STUDENTS' ATTITUDE TOWARDS MATHEMATICS, THEIR ACHIEVEMENT AND FACTORS AFFECTING THEIR LEARNING IN GOVERNMENT GENERAL SECONDARY SCHOOLS OF ADAMA CITY

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ABBREVIATIONS

AIJCR: American International Journal of Contemporary Research

df: degree of freedom

F: female

ICMER: International conference of mathematics Education Research

IJME: International journal of mathematics Education

M: male

MOE: Ministry of Education

NCTM: National council of Mathematics teachers

NJME: National Journal for research in mathematics education

NOE: National organization for Education

PISA: Press of science Association

SD.: standard deviation

SIG.: significance

WASJ: World applied science Journal

ABSTRACT

Students' attitude towards mathematics, their mathematics achievement and factors affecting their learning mathematics at government secondary schools of Adama city

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The purpose of this study is to find out students' attitude towards mathematics, mathematics achievement of students and identifying factors affecting their learning mathematics in Adama city government secondary schools. There were three government secondary schools in this city. The study had done on 346 sample students and 39 sample Mathematics teachers from these schools. The mainly used instrument for data collection is questionnaire, achievement test for grade 9 and 10 differently, interview, and classroom observation. Quantitative analysis had adopted for the data collected through questionnaire and achievement tests while qualitative analysis for the data collected through interview and classroom observation. The collected data was analyzed using mean and grand mean that could have extracted through SPSS. The findings from the respondent result showed that there was significant difference on students' attitude towards mathematics with in government schools while no significant difference observed between male and female students on attitude. On the other hand there was statistically difference on mathematics achievement among the schools, between male and female in both grade 9 and 10 there was significant difference on factors affecting students' learning mathematics among schools but family economic status, teaching method, peer pressure, sequence of content were some common problems that observed in these schools. In order to improve students' attitude and, factors affecting learning mathematics, reduce gender difference in mathematics achievement. The researcher had recommended that teachers should assist their students, give awareness to students' family on the application of mathematics to real life, training teachers how to manage large class size and recruiting, and train more female mathematics teachers that service as a role model brings change on gender difference.

CHAPTER ONE

1. Introduction

1.1. Background of the study

Based on experiences with mathematics at school, students' develop general attitudes about its nature and value and about their own abilities and interest in doing it (Hannula M., 2003). Attitudes and behaviors are frequently measured using self-report which enable economic survey method to be employed on a large scale which holds that instructional methods that are highly effective with novice learners .Further more students attitudes and behaviors have been found to be influenced by school and class room factors (Samuelson J. & Granstrom K., 2007). Attitude seen as cognitive and effective orientation or disposition towards an object, idea, person, situation…etc. (Fiske & Taylor, 2008 as cited in Mohamed & Ismael, 2011).

Early findings showed that girls tend to have more negative attitudes towards mathematics than boys do and those attitudes tend to become more negative as pupils moves from elementary to secondary school (Rosetta & Petro, 2007). The general attitude of the class towards mathematics related to the quality of teaching and social, psychological climate of the class and to develop positive attitudes needs individual effort and mathematics anxiety can reduced through systematic destinations (Haladyna T. et al, 1983). However, recent evidence suggested that collaborative approaches could promote positive attitude among students. More over attitude measures need substantial refining. (Ma & Kishor, 1997; Di Martino & Zhan 2001 as cited in Mohamed Z.G., 2012) distinguish two basic approaches to define Attitudes towards mathematics: Frist a simple definition describes it as the degree of effect associated with mathematics that is Attitude is the emotional disposition towards mathematics. The next was three component definition distinguishes emotional response, believes and behaviors as component of attitude (Fiske & Taylor, 2008 as cited in Mohamed & Ismael, 2011).

Ma.X. & J. Xu. (2004) reported that mathematics confidences, attitudes towards mathematics, affective Stacey found that students with positive attitude towards mathematics progressed to more effective behavioral and developed conceptual understanding.

In those exhibiting, more behaviors that are reflective were better able to connect their work to the underlying mathematical concepts.

Following common approaches in attitudinal research with in mathematics education both self-concept (believes about one's ability to learn and person task) and anxiety (feeling of tension that hinder learning processes and performance).Attitude may affect an individual behavior in the presence of attitude-objectives in predictable ways. This predicative relationship does not always hold, however and the likelihood that exhibited behaviors corresponds with predicted ones is higher when attitude are stable and strongly held, embedded in the individuals believe system, concern a domain which is individual knows well, are formed from personal ,relevant experience, and are considered important by the individuals(Kebede ,2007).

Different research study shows that there are different factors that facilitate learning, for example readiness, motivation mental set, mental health and teachers' personality. Likewise, a number of studies indicated that students learning and achievement correlated highly with educational attainment of parents (Habtamu, 1996). For instance, students whose parents had less than high school education obtained lower grades in mathematics than those whose parents had higher level of education (Sileshi, 1995).

Research has shown that parents educational level not only impact students' attitude towards learning but also impact their math's achievement scores (Tadese, 2006). Accordingly, students' success or failure in mathematics depends on attitude toward mathematics. In addition to students attitude towards mathematics there are also factors affecting students learning mathematics.

Research findings indicated that there are different factors affecting students learning of mathematics. Some of the factors that affect students to learn are Demographic factors such as gender, parents' educational level and socio economic status , next Instructional factors such as curriculum instructional strategies and methods, teacher's competency , and school context and facilities and the third factor is Individual factors such as self-direct learning arithmetic ability, and motivation or concentration.

However, these are not the only factors affecting students learning mathematics at secondary school level.

Students at elementary grade level may or may not have good base for mathematics, because there is no one size fits all package for math's education different factors can affect how well students grasps mathematical concepts. Most students at secondary level have trouble with math than any other subject. This is because math is a cumulative subject previously learned math skills are the foundation on which new skills had built. If you fail to understand some math skills today, this will keep you from understanding a new math skill tomorrow (Andualem, 2006)

In conclusion, several studies had done on relationship between students' attitude and students' performance in mathematics and these studies showed there was positive relationship between the two (Mohamed, and Ismail, 2011). Hence, students' attitude towards mathematics is a major factor that might influence the performance of the student. So, this study was investigated students' attitude towards mathematics and factors affecting their learning in government secondary schools Adama city secondary schools.

1.2. Statement of the problem

Problems related to learning Mathematics are common phenomenon among students around the world. This holds true in Ethiopian context too; a number of factors do influence student's Mathematics achievement positively or negatively. One among these factors is student's attitude towards Mathematics. The direct relationship between Mathematics achievements and attitudes as well as their reciprocal influence well documented.

In the Ethiopian context, the number of schools and number of students is incompatible. There are a large number of students in each class where this became a barrier to the learning of Mathematics. Many studies indicated that reduced class sizes lead to improved student achievement (Glass, Cahen, 1982; Robinson, 1990, Voekl, 1992; as cited in Yohannis, 2007). According to Nor Fadilah (1992) some prominent factors that contributed to difficulties in learning mathematics are students dislike in mathematics that they may have stem from psychological incidences such as fear endurance ,perseverance and other associated factors. Having these issues in mind in the curriculum model developed by Johnson (2001, cited in Yohannes, 2007).Socio-economic, culture and school based factors with items such as method of teaching, availability of teaching-learning materials work load and motivation are

final strategies to be adopted to improve learning and achievement (George M. & George R. 2012).

Several studies had been conducted to find out the relationship among students 'attitude towards mathematics, academic achievement of students and Factors affecting students learning; most of this study showed that there was a positive correlation between students 'attitude towards mathematics and academic achievement of students and also in problem solving (Mohamed et al. 2011). Similarly, students' attitude towards problem solving in terms of patience, confidence, and willingness had positive relation with students' mathematics achievement (Mohamed Z.G., 2012).

The aim of this researcher was to find ways how to solve problems facing to students on their mathematics achievement, solution to factors affecting secondary school students' in learning mathematics and ways to develop positive attitude towards mathematics.

Since Adama is a City that found in Oromia region in which series problem observed on students' attitude towards mathematics, their mathematics achievement and factors affecting learning mathematics. The study focused to determine the attitude of students towards mathematics, correlation among students' mathematics achievement, attitude towards mathematics and factors affecting students learning mathematics in government secondary schools of this city. In addition to this, the purpose the study is to figure out ways how to solve factors affecting students learning mathematics and to develop positive attitude towards mathematics for good performance and success in their achievement.

1.3. Objectives of the study

1.3.1. General objective of the study

The general objective of the study is to identify students' Attitude towards Mathematics and Factors Affecting their learning in government secondary schools of Adama city. It also has the following specific objectives:

- To assess the students' attitude towards mathematics at secondary school level.
- Examine the status of secondary school students' mathematics achievement.
- Identify factors affecting students' learning mathematics in secondary schools.

- ❖ Investigate a correlation among students' achievement, attitude and factors affecting learning mathematics Adama city.

1.4. Research Questions

Based on the objectives the study attempted to answer the following research questions:

1. What are the attitudes of secondary school students towards mathematics?
2. What is the status of students' mathematics achievement?
3. What are the factors affecting students' mathematics learning in secondary schools?
4. What is the correlation among students' mathematics achievement, attitudes and factors affecting their learning mathematics Adama city?

1.5. Significance of the study

Students' concerns can significantly affect their ability to learn and understand the subject: Furthermore, their anxiety and attitudes may greatly affect how they perceive their own mathematical competence.

This study particularly (significantly) used to address students attitude towards mathematics and factors affecting their learning at government general secondary schools. The study helped the society (parents of students), students and teachers in Adama City.

This research study designed to show ways how to overcome students' problem toward mathematics education in some specific area. It had believed that the study would have significances of giving insight to policy makers at different level of education, Adds to the knowledge we have about the barriers and possibilities in learning and teaching Mathematics in Ethiopia secondary schools and indicates possibilities to explore and overcome the barriers encountered. In addition, the study was expected to indicate some general problems and needs of secondary school students attitude and achievement in math, in turn, these would help those concerned with devising appropriate measures to minimize the problem of teaching and learning mathematics. Furthermore, findings of this research would lay out foundation for further investigation.

1.6. Delimitation of the study

Although the problem observed throughout the country in, all grade level. This study had done in Oromia region at Adama City government secondary schools. In conducting the

research, previous experiences indicated that, it was difficult to include all relevant variables to the criterion variable at a time. So due to the problem the study had delimited to government secondary school students.

1.7. Limitation of the study

One of the instruments applied in this research was classroom observation on students' activity; however, students had taken from six different sections of government schools there were problem faced to the researcher on observation time. Students' disciplines in the class were not good for observation and there was problem on getting permission from school administrative body.

In addition, rearrangement of observed students behaviors and variation among the teacher's inability, methodology, way of assessment etc. had its own limitation on this study. However, the researcher used different options to get a clear observation in each school. On the other hand, there was problem with interviewed mathematics teachers. On time of appointment for interview, some need another appointment day by giving reason that it coincided with their classroom teaching and some had not found in the school compound at time of appointment.

The other was problem on Achievement test given to selected students. The students were not volunteer to come and take the test on opposite shift of their learning time. The researcher gets those selected students after the end of their second semester working time. For clarity of the research also document review on student result were necessary for the quality of the study but almost all school record offices were not volunteer to give information properly; the information they were given to the researcher were vague and not clear and they were not volunteer to show student's result on the roster. So document review guide not used in this study. In addition, the process of filling questionnaires by students without assistance was not easy. However, efforts had made in such a way that the questions were set in a very simple way so that they could understand and fill in the questionnaires while the researcher and some assistant teachers as a supervisor was there to help them in clarifying things, which are not clear.

1.8. Organization of the study

This thesis has five major chapters. Chapter one constituted the introduction, which focuses mainly on the background, statements of the problem, objectives, research question, significance, limitation, and delimitation of the study, organization of the thesis, ethical consideration and definition of key terms. Unit two deals with reviews of different literatures about students' attitude towards mathematics and factors affecting students' learning and related issues can be reviewed.

