. The lesson preparation according to him was not proportionally effective.

Musaazi (2006) comments, there are perceived needs, which motivate the teacher to change existing conditions and behaviors to desire conditions and be so they relate to

teaching or create important external conditions for learning. Those perceived needs should be incorporated in a curriculum. These are:-

(a) There is a need for teachers to able to determine learner's aptitude skill development and knowledge / information.

(b) There is a need for teachers to able to prescribe and deliver appropriate learning activities fitted to the diagnosed needs of the learner.

(c) There is a need for teacher to communicate clearly, verbally and in writing to enhance the learner's ability to understand the instruction.

(d) There is a need for teachers to be able to effectively organize instructional time to allow the optimum amount for the learner to appropriately achieve learning objectives.

Besides over – loading mathematics teachers, students have scarce access to mathematics books (Text and Reference Books). For instance, in school A, a government aided school there are four hundred twenty, but there are one hundred fifty books. The ratio of books to students is at least 1:4. School B, a private urban school has one thousand students, but it has only one fifty books. The ratio of books to students is 1:6. School C, a private owned school has four Hundred forty students, it has two Hundred books. The ratio of books to students is 1:2. School D, a government owned school has a population of Four Hundreds students but there are only fifty books. The ratio is 1:8. This is to say there is scramble for books in every school. Students lack enough access to books to meet the basic needs. Lack of basic needs result into poor health in the very subject. This jeopardizes chances for various opportunities in their future prospects in the fields related to mathematical concerns.

Students Social – background.

The purpose of secondary education ("O" – Level) is to prepare and produce good technocrats citizens in various technical professions. Nkuruma (1974) suggests, in a school a student "learns to shoulder responsibilities to share with his fellow both good and bad things of life, to understand the importance of team spirit and take a personal pride in the success of school." Once a student is encouraged from home, his / her is told the importance of schooling he/ she will develop a spirit of seriousness with academic issues.

Think of what McCafferty (2008) opined on what he called "the banning of prayers in assemblies affected academic achievement." The Scholastic Aptitude Test (SAT) is an academic test measuring the developed verbal and mathematical reasoning skills of students preparing to enter college. After 1980 SAT scores began to improve. This increase was attribute to the increase in ... home schooling. The academic performance was 3 to 5 greater than size. This greater academic performance is due to the family influence. Children who are well encouraged to study right from their home, are likely to perform wonders at the end of their due courses.

5.2 Conclusions

a) Majority of students fail to get the concepts of mathematics because of the language and symbols used in the subject.
b) Majority of the students (59%) are not morally supported by their parents, guardians, and/or relatives whom they are living with to like and enjoy

mathematics. They feel incompetent, and hence, develop a spirit of phobia/fear for mathematics.

c) Unconducive learning environment affects majority of students during the process of learning mathematics.

d) The students - teacher ratio is very high in Sengerema. This forces the teachers not to be effective in the obligations. Most activities are overlooked, thus, majority of students fail to know how they are in mathematics subject because of not receiving back their work from their respective teacher.

e) Long distance trekked to and from school affects students' ability to master like mathematics subject. This is due the fact that they arrive at school already tired.

5.3 Recommendations

(a) Mathematical Language and Symbols

Research has shown that mathematical language and symbols confuse 65% and 60% of students respectively. We cannot ignore or overlook such mathematical barrier that tremendously depopulates number of technocrats in my country. It has been argued that, all languages have a common structural basis and that people can learn foreign languages (Kottak, 2000). Therefore, math educator should insure math's language does not disrupt students' perception. Lindsay in Kumar and Ratna Likar (2003) says that mathematics is the language of physical sciences and certainly no more marvelous language has ever been created by the mind of man. Mathematical symbols on the

other hand are used to make the mathematical result exact and ready useful. The skill in using symbols goes concomitant with solving many complicated problems.

Whenever a mathematics teacher uses any mathematical symbol an effort should be made to clearly explain it to students. This will help students not to cram and used it mechanically, but understand and use it ideally. Therefore, teachers should train their students in the use of mathematical languages and symbols. How? By making models with class card board.

(b) Learning Environment

If instruction in mathematics is to be worthwhile it must be planned with idea of achieving a certain aim that represents values attained from its study. Selection of materials and learning environments should be made with a purpose that is to be served by mathematics in the general scheme of education. Yes, mathematics is a subject that full of problems. There is no topic that does not require solving of problems of different types. It is practiced in solving problem, which develops speed accuracy and ability to apply mathematical facts in different solutions. Thence, the opportunities to teach problem solving and the essential aims of teaching mathematics are becoming vastly greater than ever before in history of mathematical education.

The researcher therefore calls up on all mathematics instructors and education stakeholders to create conducive learning environment that will enhance the desire of

achieving better performace in this subject. For instance, enough math quizzes, puzzles, measuring volleyball, football pitches and such like exercises.

(c)Student Social Background

Charity begins at home. Likewise, mathematics begins at home. Mathematics has a lot of cultural values. It helps in the formation of a certain habits in students and helps them to grow as cultured citizens. For any cultured person the development of power of reasoning and judgment is a basic requirement and mathematics develops these qualities in a student that he/she becomes a useful member of the society. The chief characteristics of the discipline are simplicity, accuracy, and certainty of results, originality, and correlation of the teaching of the subject with the problems of life.

Principles and theories of mathematics are applied in different aspects of life. Thinking and reasoning are very much guided by mathematics. Mathematics also is helpful in other branches of science such as engineering, physics, economics, accounting, et cetera. In fact there is a great dependency on mathematics in every field of technological development. In that:-

(a) It aims to enable the child to solve mathematical problems of his every day's life.

(b) It aims at providing a suitable type of discipline to the mind of the student/child

(c) It develops in student a sense of appreciation of cultural arts.

(d) It enables him to understand and enjoy popular literature.

(e) It develops in him a scientific and realistic attitude towards life. To list but few.

Being at home, any more mathematical support from parents children/students are encouraged to face any challenges on their way when they are exposed in to academic arena. Therefore, educational stakeholders are asked to prepare their prospective citizens right from the beginning of their respective lives. Example calculation of air in his bed room.

(d) Distance from home to school

From the above discussion, it falls that, mathematics is intimately related with all physical and social sciences. It is a queen of all sciences and art of arts. Missing mathematics classes at schools would mean distortion of the subject relation with various sciences. Therefore, educational stakeholders should be in the position to provide means of transport (bicycles, buses, taxies, etc) and build hostels nearby school so that students get to school at the right time to get right knowledge from their mathematics instructors.

(e) Students – Teacher Ratio

So far it has been noted that there is a dramatic increase of secondary schools in every country in Africa Tanzania in particular. In Mwanza region (Tanzania) for instance, there are 317 secondary schools both private and government schools. But there is only one teacher training college, which produces secondary school teachers. This college actually, does not enroll students from Mwanza region only. Students from other parts of the country are enrolled as well. This is to say shortage of teachers is acute thereof.

The researcher appeal to all educational planners in the country to layout policies that will facilitate the production of producers (Teachers)

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APPENDICES

APPENDIX A

A. THE INSRUMENT

QUESTIONNAIRE ON APPROPRIATE STUDY.

Dear Respondent:

I am a student in Master of Educational and Management at Kampala International University (K. I. U) doing a research on *"Critical Analyses of Students Fear for Mathematics in Day Secondary Schools"* I am aware that you have a sum valuable knowledge in this field. You are therefore required to respond to the following questionnaires provided. Case study is Sengerema urban and rural Secondary Schools. These questionnaires will be used for research purpose only. Therefore, the information disseminated on this study will be strictly treated with care and high confidence.

Thanking you in advance.

Yours truly,

Oscar Balandya Elikana.

SECTION A.

BIOGRAPHIC INFORMATION FOR STUDENTS.

Put tick (√) in the appropriate age group you belong.