Unit three contains research design and methodology which includes data source, sample size determination, sampling techniques, method of data collection instrument and method of data analysis. Unit four contains discussion and analysis of the results and unit five was presented summary, conclusion and recommendation.

1.9. Ethical considerations

Before starting to conduct the study, permission has assured from the selected study area administrator. Ethical consideration had seriously taken into account i. e. interviews done with mathematics teachers, questionnaire filled by teachers and students, achievement test given to students and classroom observation were done in secret with respondents. Without the permission of individual no one interfere the response of other so that the concern, integrity, consents and other human elements of the participants, interviewees had well protected. Students had asked to participate in the research voluntarily without physical or psychological coercion. Respondents was enlightened (well informed) to know the purpose of the study prior and responding to the question. They are assured that any information concerning them were never been passed to other unauthorized person or institutes without their consent. The selected study participants had requested kindly whether they agree to participate in the study or not.

1.10. Definition of key terms

Attitude: Students feeling about mathematics particularly their likes or dislikes associated with mathematical practices in and out school collected through Lickert type of scale adapted by the researcher.

Attitude towards Mathematics: Self-concept towards mathematics (believes about one's ability to learn and person task). Moreover, mathematics anxiety (feeling of tension that hinder learning processes and performance), attitudes towards mathematics, affective and behavioral engagement contribute to the effectiveness of learning process.

Achievement test: After a lot of study and exercise, Students' success and performance in mathematics as seen by scores on test conducted by the investigator and by subject teacher based on content on the textbook for each grade.

Behaviors: Knowledge objective considered to achieve if students are able to recall and recognize scientific terms, facts, symbols, concepts etc. Moreover, the way student perceived mathematics and the behavior of the subject has great influence on their achievement and learning.

Status: Current position or level of person or group holds with in the society.

CHAPTER TWO

2. Review of related literature

2.1. Students' attitude towards mathematics Education

Several studies had done in many countries to find the factors that influence students' achievement and performance in mathematics, their attitude towards mathematics and factors affecting learning mathematics. Among these factors, students' attitude towards mathematics is one important factor that has consistently studied. Often, the studies on relationship between students' attitude and the students' academic performance show a positive relationship (Mohamed & Ismael, 2011).

Hence students' attitude towards mathematics is a major factor that might influence the performance of the students. Due to this several studies has conducted in different countries in order to find out the students attitude towards mathematics (Nor Fadilah et.al. 2010). Attitude is a central part of human identity. Every day people love, hate, like, favor, oppose, agree, disagree, argue, persuade, etc. All these are evaluative response to an object. Hence, attitudes defined as "A summary of evaluation of an object of thought" (Sileshi, 1995). In addition, attitudes seen as cognitive and affective orientations or dis positions towards an object, idea, person, situation, etc. Attitudes and behaviors frequently measured using self-report (Rosetta et al, 2007). According to (Desalegn, 2005) through this combined approach, results are obtained which may be generalizable to large populations of interest, while a more fine grained view of learning process and awareness of the level of agreement between self-reported and exhibited behaviors enables a more robust interpretation of those findings.

Furthermore, students' attitude and behavior have found to influence by school and classroom factors (Samuelsson &Granstrom, 2007).

Interest and attitude in the subject area are the special predictors for the students' participation and success in the subject Attitude has based on the value and beliefs as well as varying degree of factual knowledge (George M. & George R, 2012). Attitudes towards mathematics can referred to a positive or negative emotional disposition towards mathematics (Haladyna, 1983).

According to Ademe and Gebre (1990), significant gender differences found in several areas, and attitudes variables found to be useful in predicting grades. In study that involved 847 students of grade, 8 to 11 in North shoa zone Sileshi (1995) found no gender difference in attitude towards mathematics among eight graders. None, he found significant gender differences in favor of boys at subsequent grade level (9, 10 and 11). Some studies have employed subscale measures of attitudes toward mathematics Fennema and Sherman (1976) examined gender difference among junior school students they found significant differences favoring males on two subscales.

Other researchers had agreed that attitude towards the learning of mathematics becomes increasingly less favorable beginning from the early elementary early junior high school for boys and girls (Kebede, 2007). In addition to this many research studies had been done on comparison between female and male students 'attitude towards mathematics and suggested that there is no significant difference between attitude towards mathematics among male and female students (Mohamedd et al, 2011). In line with this, the study by Habtamu (1996) to compare mathematics achievement of student between mother tongue and non-mother tongue medium of instruction in math achievement of 1080 students from grade 2 up to 4 revealed that boys 'math achievement was higher than that of girls' in all these grades. The major finding of his research is that students who learned in mother tongue achieved in test better than those students not learned in mother tongue. In the same manner study conducted by the National Organization for Examination (NOE, 2001) revealed that males performed higher than that of girls in math achievement in all regions where the study was conducted. Moreover the study indicated that in Tigray, Oromiya, Amhara, Addis Ababa and South Nation and Nationality people there was gender gap in math achievement.

From previous studies, students' achievement in mathematics has affected by several factors such as the environment of the school where it must be favorable teaching and learning process (Carolinem & Kaczala. 1980). According to Tadesse (2006), teaching methodology has direct effect on achievements in mathematics and on the student, and etcetera.

In other words, if it had delivered properly, the students can have a better learning environment.

Most studies conducted at the secondary school level to investigate gender differences in math performance indicated significant difference between boys and girls in mathematics achievement (Hilton and Braglund, 1990).

In addition, students whom are benefited more from high quality instruction are self-regulated, have strong mathematics backgrounds and mathematics self-concept is one of the factors that influence students' achievement in mathematics and this factor related to their motivation to learn mathematics Andualem (2006). In addition, he noted that students' intellectual-mathematical motivations and social-personal motivations also influence the students' attitudes in learning mathematics. Beside these, mathematics anxiety research among elementary to high school populations showed that it is an influential variable in mathematics education (Nor Fadilah et. al, 2010). Kebede (2007) examinants' attitudes toward mathematics, on class climates, on students' mathematics self –perception that there are statistically significant effect of gender, student perception of parental opinions, and amount of study time on mathematics attitudes.

On the other hand, Yilmaz et al, 2010 as cited in Mohamed Z. G. (2012), by using semi structured interview have found that some other factors affecting students' attitudes towards mathematics are usage of different teaching materials, teachers' classroom management skills, teachers' content knowledge and personality, teaching topics with real life enriched examples, and students' opinion about mathematics courses.

Usually, the way that mathematics is represented in the classroom and perceived by students, even when teachers believe they are presenting it in authentic and context dependent way stands to alienate many students from mathematics Kristi Kislenko et.al.(2005)

Researchers concluded that positive attitude towards mathematics leads students towards success in mathematics. Attempt to improve attitude towards mathematics at lower level provides base for higher studies in mathematics. Students' concerns about mathematics can significantly affect their ability to learn and understand the subject; furthermore, their anxiety and attitude may greatly affect how they perceive their own mathematical competence (Yoseph, 1997).

Little consensus exists in the research literature concerning relationship between attitude toward mathematics and achievement in mathematics, thus to assess the magnitude of this relationship the researchers conducted a meta-analysis to integrate and summarize the findings from many primary studies Samuelsson & Grastrom (2007). The statistical result of these studies were transformed into a common effect size measure, correlation coefficient; this relationship was found to be dependent on a number of variables; grade, ethnic background, sample selection, sample size and data of publication, gender did not have a significant effect on the relationship nor were there ethnic background. The researchers discuss the findings in comparison to previous narrative reviews and meta-analysis, and draw implication for practice and further research.

Students' success or failure in mathematics depends on their altitude towards mathematics. Thus students' attitude towards mathematics influences student participation rate. Students may develop positive attitude towards mathematics or may develop negative attitude towards mathematics. Researchers reported positive effects of Meta cognitive guidance on students' mathematical reasoning in cooperative learning and in different computerized environments Rosetta & petro (2007).

Most of those studies examined the effects of Meta cognitive guidance on solving mathematical problems based on school curriculum and less on tasks based on situations, which represent the kinds of problem encountered in real life (Yohannes, 2007). Nowadays mathematics has considered as an effective aid towards solving problems of any field. Because of this fact and other reasons, anybody concerned with the problem solving process of any sector is supposed to have a good knowledge of mathematics. Therefore, the aim of this study is to develop positive attitude towards mathematics on secondary school students.

2.1.1. Students positive attitude towards mathematics

The characterization of an individual's attitude as positive / negative is in most cases simply the result of a process of measurement, performed through instruments such as the Thurston or Likert attitude-scales or the semantic differential technique. This process ends up in a score attached to an individual's attitude - obtained by summing points relating to the single items. The choices of scores have assigned to the items naturally leads to a positive/negative evaluation of each one.

Since in most questionnaires used to assess attitude the items range from those related to emotions ("I like mathematics") to those related to beliefs ("Mathematics is useful"), to those related to behavior ("I always do my homework in math's"), an answer can be characterized as 'positive' by referring to different meanings of the word 'positive' itself. More precisely, this meaning varies depending on whether 'positive' refers to emotions, beliefs, or behavior, Kebede (2007)

One when it refers to an emotion, 'positive' normally means 'perceived as pleasurable'. So, anxiety when confronting a problem is seen as 'negative', while pleasure in doing mathematics is evaluated as 'positive', secondly, when it refers to beliefs, 'positive' is generally used with the meaning 'shared by the experts 'and thirdly, when it refers to behavior, 'positive' generally means 'successful'.

In the school context, a successful behavior has generally identified with high achievement: this naturally poses the problem of how to assess achievement (Nor Fadilah et. al, 2010).

In fact, the three meanings overlap. For example, in the case of beliefs, sometimes 'positive' means that it is supposed to elicit a 'positive' emotion. A typical case is represented by the belief 'Mathematics is useful', which is also used in questionnaires aimed at measuring just the emotional dimension of attitude (i.e. the 'simple' definition of attitude: see Haladyna et. al, 1983). But often 'positive' referred to a belief means that it is supposed to be related to a 'positive' behavior, i.e. to a successful behavior. Sometimes the latter meaning has also used for emotions, implicitly admitting that a 'positive' emotion toward mathematics, being pleasurable, is necessarily associated with a 'positive' behavior in mathematics. On the contrary several studies (Evans, 2000 as cited in Mohamed & Ismael, 2011) suggest the possibility that for certain subjects an optimal level of anxiety exists: above this level, but also below it, performance is reduced.

The problem is that, generally differences between the various meanings have rarely made explicit: in this way, an a priori assumption had made as to what should in effect be the result of an investigation, for example, according to Rosetta & Petro (2007) that a belief that is 'positive' because, experts share it is associated.

This characterization is not so frequent in qualitative studies, and when it is used, it is generally accompanied by a description of the factors (behavior, beliefs, emotions) from which it is obtained.

In any case, the evaluation of a Positive attitude brings us back to a positive evaluation of at least one of the components: emotions, beliefs, behaviors, this continuous sliding between the researchers 'assumptions and the desired result of the investigation enhances the risk of circularity in research on attitude ,Yoseph (1997).

Depending on the criteria used to evaluate an attitude, different results obtained that an attitude can be evaluated 'positive' as regards the emotional dimension, but 'negative' regarding the cognitive dimension, or vice versa.

Rosetta & Petro (2007) suggested that the problem had only apparently overcome when the algebraic sum of the two components results in a single evaluation: Furthermore, as we have observed, beliefs have often used to assess the significance of the emotional dimension, or evaluated according to their 'behavioral' consequences, and this increases ambiguity. The differences in the use of the adjective 'positive' not only imply different choices of problem had dealt with. For example, Samuelsson & Granstrom (2007) the problem of identifying how to push a 'positive attitude', typically encountered in this field of research, requires a completely different approach depending on whether the positive attitude refers only to the emotional component or it refers to a particular pattern of beliefs and emotions, to be assumed as a model.

Generating positive attitudes towards mathematics among secondary school students is an important goal of this study. To develop positive attitudes on students, techniques to be employed to develop interest in mathematics. Curriculum should be flexible enough in order to meet the need of the individual child Kebede (2007), however, the existing practice of preparation of curriculum doesn't allow teachers to involve and participate in the preparation. In every class, there most certainly is a need for high degree of flexibility in order to adapt the learning environment to all pupils' level of mastery, learning possibilities and barriers.

The preparation of elementary school and secondary school curriculum are highly centralized at the regional government. Moreover, federal government levels respectively to limited experts. As in other subjects, the syllabus of Mathematics in most grades is very vast and is expected to be covered at the end of each academic year which forces the teacher to precede whether the students understood or not (Yohannes, 2007).

Engagement and motivation are critical elements in student success and learning. Engaged students learn more and retain more, and enjoy learning activities more than students who are not engaged George M. & George R. (2012).Those techniques had employed to develop interest in mathematics:

Intellectual activities:

The work in mathematics should challenge the intellect of students. Students' academic self-concept is both an important outcome of education and a powerful predictor of student success. Belief in one's own abilities is highly relevant to successful learning (Marsh, 1986 as cited in Tadese, 2006). It can also affect other factors such as well-being and personality development, factors that are especially important for students from less advantaged backgrounds.

Emphasis using practical application:

Students are working together usually in small groups, on a shared activity and with a common goal had been widely recommended in recent years as a strategy to enhance Mathematics learning for all students (Abera, 1993). The traditional way of teaching based on competitive and individualistic learning, which makes students work against each other to show who the best is and cooperative learning is advisable particularly. In Mathematics class, as Mathematics concepts and skills learned as a dynamic process with active engagement of the students, talking through mathematics problems with classmates helps students understand how to solve the problem correctly. It helps them to communicate effectively, it develops confidence in their individual Mathematics abilities, it helps them to learn more about future carriers from peers. In general, cooperative learning creates more positive attitude towards Mathematics (Andualem, 2006).

Correlation with other subjects

The lack of understanding of basic mathematical principles can result in an inability to solve numerous subjects such as chemistry, engineering, and other important scientific problems (Yoseph, 1997). Likewise, providing a specific recommendation to schools that take the responsibility for training teachers and thus to develop positive attitudes toward mathematics teaching Yohannes (2007). Difficulties in mathematics often caused by lacking of mathematics skills and understanding of the issue, knowledge, skills and commitment of teachers are keys of success in mathematics (Suthar, Tarmizi, Midi and Adam, 2009) as cited in Mohamed Z.G (2012).

Recreational activities and mathematics club:

Mathematics considered as dry subject and students' do not find anything interesting in it and this impression about Mathematics reversed with the help of recreational activities in Mathematics Ma X. & J. Xu (2004). It is also possible to present a lively and interesting picture of Mathematics with the help of these activities. Recreational activities bring variety and develop taste for Mathematics. In ancient times, Mathematics mainly studied for its recreational value as a leisure time activity (Sudhir K. & D.N. Ratnanlikar, 2003).

Practical work:

Students' beliefs and attitudes towards mathematics teaching and learning play an important role in mathematics education (Yoseph, 1997). The learning outcomes of students are strongly; related to their beliefs and attitudes towards mathematics. While, point out any good mathematics teacher would be quick to point out that students' success or failure in solving a problem often is as much a matter of self-confidence, motivation, Thus assessing or evaluating students' mathematical knowledge must be made with the awareness of their beliefs. Systematic inquiry into students' affective domain has grown a great deal during the last twenty years and many countries have been included in the research (Yohannes, 2007).

Use of teaching Aids:

In spite of the attention given to education by the government the budget allocated to schools is limited and is not sufficient to fulfill the basic needs of the schools.

There are no enough teaching materials in schools and teachers have forced to teach with almost no additional teaching materials. It is hard to find even simple materials such as protractors, solid figures, rulers etc. in schools. Textbooks are scarce so that each child cannot have one book of his own; one book may be shared with 2 or 3 other students. Since Mathematics by its nature is full of home works and assignments, not having a book on one to one basis has a big impact on the Childs' education Demissie (2007).

The shortage of relevant, low-cost books for use inside and outside the school continues to create challenges to provide quality education for all. Low access to teaching and learning materials, inadequate provision of additional reference books, not well equipped resource centers are some of the problems, which mentioned as barriers to teaching. The absence of the above mentioned resources make the teaching and learning of Mathematics more problematic to the students and teachers as they are forced to deal with only theoretical aspect and can't learn in a more (Kebede,2007)

Suitable physical conditions:

Education of the child affected by external factors other than the situation within the child. These can be divided in to three categories. Those which are at macro level such as laws and legislatives, policy and budget, Physical frame factors such as convenient class rooms, school yards, location of the school, availability of playing ground etc. and physical frame factors which can be seen related to socio-cultural situations of the community where the school is found(Yohannes, 2007).

Individual attention:

The child is the core element in the process of education. It is important to give due consideration to the knowledge, skills, attitudes capacities and needs of the individual child in order to have overall understanding about the child. In addition, whole range of influencing factors concerning the learning and teaching environment needs to be consider Demissie (2007).

Class room organization:

Deals with creating class rooms that contained students in general and students with special needs in particular. Other possibilities of creating learning environments like gardening, excursions, study visits and field work can be considered whenever convenient Andualem (2006).

Assessment:

To assess and evaluate is to gather, interpret and reflect on a variety of information in order to adjust the direction of action towards future aim. Educational assessment and evaluation consists of considerations and judgments about teaching and learning environments, process and results, and about their contextual relations. The very restricted perception of continuous assessment as continuous exams needs a revision. The purpose of assessment and evaluation is neither to give marks nor to place pupils in segregated environments. Rather its purpose should be to identify the needs, interest, capacity and problem areas of each individual child and act accordingly. What assessed are all eight main aspects of the curriculum model with relevant sub- aspects, and the interrelationship between these aspects Abera (1993).

Assessment methods:

Examples of assessment in a class setting include checklists, dialogue with the people, observations, logbook or diary, pupil's works, screening tests and portfolios. Individual assessment had done through interviews and conversations, questionnaires, pupil's self-evaluation, assessment as part of mediating, achievement tests and specific mastery or ability tests. Assessment is an ongoing process. This assessment process leads to continuous Modifications of curricular plans and implementations (Ademe & Gebre, 1990).

Communication:

Without communication, there will not be education, no matter how qualified and relevant the adaptation of content, methods and organization seems to be. Communication is certainly at the core of interaction and mediation. Pupils learn through interaction with their fellow human beings and with their environments.

Language and communication are essential tools in learning and cognitive development. Parents, teachers and peers may function as mediators and discourse partners in joint teaching and learning process (Yohannes, 2007).

In general a conscious effort on part of the teacher and parents can bring about a constructive change in the attitude towards mathematics of the students. This more positive attitude creates the opportunity for learning and motivation that leads to success in math regardless of past performance. This together with the important role mathematics education plays in the school education of a child makes it necessary to undertake measures positively affect attitudes and achievements in school level mathematics Nor Fadilah et.al (2010).

2.1.2. Students negative attitude towards mathematics

One of the reasons why students' attitude towards Mathematics is negative is that students are not able to see its relevance in daily life or in relation to other sciences. And hence the feeling that why learn if it has no use prevails among most students (Fennema & Sherman, 1976 as cited in Yohannes, 2007).Poor attitude towards mathematics has been often cited as factor that has contributed to lower participation and success girls in mathematics (Sileshi, 1995).

Most students at secondary school level have trouble with math than any other subject in same manner, previously learned math skills are the foundation on which new skill are built so, meaningful learning is a process through which new knowledge is absorbed by connecting it to some existing relevant aspect of the individual's knowledge structure George M. & George R.(2012). One of the reasons why students attitude towards Mathematics is negative is that students are not able to see its relevance in daily life or in relation to other sciences, and hence the feeling that why learn if it has no use prevails among most students (Fennema & Sherman, 1976:14 cited in Yohannes,2007). Many different factors lead students poor attitude towards mathematics. A number of studies indicate that students' achievement is correlated to highly with educational attainment of parents (Desalegn,2005), for instance students whose parents had less than high school education obtained lower grades in mathematics than those whose parents had higher level of education.

In almost all Ethiopian schools considering Mathematics as a challenging subject, which cannot be understand, is a common phenomenon among students, teachers and parents.

Nevertheless, this is true in many countries too Mathematics is considered by many individuals as a difficult subject to learn (Fennema & Sherman, 1976). This kind of outlook has a direct relation with achievement. Children with negative attitudes towards Mathematics have performance problems because they develop anxiety (Adamu, 2004).Students with low mathematics achievement is a factor to develop negative attitude towards mathematics and associated anxiety have been known to plague students with diverse Rosetta & Petro(2007).

They also suggested that a number of factors do influence students' mathematics achievement positively or negatively. One among these is students' attitude towards mathematics. Negative attitude towards Mathematics is also common among most parents and parents believe that Mathematics is hard to understand and they try to avoid it for their children as far as possible (Hannula M., 2002). Simple example that shows us the negative attitude of Ethiopian parents is their reluctance to send their children to college or university faculties, which offer Mathematics as a course. They encourage their children to enroll in the social science faculty where they think there are "no" Mathematics courses (Adamu, 2004). According Kristi Kislenko et. al. (2005) another factor which bears some influence on the relationship between success and motivation is the whole notion of 'worth' and this is arguably the aspect most likely to Change over time as motivation, social and emotional development will all influence the pupil's perception of what Mathematics achievement is 'worth'.

For some pupils at certain stages their notion of the worth of Mathematics may simply reflect teacher attitudes, at other stages peer attitude may be more significant and, particularly at the later stage of the secondary school, the perception of worth may be bound up with ideas of examination and employment prospects. In the case of young slow learners, the parental attitude towards education is of very considerable significance in the pupil's view of worth (Sileshi, 1995). Even those people who experience no great difficulty with Mathematics at school often avoid the subject as possible outside school. Hostile feelings and negative attitudes toward Mathematics and science, therefore, are much more influential on general behavior and values than epistemological issues George M. & George R. (2012).

These feelings and attitude that sustain a dislike of Mathematics or hinder any interest in Mathematics-are much more significant obstacles to the development of Mathematical literacy than any lack of particular concepts, skills, or thinking abilities. So one of the reason why students attitude towards mathematics is negative is that students are not able to see it relevance in daily life or in relation to other sciences, and hence the feeling that why learn if it has no use prevails among most students (Yohannes, 2007).

2.2. Factors Affecting students learning mathematics

There are factors that makes learning easy such factors that tends to promote learning are intent to learn, distributed effort over learning ,capitalizing whole and part of learning, knowledge of progress, recitation, active recall, application of what is learned and activity. The teaching/learning process modeled as a sequence of situations that result in new knowledge construction by students (Abera, 1993). On the other hand, according to Demissie (2007) Education is dynamic process, it reconstructs a new and better social pattern according to the changing needs of time, place and society psychology and learning mathematics inter personal and emotional factors. Before contact with the learner (whatever age they are), the teachers of mathematics has two important tasks this are; First to make a conceptual analysis of the material. And second to plan carefully way in which they necessary schemas can be developed, particular attention to stages at which restructuring of the learner's schemas will be needed (Rosetta & Petro,2007) Effective mathematics learning is thought to involve active engagement, ongoing discourse and reflection on one's own and others' actions (Desalegn, 2005).

This is particularly important in contemporary mathematics education, where knowledge and skills actively constructed through exploration, investigation and perseverance on a wide variety of challenging and complex problem solving tasks (Adamu, 2004). At the same time, he suggested that, communication and reflection had believed to stimulate modification or reorganization of previously held ways of thinking and acting, and to enable abstraction and generalization, allowing a higher level of learning.

Furthermore, purposefulness, investigation, reflection and communication are essential goal-oriented learning behaviors for the acquisition of mathematical knowledge and skills (Andualem, 2006).