1. 13 – 15 ☐

   15 – 17 ☐

   17 – 19 ☐

   19 – 21 ☐

2. Class

   Form one ☐

   Form two ☐

   Form three ☐

   Form four ☐

3. Gender

   Female ☐

   Male ☐

4. Do you study mathematics subject at your school?

   YES ☐

   NO ☐

5. What type of mathematics do you study at your school?

Basic mathematics ☐

Traditional mathematics ☐

Modern mathematics ☐

Pure mathematics ☐

6. Howe far is from home to school

Less than five kilometers ☐

Between 5 = 10 kilometers ☐

More than 10 kilometers ☐

7. Which means of transport do you use from home to school?

Walking on foot. ☐

Riding bicycle ☐

By bus ☐

8. How many minutes do you spend in traveling from your home to school?

Less than 45 minutes ☐

Between 45 – 60 minutes ☐

More than 60 minutes ☐

SECTION B.

Prescription of the subject for students.

Circle One Number for each Statement.

	SA	A	D	SD
1. I simply don't understand the vocabularies used in mathematics	4	3	2	1
2. Mathematical symbols create confusion to most of students in class.	4	3	2	1
3. We do not have enough mathematical equipment for us to do arithmetic	4	3	2	1
4. I do not understand mathematics when I see learning Materials are not properly arranged	4	3	2	1
5. I do not enjoy reading mathematics at home because of the family work I do after school	4	3	2	1
6. Even if I fail mathematics, no body will ask me at home	4	3	2	1
7. I simply don't enjoy the first period because of tiredness after walking from home	4	3	2	1
8.I do not have enough time to practice mathematics at home because always arrive late	4	3	2	1
9. We rarely get our exercises feedbacks from our teacher because we are so many in a class	4	3	2	1
10.We do not have mathematics clubs activities at our school because teachers are be with marking.	4	3	2	1

APPENDEX B.

AN INTRODUCTORY LETTER FROM KAMPALA INTERNATIONAL UNIVERSITY (SPGS)

APPENDEX B.

)DUCTORY LETTER FROM KAMPALA INTERNATIONAL UNIVERSITY

KAMPALA
INTERNATIONAL UNIVERSITY

P.O.BOX 20000
KAMPALA- UGANDA.
TEL:-041-266813

OFFICE OF THE DIRECTOR
SCHOOL OF POST-GRADUATE STUDIES

8th May 2008

To whom it may concern

Dear Sir/Madam,

RE: INTRODUCTION FOR MR. OSCAR BALANDYA ELIKANA

The above named is our registered student in the School of Post Graduate Studies pursuing a Master of Education in Educational management and Administration (MED Mgt), With registration number MED/16006/71/DF.

He wishes to carry out a research in your organization on "A Critical Analysis of Students' fear for Mathematics in 'O' Level Day-Secondary schools: A case Study of Sengerema, Mwanza, Tanzania"

Any assistance accorded to him regarding research will be highly appreciated.

Yours faithfully,

Prof. Owolabi O. Samuel
DIRECTOR-SCHOOL OF POSTGRADUATE STUDIES

APPENDEX C

TIME FRAME.

S/N	YEAR 2008/2009	EVENT
1.	Jan. 10 – Feb. 5/ 2008	Primary research, literature searches.
2.	Feb. 6 – March 6/ 2008	Developing and piloting questionnaire
3.	March 7 – April 10/2008	Checking the validity of the instrument.
4.	April 11 – 30/ 2008	Collecting an introductory letter from the Director of SGPS.
5.	July 1 – 31/2008.	Sending out the questionnaire.
6.	August 1 – Oct. 15/2008	Data input, Data analysis
7.	Oct. 16 – Nov. 30/2008	Write a report and prepare for oral presentation.
8.	December 1 – 20 / 2008.	Meeting the supervisor for consultation.
9.	Jan.1 – 30 / 2009.	Writing all corrections discovered.
10.	Feb. 1 – 28 / 2009.	Preparation for VIVA