On the observed investigations on gender difference girls are often discouraged from mathematical work in their primary schools (Adugna, 2004). In addition, he showed that they dislike it in the secondary schools so; they drop it at high-grade levels in far greater numbers than boys do. As a result, fewer women employed in industry and in post needing mathematical ability (Mohamed & Ismael, 2011). Male and female learners of mathematics have almost same type of achievement scores, because this gender-based gap is decreasing day by day. Still research indicates that this difference prevails in some areas of complex mathematical tasks (Rosetta & Petro, 2007).

Attitude based on value and belief, as well as varying degree of factual knowledge and still the consequences about the gender differences in subject of mathematics are not conclusive because there are so many other factors, which contribute towards achievement (Adugna, 2004). Poor attitude towards mathematics have cited as one factor that had contributed to lower participation and success of girls in mathematics. while, Interest and attitude in the subject are the special predictors for the students' participation and success in the subject then Gender based differences are due to the individual's perception of own abilities and the sex role (Desalegn, 2005).

AIJCR in George M. & George R. (2012) reported "almost all literature on this topic points to the commonly held perception that doing mathematics is consistent with a male self-image and inconsistent with a female self-image." The peer pressure usually causes this self-image. Males are more inclined towards mathematics than females on being the male dominated domain. It is found that at secondary school level most of the girls don't actively participate in mathematics classes due to their poor perceptions about mathematics thus, girls are negatively influenced by their sex-role stereotypes.

Poor mathematical skills in women deprived them from large number of professions because in some countries mathematical background knowledge is the pre requisite for entrance in any profession (Samuelsson & Grastrom, 2007).

They suggested that sex differences are the serious concerns for the communities it is a common observation that at higher levels females take mathematics quite lesser than the male students. Ultimately, the males fill more vacancies based on knowledge of mathematics than

the females and females do not prefer mathematics at higher level because they perceive it as a male domain Mohamed Z.G. (2012).

. Many barriers are there for the female students to have their career in mathematics, sometimes they feel pleasure in taking mathematics but their parents consider it as a useless effort for them and also female students show less confidence in mathematics than their male counterparts thus their attributions of failure and success also differ(Habtamu, 1996). Several measures and intervention programs has been designed for improving females attitude towards mathematics, observations and researches indicate that "women are clustered in the life sciences with far fewer in physical sciences, mathematics, and engineering and computer science" (Gavin, 1997 as cited in Mohamed & Ismael, 2011).

A number of scholars (Fennema & Sherman, 1976) have noted that Mathematics perceived as a male domain in various countries. Recent studies show that the magnitude of gender differences in Mathematics has declined over the years (Kebede, 2007). This statement showed the existence of gender difference in learning Mathematics even though it is declining over time even in the western countries through their socio economic development and the problem related to the education of girls can be seen associated with different outlooks (Adugna, 2004).

There is an outlook, which emphasizes any found difference, is biological and hence this difference is unalterable and changed. Therefore, schools could accept the difference as no changeable and not work to change them. The second outlook associates the existing problem to socio-economic situations and can be changed (Forgasz, 2001 as cited in Yohannes, 2007). Gender difference in the achievement of Mathematics varies from country to country (Yohannes, 2007). He noted that in developing countries like Ethiopia, girls had not given equal opportunity to education as boys. They have forced to marry at early age, remain at home to look after their siblings and to help their mothers at home.

Parents with low economic status cannot send all their children to schools and hence priorities to attend schools have given to boys and the girls remain at home (Kebede, 2007). Besides parents have a negative attitude towards the education of girls, this negative attitude related to socio cultural beliefs regarding gender roles and abilities, women seen as less capable.

Among other factor that, contributes to the gender difference, in the achievement of Mathematics are treatments of students by teachers in the classroom Habtamu (1996).

Studies showed that males receive more attention from teachers in terms of help, interactions and informal contacts, particularly from male teachers, a higher proportion of criticism for their behaviors, a great amount of work- related criticism (Mohamed & Ismael, 2011). They suggested that teachers tend to overestimate boy's potential in Mathematics and underestimate that of girls. Friendly learning environments or classes where there are cooperative activities, low level of social competition, extensive career guidance contribute to better performance of girls, any form of discrimination in Mathematics classrooms such as sexist humor, consistent use of male names and masculine contexts in test questions can have detrimental effects on females' attitude towards Mathematics (Andualem, 2006). However, many studies suggest there is no significant difference between attitude towards mathematics among male and female students. And also there are some other studies which suggest that the attitude of the participants of their study towards mathematics was more positive in the third year than the first year and there is a difference between attitude in the grade 8 (Kebede, 2007).

Hence it can be said that students‟ attitude towards mathematics are very subjective and varies among the students. Several studies had conducted to find out the relationship between attitude towards mathematics and academic achievement of the students. Most of these studies showed that there is a positive correlation between students attitude towards mathematics and academic achievement of students (Mohamed et al, 2011) and also achievement in problem solving ,the studies has also shown that students attitude towards problem solving in terms of patience, confidence and willingness has a positive relation with students‟ mathematics achievement (Mohamed Z.G., 2012).

Self-regulated learning thus depends on the interaction between what students know and can do on the one hand, and on their motivation and disposition the other.

PISA's investigation of student approaches to learning based on a model combining these two broad elements (Yohannes, 2007). They interact strongly with each other. For example, students' motivation to learn has a profound impact on their choice of learning strategies because, as shown below, some strategies require a considerable degree of time and effort to

implement and learners form views about their own competence and learning characteristics (Desalegn, 2005).

These had considerable impact on the way they set goals, the strategies they use and their achievement ,so there are two ways of defining these beliefs: in terms of how well students think that they can handle even difficult tasks – self efficacy and in terms of their belief in their own abilities – self-concept (Marshall, 1987 as cited in Sileshi, 1995). Accordingly, these two constructs are closely associated with one another, but nonetheless distinct. Self-related beliefs sometimes referred to in terms of self-confidence, indicating that such beliefs are positive. In both cases, confidence in oneself has important benefits for motivation and for the way in which students approach learning tasks therefor, in order to create relevant learning and teaching situations, and for children to be successful in their education and future life, overall assessment of school situations and other determinant factors is essential Demissie (2007).

Children's academic performance or other potentials can be affected or strengthen by internal or external factors. If some of these aspects have not seen thoroughly and dealt with proper considerations, the desired outcome of children being capable, self-confident and successful shuttered. As needs, potentials and interests of children vary, defining and implementing individual plans to meet the individual child's need is very important Abera (1993). According to Nor Fadilah (1992) some prominent factors that, contributed to difficulties in learning mathematics are students dislike in mathematics that, they may have stem from psychological incidences such as fear endurance ,perseverance and other associated factors. The mathematics curriculum may have failed to show much relevance real life application; Mathematics teacher lack of having much interest in the subject and consequently did not help students by way of catering for individual differences.

Having these issues in mind in the curriculum model developed by Johnson (2001, cited in Yohannes, 2007).Socio-economic, culture and school based factors with items such as method of teaching, availability of teaching-learning materials work load and motivation are final strategies to be adopted to improve learning and achievement (George M. & George R. 2012).

(Desalegn, 2005) Secondary school students appear to learn more mathematics from teachers with degrees or significance course work in mathematics also he raised the following questions what are the main problems related to the learning of Mathematics? Why do most students achieve low marks? What had done to improve their achievements? These some are of the questions that come to my mind during my teaching career. Now having this opportunity of doing a research, I decided to do it in this area to investigate my questions. Various reasons as to why students' achievement is very low had considered. Some of the possible reasons could be their attitude towards Mathematics, not understanding its practical application, large class size, no enough resource materials such as textbooks, reference books and teaching aid materials, not understanding the application of Mathematics in relation to other sciences and other fields etc. However, it is important to understand the real existing problems related to teaching and learning Mathematics based on a scientific research and hence propose a solution to alleviate the problems.).

Regarding to Ethiopian contexts, study on secondary school students (9_12) in Bahir Dar, the investigators (Ademe & Gebre, 1990) boys perform better than girls. Moreover, Fennema & Sherman (1978) had reported that boys perceived both their parents as more positive toward as learner of mathematics than did girls. Beside different treatments and reinforcements by parents, teachers, peers, and considers together with perceived usefulness of mathematics tend to account for the gender gap in attitude towards mathematics (Sileshi, 1995). He noted that Even if performance does not depend on sex difference, due to different factors at secondary school level boys perform better than girls do and girls make many mistakes than boys at secondary school level. Researchers frequently reported that female students have lower perception of competence and lower performances than male students do in mathematics (Hannula M. 2002).

From different studies, some investigators had generally agreed that attitude towards the learning of mathematics becomes increasingly less favorable beginning from the late elementary and early junior secondary school for boys and girls, so thing this particularly in the Ethiopian community's girls are engaged in household duties in order to support their family. They involve in taking care of young children, cooking and in carrying out other duties (Andualem, 2006). This does not allow girls to spend much time in their education in general and Mathematics in particular (Sileshi, 1995).

Most of the above-mentioned problems have their roots in the lower elementary schools. This makes the assessment of the problems and the proposing of possible solutions at this stage vital. In the Ethiopian educational system grade four is the end of the first cycle (lower elementary), hence the study gives us a general overview of the problems related to the teaching and learning of Mathematics in the lower grades and helps us to act accordingly(Yohannes, 2007). There are now wide speared recognition that affective factors play critical role in teaching and learning of mathematics (Githua & Mewing, 2003 as cited in Mohamed et. al. 2011). Accordingly, mathematics self-concept is one of the factor that influence students' achievements in mathematics and this factor related to their motivation to learn mathematics. Beside these, mathematics anxiety research among elementary to high school populations showed that it is an influential variable in mathematics Education.

The causes of poor attainment in school are complex. Usually many factors combine to give a low level of learning – physical, intellectual, emotional and social. The most common are slow maturation, poor attendance, environmental deprivation, emotional disturbance, and low average intelligence. This research study also tries to find solutions to factors affecting students learning mathematics. Research findings indicate that demographic, individual and instructional factors have an impact on mathematical achievement of students (Kebede, 2007).

Demographic factors include:

Students' gender, parents' educational level and students' socio-economic status are some of the demographic factors. Very important factor involved in motivating students and creating lifelong learners is the parent (Demmisie, 2007).

He noted that parental involvement in school and home is important in motivating students in addition to this parents are good role models and gives them another source to learn and include many different things as well. In addition, the relationship between parental involvement and students' motivation is that students are encouraged by seeing their parents take active interest in school (Duetscher, 2003 as cited in Demmisie, 2007). Parents' involvement in school activities is essential for the success of the school objectives.

Besides parents have a lot to contribute in helping their children to do their home works by providing proper study area, help them with their difficulties, supervising time for home work

and study (Kebede, 2007).on the other hand Environmental variables have impact on learning motivation because it includes the climate, the society, the peer, the classroom activities…etc. Furthermore, the environment of the classroom is important in the teaching, room, temperature comfort of seating, background and visual directions are all factors in the environment that can affect concentration and motivation (Kirschner V. 1981 as cited in Sileshi, 1995).

Instructional factors include:

Curriculum, instructional strategies and methods, teaching competency in math's education and school context and facilities are some of the instructional factors. In the Ethiopian context, the number of schools and number of students is incompatible. There are a large number of students in each class where this becomes a barrier to the learning of Mathematics. Many studies indicate that reduced class sizes lead to improved student achievement (Yohannes, 2007).

Accordingly, when it comes to lesson and curriculum there many things a teacher should do to become familiar with the students and get to know their individual learning needs because all teachers need to understand that every student learn differently. Resources are instructional materials, students' textbook, and reference books, said that there were no enough basic materials such as chalkboards, textbooks, teacher's guide, syllabus etc. In most schools because of budgeting, producing and distributing problems in general secondary schools.as a result, most of the learners were supplied with neither ample text books nor supplementary materials.

In addition to these problems, weak tradition of supplying reference books to Libraries, poor culture of reading, poor effort to create literate environment, less effort of teachers to prepare and use self-made supplementary materials are also other major problems MOE (2002).

The shortage of relevant, low-cost books for use inside and outside the school continues to create challenges to provide quality education for all. Low access to teaching and learning materials, inadequate provision of additional reference books, not well equipped resource centers are some of the problems that can be mentioned as barriers to teaching.

The absence of the above mentioned resources make the teaching and learning of Mathematics more problematic to the students and teachers as they are forced to deal with only theoretical aspect and can't learn in a more concrete way (MOE 1996 as cited in Yohannes, 2007).

In other word, less frequent situations, teachers clearly learn mathematics that is new to them, thus mathematics then serves them in the instructional design of subsequent lessons so many situations, it is difficult to differentiate between mathematical and pedagogical learning, and the distinction blurred because the teachers' knowledge situated largely in their teaching practice (Caroline M. & Kaczala, 1980). Development of the teachers' craft knowledge depends strongly on their systematic knowledge and the teachers' pedagogical knowledge and skill are responsible for their awareness of the importance of granting students autonomy in the mathematics classroom and of being open to student ideas (Ma, X. & J.XU, 2004). Finally, they found that teachers with more profound mathematical understanding feel safer allowing students to present their mathematical ideas and ask questions.

Individual factors include:

Self-directed learning arithmetic ability, and motivation or concentrations are some of the individual factors. In addition, the causes of poor attainment in school are complex usually many factors combine to give a low level of learning such as physical, intellectual, emotional and social are slow maturation, poor and low average intelligence (Kebede, 2007). Research also shown that students attitude towards problem solving in terms of patience, confidence and willingness has positive relation with students mathematics achievement (Mohamed & Ismeal, 2011).

Likewise, impoverishment of facilities, lack of instructional materials and declining quality of teachers has contributed to the decline of educational standards in general and the impact was bad on the quality of teaching in science, Mathematics and English in particular (MOE, 2002). Taking this problem in to account their crucial contribution towards the development of the country educational Sectors; consideration should be seen on quality of teachers and lack of instructional materials (Yohannes, 2007).

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Research design

Even though the selection of research design depends on the nature of the study, the research problems had addressed and the resources available for the study, there is an increasing attention of using both quantitative and qualitative methods as a research strategy. According to Creswell (2009) as cited in Abdisa (2013), for mixed research, the overall strength of the study is greater than either qualitative or quantitative methods. Also, (Abdisa, 2013) recommended that employing both qualitative and quantitative methods is preferable because using both enable the researcher to verify and substantiate the data; and discover something that would have been missed either quantitative or qualitative approach had been used. If you generated a finding by a qualitative method, perhaps you can check it by using a quantitative data collection method (Gall et al, 2003 cited in Yohannes, 2007).

Therefore, both quantitative and qualitative techniques employed to meet the stated objectives of the study. Quantitative techniques had used to analyze the data gathered through questionnaire and achievement test. The data that obtained through interview and observation analyzed, organized and summarized by qualitative methods. The result of quantitative analysis had confirmed by qualitative results for effective achievement of the study objective.

3.2. Research methodology

3.2.1. The source of data

For the success of this study, both primary and secondary sources had used. Primary sources had used to collect data from different respondents on time and detail information about the issue under study. Secondary sources have used to collect data from different published and unpublished materials such as research articles, websites, recent publications, relevant books and journals. Likewise, the study conducted at Adama city on general secondary schools. The goal of this study is identification of attitudes of students towards mathematics and factors affecting their learning in government general secondary schools of Adama city.

3.2.2. Study population

The study covers government general secondary schools of Adama city. In this area there are three government secondary schools namely Goro, Adama and Dembela secondary schools. There were 2053 grade 9 and 1922 grade 10 students in Goro, there were 1904 grade 9 and 2099 grade 10 students in Adama and there were 1144 grade 9 and 986 grade 10 students in Dembela secondary schools. Thus 3975, 4003, 2130 students were in Goro,Adama and dembela secondary schools respectively. Moreover, total numbers of students were 10108. On the other hand, there were 45 mathematics teachers in these schools 15 in Goro, 17 in Adama and 13 in dembela. To complete the study on the allocated time determining an appropriate sample size is very vital issues in research because large sample size may affect the researcher to complete on time and brings economical problem to the researcher to get accurate data; on the other hand small sample size may lead to inaccurate results. So determining appropriate sample size is a vital issue depends on the purpose of the study, homogeneity or heterogeneity of the population.

3.2.3. Sample size and sampling technique

To determine the appropriate sample size for this study the desired confidence level had assumed 95% and maximum variability that is present in the population is assumed 0.05. The overall secondary schools in Adama city, Number of students and Mathematics teachers in each secondary school in 2006 E.C. summarized in the following table: Now first determining the appropriate sample size to apply the instrument is the necessarily step. Therefore, the sample size of the population was discussed table in the table below.

Table 1: Description of study population, sample size and gender and grade level for students

		Government secondary schools							
		Goro		Adama		Dembela		Total	
Population		M	F	M	F	M	F	M	F
Students' grade	9	852	1201	670	1234	560	584	2082	3019
	10	900	1022	1002	1097	449	537	2351	2656
Total		1752	2223	1672	2331	1009	1121	4433	5675
Teachers		11	4	12	5	12	1	35	10
Sample size		M	F	M	F	M	F	M	F
Students' grade	9	29	40	25	42	20	21	74	103
	10	31	36	32	38	15	17	78	91
Total		60	76	57	80	35	38	152	194
Teachers		10	4	10	4	10	1	30	9

As summarized in table 1 there were 346 sample respondent students, 136, 137, 73, sample students/respondents were taken from Goro, Adama and Dembela, secondary schools respectively. Moreover, there were 39 sample respondent mathematics teachers 14, 14 and 11were taken from Goro, Adama and Dembela secondary schools respectively. Out of student respondents 152 (43.93%) were male whereas 194 (56.07%) were female. On the other hand, there were 177 (51.12%) grade 9 and 169 (48.88%) grade 10 students.

Since it is usually not possible to deal with the whole (target) population, The researcher identified the above sample size for this study using proportion allocation formula. After determining the sample size, study samples allocated to each school in proportion. Probability sampling (systematic random sampling) techniques were employed in selecting sample respondents in each school to achieve the objectives of the study in each secondary schools.

3.2.4 Data Collection and processing instrument

In order to collect sufficient information from different sources in the study area, several data collection tools had employed. The tools used for primary data collection include achievement test, questionnaires, key informant interview guides, and personal observation checklist whereas; secondary data had obtained from school societies, related literature and different Educational articles. Because it shows self-report of students for this research the instrument used were mainly questionnaire, achievement test and class observation using classroom observation guide lines.

Questionnaire:

Based on the literature, the questionnaire had considered as a common instrument to study beliefs and attitudes (Leder & Forgasz, 2002 cited in Abdisa, 2012). Several researchers use questionnaire as a main tool (e.g., Graumann, 1996; Pehkonen, 1994; Pehkonen, 1996; Pehkonen & Lepmann, 1994; Perry, Howard, & Tracey, 1999; Tinklin, 2003; Tsamir & Tirosh, 2002; Vacc & Bright, 1999; Williams, Burden, & Lanvers, 2002 cited in Kebede, 2007).

The purpose of questionnaire were to identify students ability in mathematics, understanding of the classroom teaching process, the perception of the students towards their teachers liking of the subject ,the importance of mathematics in their future career choices. The questionnaire developed from other researcher's instruments and personal Experience. The questionnaire was worded both in the positive and in negative sense ranging from "strongly agree to "strongly disagree" For the positive sense questionnaire a value of 5 was assigned to "strongly agree" ,decreasing values of 4,3,2,1 were given to the other questions, where "strongly disagree was assigned the value 1. For negative sense questionnaire; values was assigned in the opposite sense.

For this study, two separate questionnaires were prepared for students and mathematics teachers. The questionnaires for students (self-report) was structured and used to collect data about the entire status of the issue under investigation. It also supposed to supplement all other instruments in the study the first questionnaire administered to 346 secondary school students. The second type of questionnaire prepared for 39 mathematics teachers also

structured and used to understand how the issue under investigation is analyzed both questionnaire were supposed to survey the total state of the issue.

Interview:

The second instrument for this study was interview prepared to secondary school mathematics teachers to get some additional investigation on students' attitude towards mathematics, current students' mathematics achievement and factors affecting students learning mathematics. The interview made with six mathematics teachers from the six secondary schools using simple random selection of one mathematics teacher from each school.

Class room observation:

This instrument used to see the participation of the students in the actual classroom condition. Many scholars believe that observation provides that an accurate information about the issue under investigation. In this study class room observation of the same group had done twice for 40 minutes taking one classroom from each government secondary schools. The number of students in each class ranges from 75 up to 80.

The behavior observed in each observation period had filled in the observation checklist and field notes. The checklist was prepared in the way that the observer can tick (✓) or mark under 'yes' or 'no' column according to the behavior observed. In addition note taken to supplement this observed behavior. This instrument used for researcher to substantiate and consolidate the information obtained through questionnaire and interview.

Achievement test:

This was the other basic instrument, which shows students mathematics achievement. Students' achievement test was prepared for both grades 9 and 10 students selected from all government secondary schools. Thus, the researcher prepared Achievement test for 120 students 60 from grade 9 and 60 from grade 10 and the number of male and female students are proportional.

Next the collection process started by distributing questionnaire to sample students and mathematics teachers, and achievement test given to the selected students to have enough

information on quantitative data. Moreover, qualitative data collected through interview for mathematics teachers to substantiate the data collected through questionnaire survey and similarly observation held throughout the data collection process. The data collected with the assistant of secondary school teachers, administrators in the selected schools and with the supervisor of the researcher. A questionnaire had pre-tested before actual data collection to check whether the questions are decent to collect the required data or not. Second, sample respondents' was classified and arranged into two groups to collect the data. The group was respondents for questionnaire survey and the respondents for interview.

3.2.5 Methods of Data Organization and Analysis

3.2.5.1 Methods of Data Organization

A codebook was prepared to organize the data for analysis after the completion of data collection process. The preparation of codebook were include and labeling each variable which were analyzed by using SPSS Software version 20, and the responses were recording in the computer code book file.

3.2.5.2. Methods of Data Analysis

Students' response to mathematics achievement test and mathematics self-concept scale, class room observation and teachers' response on their students' attitude towards mathematics and factors affecting their learning were the sources of data after assigning scores for each respondents, then mean and standard deviation were computed for attitude, achievement and factors affecting students' learning mathematics. The raw data had analyzed, summarized and interpreted into a meaningful form using independent group sample T-test between male and female students' whereas ANOVA among the schools. Different statistical techniques that comprise both descriptive and inferential statistics employed to analyze the raw data for this study.

3.2.6. Pilot study

The main objective of pilot study is to improve the instruments on students self-report. Accordingly, 29-items were using Lickert scale on students' attitude towards mathematics and factors affecting their learning mathematics analyzed to find the reliability for each item. Twenty students had selected randomly from Goro secondary school. Thus, after applying, the item analysis procedure 18 had selected and eleven rejected.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

4.1. RESULTS

This section had divided in to five parts. They are socio- demographic characteristics of students and corresponding mathematics teachers, results on students' attitude towards mathematics, results on students' mathematics achievement, results on factors affecting students learning mathematics and correlation among students' attitude, achievement and factors affecting learning mathematics. The study had mainly based on the quantitative data gathered through questionnaire and achievement test whereas qualitative data gathered through interview and classroom observation. The data collected from primary investigation in the study area had tabulated and analyzed with reference to stated objective of the study.

In this study, Mathematics teachers and students were the main stockholder. Questionnaires, classroom observation and achievement test to students administered. Questionnaires and Interview administered for Mathematics teachers and classroom observation done in the selected schools using method mentioned in the methodology. The information obtained from the questionnaires analyzed using SPSS. In this section, the findings had categorized and presented in four main themes. These are the attitude of secondary school students towards mathematics, the status of secondary school students' mathematics achievement, Factors affecting students' learning mathematics and correlation among students' attitude, achievement, factors affecting learning and sex difference in government secondary schools of Adama City.

These result sections presented the major findings, beginning with socio-demographic variable that used for comparative purposes latter on. This is followed a presentation of the attitude, achievement of mathematics, factors affecting students learning mathematics and a relationship between attitude and achievement.

4.1.1. Socio Demographic Characteristics of the Respondent

The major respondents of this study were government secondary school students and their mathematics teachers. The socio demographic characteristics of respondents were described in detail in the following two tables. Table 2 represents the demographic back ground of the students according to their gender and age level. The number of students participated in this study was 346, of which 152 were male students and 194 were female students.

Table 2: Socio Demographic characteristics of government secondary school students/respondents

Schools	Sex	Students' age and grade						Total
			14 years	15-20 years		Above 20 years		
		9	10	9	10	9	10	
Goro	M	23	-	6	26	-	5	60
	F	31	-	9	30	-	6	76
Adama	M	19	-	7	22	-	10	58
	F	33	-	8	30	-	8	79
Dembela	M	13	-	6	11	-	4	34
	F	15	-	7	12	-	5	39
Total		134	-	43	131	-	48	**346**

Table 2 above showed those 134 students whose age were 14 years and 43 students whose age between 15-20 years and in grade 9. While 131 students between 15-20 and 48 students above 20 years were in grade 10.In addition to this there were 60 male and 76 female students were from Goro secondary school, 58 male and 79 female students were from Adama secondary school and 34 male and 39 female students were from Dembela secondary school.

Similarly, table 3 represents the demographic background of mathematics teachers according to their Educational qualification and work experience. The number of mathematics teacher participated in this study was 39, of which 30 were male and 9 were female teachers.

Table 3: Socio Demographic characteristics of government secondary school mathematics Teachers

school		Educational qualification and work experience										Total
		Below 5 years		5-10 years		11-15 years		16-20 years		Above 20 years		
		BA/BSC	MA/MSC	BA/BSC	MA/MSC	BA/BSC	MA/MSC	BA/BSC	MA/MSC	BA/BSC	MA/MSC	
Goro	M	1	-	1	1	3	1	2	-	1	-	10
	F	-	-	1	-	1	-	1	-	1	-	4
Adama	M	2	-	3	-	2	-	1	-	2	-	10
	F	-	-	1	-	2	-	1	-	-	-	4
Dembela	M	1	-	3	-	4	-	2	-	-	-	10
	F	-	-	1	-	-	-	-	-	-	-	1
	Total	4	-	10	1	12	1	7	-	4	-	**39**

Table 3 above showed that there were 4 mathematics teachers whose work experience was below 5 years, 11 teachers were between 5-10 work experiences, 13 teachers were between 11-15 work experience years, 7 teachers were between 16-20 years' work experience and 4 teachers were above 20 years of work experience.

In addition to these 14 teachers were from Goro secondary school such that 2 of them had second degree while the remaining 12 had first degree, 14 teachers were from Adama secondary school all of them had first degree and 11 teachers were from Dembela secondary school again in this school also all had first degree.

4.1.2.Results on students' attitude towards mathematics

The attributes for students 'attitude towards mathematics consists of a set of 25 statements to which respondents respond using a five point Likert scale. The questionnaires related to their self-confidence in learning mathematics, the usefulness of mathematics, the importance of conceptual understanding in mathematics, the relation between effort and ability in mathematics. And teachers' attitudes towards their ability in mathematics, understanding of the classroom lecture, the perception of the students towards their teachers liking of the subject, the importance of mathematics in their future career choices. The questionnaires worded both in the positive and negative sense ranging from "strongly agree to "strongly disagree". For the positive sense questions a value of 5 was assigned to "strongly agree, decreasing values of 4,3,2,1 were given to the other questions, where "strongly disagree was assigned the value 1. For the negative sense questions, the values had assigned in the opposite sense.

Table 4 contained 10 items from both positive and negative statements. In this table, the researcher showed mean comparison of each item response of students among the schools. The mean and standard deviation of the combined scores had calculated, ANOVA (Analysis of Variance) has been used to test the variance in the mean of the combined score for the different classes of students' attitude.

Table 4: Mean comparison of Students Responses on Attitude towards Mathematics among the three schools

No	Items	Goro		Adama		dembela			Total	
		Mean	SD	Mean	SD	Mean	SD	Grand mean	F-value	p
1	Mathematics is important in everyday life	4.80	.4	4.80	.4	4.75	.43	4.80	.73	.482
2	Mathematics is the most important subject for students to study	4.73	.61	4.73	.44	4.75	.43	4.73	.05	.951
3	I have usually enjoyed study mathematics	4.09	.51	4.45	.49	4.24	.43	4.27	18	.000
4	I am happier in math class than in any other class	3.71	1.36	4.19	.93	4.51	.50	4.07	14.9	.000
5	I have usually been at easy during mathematics test	3.06	1.29	3.47	1.15	4.24	.43	3.47	27.6	.000
6	I always worry about my ability to some mathematics problems	3.18	1.27	2.61	1.44	3.75	.43	3.08	21.5	.000
7	My friends always help me in solving Mathematics problems.	3.37	1.38	4.09	1.32	3.26	.83	3.63	15.1	.000
8	Mathematics test questions are more difficult when compared with other subject test questions	3.34	1.57	2.82	1.11	2.00	.71	2.85	27.2	.000
9	I am always under a terrible strain in a mathematics class	3.07	1.26	2.42	1.42	1.74	1.30	2.53	24.4	.000
10	I always imitate my friend answer in mathematics	3.07	1.53	2.98	1.60	3.27	1.79	3.08	.763	.467
	Total items' mean							3.7		.002

As indicated in table 4 the grand mean of item one was 4.8 which indicate high scale and SIG = .482, $p > .05$. The grand mean of the item two was 4.73 indicate high scale and SIG = .951, $p > .05$ and grand mean of item ten was 3.08 medium scale and SIG = .467, $p > .05$ showed that no significant difference among the response of respondents in three schools.

However, regarding to item ten the response of showed that respondents did not decide whether they imitate their friend's answers on examination or not. While the grand mean of item three 4.27, grand mean of item four was 4.07 and grand mean of item seven was 3.67 indicated high scale. On the other hand grand mean of item five was 3.47 and grand mean of item six was 3.08 indicated medium scale while the grand mean of item eight was 2.85 and grand mean of item nine was 2.53 indicated low scale. In items three, four, five, six, seven, eight and nine SIG = .000, $p < .05$ implied that there were significant difference among the response of respondents in three schools. In Goro secondary school students were under terrible strain on math, math test questions were difficult to them than students in Adama and Dembela schools.

From this, the result indicated that students in mathematics class at Adama secondary school were most interesting to that of Goro and Dembela secondary schools students. Frustration at examination was low on students of Dembela secondary school than Goro and Adama secondary schools .On contrary Goro secondary school students were under terrible strain in a mathematics class than Adama and Dembela secondary school students. From the response of students on item ten in Dembela secondary school cheating on examination was very high. One of the questions answered in this study was attitude towards mathematics among the three government secondary schools.

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Similarly, table 5 contained 10 items that listed in table 4 in this table the researcher showed mean comparison between male and female students. The mean and standard deviation of the combined scores calculated, independent sample t-test had used to obtain t-value.

Table 5: Mean comparison of Male and female Students on Attitude towards Mathematics

No	Items	Male		Female		t-value	SIG(2 tail)
		Mean	SD	Mean	SD		
1	Mathematics is important in everyday life	4.81	.40	4.8	.40	.19	.985
2	Mathematics is the most important subject for students to study	4.71	.5 4	4.76	.49	1.032	.303
3	I have usually enjoyed study Mathematics	4.3	.53	4.23	.51	1.157	.248
4	I am happier in math class than in any other class	3.97	1.16	4.14	1.07	1.485	.139
5	I have usually been at easy during mathematics test	3.50	1.18	3.44	1.19	.449	.654
6	I always worry about my ability to some mathematics problems	3.18	1.21	2.99	1.34	1.392	.165
7	My friends always help me in solving hematics problems	3.60	1.36	3.66	1.27	.528	.598
8	Mathematics test questions are more difficult when compared with other subject test questions	2.87	1.36	2.83	1.32	.241	.810
9	I am always under a terrible strain in a Mathematics class	2.59	1.45	2.47	1.39	.766	.444
10	I always imitate my friend answer in mathematics	2.96	1.64	3.17	1.59	1.201	.231

As shown in Table 5 grand mean of item one for both male and female students were 4.81 and 4.8 respectively thus indicated high score and the obtained t-value df (344), t(.19)and p = .985 > .05. It could be said that there was no difference on response of male and female students on the use of mathematics for everyday life. Grand mean on item two was for both male and female were 4.7 and 4.76 respectively thus indicated high score and the obtained t-value df (344), t (-1.032) and p = .303 > .05 indicated that no difference on response of male and female students on mathematics is important subject to be studied.

Grand mean on item three for both male and female was 4.3 and 4.23 respectively thus indicated high score and obtained t-value df (344), t (1.157) and p = 248 > .05 showed that no difference on response of male and female students. Grand mean on item four for both male and female students was 3.97 and 4.14 respectively thus indicated high score and the obtained t- value df (344), t(1.485) and p = .139 > .05 indicated that no difference on response of male and female students.

Grand mean on item five for both male and female students was 3.5 and 3.44 respectively almost indicated medium score and the obtained t- value df (344), t(.449) and p = .654 > .05 indicated that no difference on response of male and female students. Grand mean on item six for both male and female students was 3.18 and 2.99 respectively indicated medium score and the obtained t- value df (344), t(.165) and p = .654 > .05 no difference on response of male and female students. Grand mean on item seven was 3.6 and 3.66 respectively thus indicated high score and the obtained t- value df (344), t(.528) and p = .598 > .05 indicated that no difference on response of male and female students.

Grand mean on item eight for both male and female students was 2.87 and 2.83 respectively indicated almost low score and the obtained t- value df (344), t (.241) and p = .810 > .05 no difference on response of male and female students. Grand mean on item nine for both male and female students was 2.59 and 2.47 respectively indicated almost low score and the obtained t- value and df (344), t(.766) and p = .444 > .05 no difference on response of male and female students. . Grand mean on item eight for both male and female students was 2.96 and 3.17 respectively indicated almost low score and the obtained t- value df (344), t(-1.201) and p = .231 > .05 no difference on response of male and female students.

Form the results of Table 5 almost in all items there was no significant difference on the response of students from the three government secondary schools it could therefore, concluded that there is no significant difference between male and female students in government secondary schools of Adama city. In general merging the response of students from the schools the number of students participated in this study was 346, of which 152 were male students and 194 were female students.

As observed from the result of students' response, there was significant difference on students' attitude towards mathematics. Moreover, 167(48.27%) students had positive attitude, 63(18.2%) had neutral and 116(33.53%) had negative attitude towards mathematics. in government secondary schools of Adama city. Male and female students of 9th and10^{th} grade of the secondary schools of Adama city have same type of attitude towards mathematics. It means that gender differential has no impact on the attitude of students towards mathematics.

Table 6 contained 5 items from both positive and negative statements. In this table the researcher wanted to reveal mean comparison of each item response of teachers among the schools. The mean and standard deviation of the combined scores were calculated, ANOVA (Analysis of Variance) has been used to test the variance in the mean of the combined score for the different classes of students' attitude.

Table 6: Mean comparison among the three schools Mathematics teachers' response to students attitude towards mathematics.

No	Items	Goro		Adama		embela		Total		
		Mean	SD	Mean	SD	Mean	SD	Grand mean	F-value	p
1	Mathematics helps students to come real life activities	4.5	.52	4.64	.49	4.72	.47	4.61	.68	.514
2	Mathematics is difficult than any rs subject	2.00	1.04	193	.83	2.00	.83	1.97	.027	.974
3	Students class performance affects students learning mathematics	4.5	.52	3.64	.49	4.00	.63	4.05	8.71	.001
4	Students inability on examination affect them learning mathematics	3.5	.52	4.00	.00	3.73	.47	3.74	5.56	.008
5	Mathematics help students in learning other subjects	4.5	.52	4.57	.51	4.55	.52	4.54	.068	.934
Total items' mean								3.8		.4862

As indicated in Table 6 Mathematics helps students real life activities the grand mean of teachers response among the three schools were 4.61 high score and df(37),p = .514 > .05 , on the other statement mathematics helps students to learn other subject the grand mean of teachers response among the three school were 4.54 high score and df (37). P = .934 > .05 from the result all government secondary school teachers believe that these three items are

necessary for students and there was no significant difference on their response in Adama city.

On the statement students class performance affects students learning mathematics the grand mean of teachers response among the schools were 4.54 high score and df (37), p =.974 > .05. Almost in all these three statements, the responses of teachers were similar in all government secondary schools of Adama city.

while, on the statement students class performance affects students learning mathematics was 4.05 high score and df (37) , p = .001< .05 on statement students inability on examination affects them learning mathematics the grand mean of teachers response among the schools were 3.74 high score and df (37), p =..008<.05 there was slightly a significant difference on their response among government secondary schools of Adama city. On the other hand on the statement mathematics is difficult than any other subject the grand mean was 1.97 which was low score and df (37), p = .974 > .05 thus, all teachers of Adama city gave response that mathematics is not difficult than any other subject. It could conclude that there was no significant difference on students' attitude towards mathematics in Adama city government secondary schools.

4.1.3. Results on student' mathematics achievement

To obtain current government secondary school students' mathematics achievement in this city; two mathematics achievement test was prepared for each grade level. For that the researcher had prepared achievement test to compare Mathematics achievement of students from the three schools and also to compare gender difference in mathematics achievement. 20 questions were prepared for each grade level, respondent students were used 60 minutes to complete all questions and the result of each students were recorded in table 7. And next questionnaire were prepared to selected mathematics teachers to strengthen the result obtained through achievement test and this is revealed in table 8.

Table 7: Achievement test scores of 120 grade 9 and grade 10 government secondary school students

No of students	Government secondary schools											
	Goro				Adama				Dembela			
	Grade 9		Grade 10		Grade 9		Grade 10		Grade 9		Grade 10	
	M	F	M	F	M	F	M	F	M	F	M	F
1	14	14	10	10	10	6	12	10	6	12	12	10
2	12	8	18	10	8	8	10	8	8	10	10	12
3	10	8	18	8	6	14	8	14	12	8	8	14
4	16	6	10	6	12	12	14	10	14	6	8	6
5	6	4	8	12	20	10	6	8	10	4	8	8
6	4	12	6	14	10	6	4	12	12	8	12	12
7	20	4	6	12	8	4	2	12	10	4	10	6
8	18	12	12	16	20	12	10	10	16	10	14	6
9	16	16	4	6	4	10	8	10	12	6	4	10
10	8	10	12	8	10	14	6	8	10	12	4	12
GRAND MEAN	12.4	8.0	10.4	8.6	5.4	9.6	10.2	9.4	11.0	8.0	10.2	8.8

As indicated in Table 7 mathematics achievement of Goro secondary school grade 9 male students grand mean was 12.4 that revealed medium score but in comparison to other government secondary schools male grade 9 Goro secondary school had better mathematics achievement test result. Therefore there was significant difference on mathematics achievement of grade 9 male students of Adama city government secondary schools. On the other hand, mathematics achievement of Adama government secondary school female grand mean was 9.6 below the average result while in comparison to other government secondary schools female grade 9 Adama secondary school students had better result.

Hence, there was significant difference in mathematics achievement of grade 9 female students in Adama city government secondary schools. From the Table mathematics, achievement grand mean of grade 9 male students in Goro, Adama and Dembela was 12.4, 10.8 and 11 respectively. While grand mean of grade 9 female students in Goro, Adama and Dembela was 8.0, 9.6 and 8.0 respectively showed that there was a significant difference between male and female grade 9 students. From this, the researcher concluded that male students in grade 9 had medium achievement while female students in this grade level had low achievement of mathematics.

Moreover, grade 10 students' mathematics achievement grand mean of male students in Goro, Adama and Dembela was 10.4, 10.2 and 10.2 respectively. Almost the mean value and observed that there was no statistically significant in grade 10 male government secondary school students of Adama city. On contrary grade 10 mathematics achievement, grand mean of female students in Goro, Adama, and Dembela was 8.6, 9.4 and 8.8 respectively below the average value and showed that there was statistically significant in grade 10 female government secondary school students of Adama city.

In addition, there was statistically difference between male and female grade 10 students. Similar to grade 9 , it had concluded that male students in grade 10 had medium achievement while female students in this grade level had low achievement of mathematics. From the response of students, concluded that in Adama city secondary schools male students in both grade levels had medium mathematics achievement while female had low mathematics achievement.

In table 8 the researcher showed by merging government secondary schools mean comparison between male and female students. The mean and standard deviation of the combined scores were calculated, independent sample t-test had been used to obtain t-value.

Table 8: Mean comparison between male and female students on achievement

	Grade	Sex	Grand mean	SD	t- value
Merging government secondary schools	9	M	11.4	.71	.032
		F	8.6	1.08	
	10	M	10.26	.84	.046
		F	8.94	.99	

Table 8 revealed that mathematics achievement grand mean of grade 9 male student was 11.4 showing medium score and that of female was 8.6 indicated low score suggested that in comparison male students had medium achievement in mathematics than female in grade 9. At the same time, the table indicated that mathematics achievement grand mean of grade 10 male student was 10.26 showing medium score and that of female was 8.94 indicated low score suggested that in comparison male students had medium achievement in mathematics than females in grade 10.

Table 9 contained 5 items from both positive and negative statements. In this table the researcher wanted to show mean comparison of each item response of teachers among the schools. The mean and standard deviation of the combined scores had calculated ANOVA (Analysis of Variance) used to test the variance in the mean of the combined score for the different classes of students' attitude.

Table 9: Mean comparison of Teachers response on students mathematics achievement

No	Items	Goro		Adama		Dembela		Total		
		Mean	SD	Mean	SD	Mean	SD	Grand mean	F-value	P
1	Students poor mathematical skill leads to low performance and achievement	4.5	.52	3.71	.99	4.27	.47	4.15	4.41	.019
2	Students encouragement in class affect their mathematics achievement	4.5	.52	4.4	.50	4.45	.93	4.44	.173	.842
3	Students confidence on mathematics affects their achievement	1.5	.52	2.7	.99	2.27	.46	2.15	10.2	.000
4	Resource materials on mathematics affects students' performance and achievement	4.5	.52	3.3	.99	2.73	.47	3.6	20.44	.000
5	Mathematics anxiety influence students mathematics achievement	3.1	.92	3.6	.50	2.9	.83	3.2	3.31	.048
Total items' mean								3.51		.178

Table 9 indicated that on the statement Students encouragement in class affect their mathematics achievement the grand mean among schools was 4.44 showing high score and df (37), $p = .842 > .05$. There was no statistically significant on the response of teachers among the schools. This showed that in Adama city government secondary schools teachers agree that students' encouragement in a class was one of the factors that affect students' achievement in mathematics. On the statements Students poor mathematical skill leads to low performance and achievement the mean in Goro, Adama, and Dembela was 4.5, 3.71 and 4.27 respectively with grand mean 4.15 showing high score and df(37), $p = .019 < .05$. There was statistically significant on response of teachers among the schools about this item but the teachers from all schools indicated that poor mathematical skill leads to low performance and achievement.

On the other statements; Students confidence on mathematics affects their achievement the grand mean was 2.15 showing low score and df (37), p = .000, Mathematics anxiety influence students mathematics achievement the grand mean was 3.2 showing medium score and df (37), p = .048 < .05. Even if there was a significant difference on the response teachers in the schools on these items, they indicated that confidence on mathematics and Mathematics anxiety had a little influence on students' mathematics achievement.

For the statement Resource materials on mathematics affects students' performance and achievement mean in Goro, Adama and Dembela schools was 4.5, 3.3 and 2.73 respectively and grand mean 3.6 showing high score and df (37), p = .000 revealed that there was statistically significant on the response of teachers with in schools. From this one can revealed that resource material affected Goro secondary school students' mathematics achievement.

4.1.4. Result on factors affecting students' learning mathematics

The attributes for factors affecting students' learning mathematics consists of a set of 22 statements to which respondents respond using a five point Likert scale. The questionnaires related to their parent economic status and learning mathematics, school environment in learning mathematics, peer pressure in learning mathematics, teachers' attitudes towards their ability in mathematics, understanding of the classroom lecture, the perception of the students towards their teachers liking of the subject, the importance of mathematics in their future career choices. The questionnaires worded both in the positive and negative sense ranging from "strongly agree to "strongly disagree". For the positive sense questions a value of 5 was assigned to "strongly agree, decreasing values of 4,3,2,1 were given to the other questions, where "strongly disagree was assigned the value 1. For the negative sense questions the values assigned in the opposite sense.

Table 10 contained 8 items from both positive and negative statements. In this table the researcher showed mean comparison of each item response of students among the schools. The mean and standard deviation of the combined scores were calculated, ANOVA (Analysis of Variance) has been used to test the variance in the mean of the combined score for the different classes of students' attitude.

Table 10: Mean comparison among the three schools on students response about Factors affecting learning mathematics

No	Items	Goro		Adama		Dembela		Total		
		Mean	SD	Mean	SD	Mean	SD	Grand mean	F-value	P
1	Family economic status affects students learning mathematics	4.18	.72	4.27	.75	3.75	.43	4.12	14.25	.000
2	Method of teaching affect students learning mathematics	2.97	1.14	3.64	1.22	1.89	1.16	3.01	52.92	.000
3	School environment affects students learning mathematics	4.05	1.23	4.57	.88	3.01	1.01	4.04	51.72	.000
4	Family educational status affects students learning mathematics	4.18	.83	4.08	1.01	3.92	.64	4.09	2.206	.112
5	Class room size do not affect students learning mathematics	3.80	1.20	3.92	1.16	3.75	.43	3.84	.709	.493
6	Students class activity do not affect learning mathematics	3.90	.91	4.19	.93	4.01	1.23	4.04	3.002	.510
7	Motivation and readiness affects students learning mathematics	2.65	1.56	4.18	.71	4.51	.86	3.65	86.65	.000
8	The behavior of subject matter affects students learning mathematics	2.80	.96	3.27	1.04	4.25	.43	3.29	60.3	.000
Total items' mean								3.8		.0032

As shown in Table 10 on the first item family economic status affect students learning mathematics the grand mean was 4.12 showing high score and df(344), $p = .000 < .05$ on the other item school environment affects students learning mathematics the grand mean was 4.04 again showing high score and df (344), $p = .000 < .05$.

For the statement method of teaching student mathematics affects learning math the grand mean was 3.01 showing medium and df (344), $p = .000 < .05$. On the other statement Motivation and readiness affects students learning mathematics the grand mean was 3.65 showing high score and df (344), $p = .000 < .05$. And for the statement The behavior of subject matter affects students learning mathematics the grand mean was 3.29 showing medium and df(344), $p = .000 < .05$, in all the above items there was a significant difference on response of students among the three government secondary schools of Adama city. They suggested that family economic status is the most critical factor that affects secondary school students learning mathematics in Adama city.

On the other hand for statements; family's Education status affects secondary school students learning mathematics with grand mean 4.12 showing high score and df (344), $p = .112 > .05$ Class room size do not affect students learning mathematics with mean 3.84 showing high score and df(344), $p = .493 > .05$. And Students class activity do not affect learning mathematics with grand mean 4.04 which is high score and df(344), $p = .510 > .05$ There was no significant difference on the response of students in all government secondary schools of Adama city.

Similarly, table 11 contained 8 items that listed in table 10 in this table the researcher showed mean comparison between male and female students. The mean and standard deviation of the combined scores were calculated, independent sample t-test had been used to obtain t-value.

Table 11: Mean comparison between male and female students on factors affecting learning mathematics

No	Items	Male		Female		Grand mean	t-value	SIG(2 tail)
		Mean	SD	Mean	SD			
1	Family economic status affects students learning mathematics	4.14	.72	4.11	.70	4.11	.321	.748
2	Method of teaching affect students learning mathematics	3.09	1.22	2.94	1.44	3.01	1.005	.316
3	School environment affects students learning mathematics	4.16	1.28	3.95	1.14	4.07	1.652	.099
4	Family educational status affects students learning mathematics	3.99	.87	4.17	.88	4.10	-1.897	.059
5	Class room size do not affect students learning mathematics	3.99	1.00	3.72	1.1	3.85	2.427	.016
6	Students class activity do not affect learning mathematics	4.17	.92	3.92	1.04	4.04	2.358	.019
7	Motivation and readiness affects students learning mathematics	3.69	1.41	3.61	1.41	3.63	.484	.629
8	The behavior of subject matter affects students learning mathematics	3.37	1.04	3.22	1.06	3.31	1.368	.172

As indicated in Table 11 on statements; Family economic status affects students learning mathematics the grand mean between male and female students was 4.11 showing high score and t (.321), p = .748 > .05. Method of teaching affect students learning mathematics the grand mean was 3.01 showing medium and t(1.005), .p = .316 > .05, School environment affects students learning mathematics the grand mean was 4.07 showing high score and t(1.652), p = .099 > .05.

Family educational status affects students learning mathematics the grand mean was 4.10 showing high score and t(-1.897), p = .059 > .05. Motivation and readiness affects students

learning mathematics the grand mean was 3.63 showing high score and t(.484), p = .629 > .05 and The behavior of subject matter affects students learning mathematics the grand mean was 3.31 showing medium score and t(1.368), p = .172 > .05. Both male and female students had similar response on all these items also they agreed that family economic status, school environment, family Educational status and motivation and readiness either directly or indirectly affects students learning mathematics in Adama city government secondary schools.

For other statements; Class room size do not affect students learning mathematics the grand mean was 3.85 showing high score and t(2.427), p = .016 < .05, and Students class activity do not affect learning mathematics the grand mean was 4.04 showing high score and t(2.358), p = .019 < .05. these students had slightly statistically significant on their response even if there was difference on their response, they suggested that class room size and students class room activity did not affect them learning mathematics in Adama city government secondary schools.

Table 12 contained six items from both positive and negative statements. In this table the researcher showed mean comparison of each item response of teachers among the schools. The mean and standard deviation of the combined scores were calculated, ANOVA (Analysis of Variance) had been used to test the variance in the mean of the combined score for the different classes of students' attitude.

Table 12: Mean comparison of teachers response on factors affecting their students learning mathematics

No	Items	Goro		Adama		Dembela		Total		
		Mean	SD	Mean	SD	Mean	SD	Grand mean	F-value	p
1	Family back ground affects students learning mathematics	4.88	.36	4.64	.50	4.45	.52	4.67	2.38	.107
2	School administration support to mathematics teacher affects students learning mathematics	3.5	.52	4.00	.88	4.45	.52	3.95	6.29	.005
3	Teaching method affects students learning mathematics	4.5	.52	4.64	.50	4.54	.52	4.56	.283	.756
4	Teachers' qualification affects students learning mathematics	4.5	.52	4.35	.49	4.27	.47	4.38	.677	.514
5	Peer pressure affects students learning mathematics	4.5	.52	4.35	.49	4.27	.47	4.38	.677	.514
6	Sequence of content affects students learning mathematics	4.5	.52	4.64	.50	4.64	.50	4.59	.342	.712
Total items' mean								4.42		.613

As shown in Table 12 above for statements; Family back ground affects students learning mathematics the grand mean was 4.67 showing high score and df (37), $p = .107 > .05$. Teaching method affects students learning mathematics the grand mean was 4.56 showing high score and df (37), $p = .756 > .05$. Teachers' qualification and Peer pressure affects students learning mathematics the grand mean was 4.38 showing high score and df (37), $p = .514 > .05$ and Sequence of content affects students learning mathematics the grand mean was 4.59 showing high score and df (37), $p = .712 > .05$. In this city government secondary schools the response of teachers on were the same. They suggested that family background, teaching method, teacher's qualification, peer pressure and sequence of content had great impact on students learning mathematics in Adama city government secondary schools.

For the statement School administration support to mathematics teacher affects students learning mathematics the grand mean was 3.95 showing high score and df(37), p = .005 < .05 on this statement there statistically significant observed in the response of mathematics teachers among the schools.

From the response this problem was highly observed in Dembela secondary school than the two remaining secondary schools. There was no statistically significant difference on teachers' response regarding to factors affecting students' learning mathematics in government secondary schools of Adama city.

4.1.5. The correlation among study variables

Analysis of the correlations among the variables was, carried out to examine the existence of associations among the factors, teacher attribution, classroom climate, students' attitude towards mathematics and students' anxiety with students' mathematics achievement. The most commonly used correlation coefficient in Educational and behavioral science is the Pearson product correlation coefficient(r) and the range of r is from-1 to 1. The sign of the correlation coefficient indicates the direction and the absolute value the correlation coefficient indicates the strength of the relationships: The greater the absolute value the stronger the relationship. Likewise, the inter correlation coefficient among the study variables i.e. the inter correlation coefficient among students' attitude, achievement, factors affecting learning mathematics and these variables sex difference.

Table13: Inter correlation matrix among the study variables

Variable	Attitude	Achievement	Factors
Attitude	-	.949*	.954*
Achievement	.949*	-	.947*
Factors	.947*	.954*	-

As revealed in Table 13, there was strong correlation between students' attitude and achievement(r = .949), students' attitude and factors affecting learning mathematics (r = .954) and achievement and factors affecting learning mathematics(r = .947). The result of the correlation analysis indicated that math self-concepts of students significantly and positively correlated with mathematics achievement of students, this result generally supported by other study (Tadese, 2006).

Furthermore, stepwise regression indicated that students' attitude and factors affecting learning mathematics had significantly correlated with each other. From the regression matrix Table above there was strong correlation among attitude, achievement and factors affecting students learning mathematics.

4.2. Discussion

This part of the study will discuss the result of the study, the interview done with mathematics teachers and class room observation. The investigation was performed to identify students' attitude towards mathematics, key factors that affecting/ influencing students' learning mathematics and the students' mathematics achievement. Also in this section, the findings are discussed in view of theoretical aspects, previous related studies, experience of the researcher and the research questions. Depending on this discussion on the next chapter summary, conclusions of the findings of the study and points which require attention are stated as a recommendation.

As mentioned in the result for grade 9 government secondary school students achievement score in mathematics male had significantly higher achievement score in mathematics (grand mean = 11.4) than female (grand mean = 8.6). This result provided an answer whether or not male perform significantly higher than female. Similarly for grade 10 students of these schools males mathematics achievement (grand mean = 10.26) was higher than female (grand mean = 8.94) .From this result one can conclude that the male-female differences in mathematics achievement were statistically significant. In addition to this from the result, it indicated that differences in mathematics achievement were statistically significant with in the schools both in grade 9 and 10. From teacher response, the result also revealed that male students had significantly high score in both grade levels to female students. On the observed investigations about gender difference girls are often discouraged from mathematical work in their primary schools (Adugna, 2004). In addition, he showed that they dislike it in the secondary schools so; they drop it at high-grade levels in far greater numbers than boys do. As a result, fewer women had employed in industry in post needing mathematical ability (Mohamed & Ismael, 2011). Male and female learners of mathematics have almost same type of achievement scores, because this gender-based gap is decreasing day by day while still research indicates that this difference prevails in some areas of complex mathematical tasks (Rosetta & Petro, 2007).

. The reason why girls low performance in mathematics related to their life style, accordingly Sileshi, 1995 indicated that in north shoa most girls do house work including taking care of their youngers. It was similar condition with Adama city. Other studies had found a similar result at secondary school level (Tadese, 2006.)

On the other hand, from students' response the result suggested that there was significant difference on attitude towards mathematics among the three government schools while, there was no significance between male and female students' attitude towards mathematics. Teachers in Adama city responded that there was no significant difference on students' attitude towards mathematics. It was observed that there was significant difference on students' attitude towards mathematics with in the government secondary schools in Adama city, while there was no significant difference between male and female students at grade 9 and 10. This was usually the way that mathematics is represented in the classroom and perceived by students, even when teachers believe they are presenting it in authentic and content dependent way stand to alienate many students from mathematics (Mohamed & Ismael, 2011).

On the issue about students' attitude towards mathematics; question raised to teacher from Dembela School, What are the major factors that influence student's attitude towards mathematics?

The teacher responded as:

> "For me to arouse and maintain students' interest in math is major problem to the teacher. Thus lack of interest is one of the major factors that affects attitude of students. In addition to this method of teaching, teacher qualification, students family background are some of the factors that affect student's attitude towards mathematics In my opinion in this town most of the students have medium understanding on the use of mathematics with their real life. If they develop its uses, I expect that they will develop positive attitude towards mathematics than now."
>
> March 26/2014 G.C.

During class room observation students with in the three schools had similar implication to math class and did not engaged in active learning. They did not ask question, not participated actively in the class, and not volunteer to solve problems.

One of the most striking features of the analysis was many students in selected class of each schools were silence and confusion occurred for extended periods. Several factors may account for this: teacher frequently wrote problems to be solved during the lesson on the blackboard without involving students. In all the observed class students spent a lot of time quietly writing work, which had been on the black board by the teacher in to their exercise book. Teachers may have felt that they were compelled to exercise control over students due to large class size they were obliged to deal with. From this observation it was suggested that both male and female involved equal in learning mathematics.

Also studies had been showed students' attitude towards problem solving in terms of patience, confidence, and willingness had positive relation with students' mathematics achievement (Samuelsson, J., & Granstrom, K. 2007). Several studies had been conducted to find out the relationship between attitude towards mathematics and mathematics achievement; most of these studies showed that at secondary level there was a positive correlation between the two (Sileshi, 1995).

To obtain correlation among attitude achievement for this study Mathematics teachers were interviewed. On the question raised, how students' attitudes towards mathematics affect their achievement?

Teacher from Goro responded as:

> "Students mathematics attitude and achievement was greatly interrelated conditions and also one can be affected by the other .In addition to this teaching method, students' family Educational level, teacher-student interaction in class room and family daily income are some of the factors that affects students' attitude and mathematics achievement. Both male and female have similar attitude towards mathematics, but mathematics achievement of male students are higher than female in this school. "
>
> March 20/2014 G.C

From this response, the teacher indicated that there was high correlation between attitude and achievement in mathematics.

In addition to this the teacher showed that there was a significant difference on students' mathematics achievement, while there was no statistically significance in attitude between male and female students in this school.

This interview indicated that parent economic status, family educational level, student-teacher interaction in a class rooms are factors that influences students' attitude and achievement in mathematics. Similarly, other Mathematics teachers from Adama secondary school had interviewed. On the questions raised, how students improve their mathematics performance and achievement?

He responded as:

> "First better to develop interest to the subject among students and the teacher must assist his students' to bring change on feelings of students toward the subject. Attitude towards mathematics depends on individual interest and the way he perceive the subject matter. If he had good interest to the subject he will develop positive if not to the contrary. Having this in your mind to develop good attitude and to increase students' math achievement in this Town co-curricular activities should be included in school like math club."
>
> March 22/2014 G. C.

From this one could revealed that for supplementing the teaching of mathematics in the classroom and to widen students' math performance math teacher can involve his students in a number of co-curricular activities such as math club, broadcast and computer assisted learning.

Highly positive attitudes indicated strong performances in mathematics. This interdependent relationship of interest in mathematics affecting achievement and high achievers showing positive interest has been seen in studies by Koller O. and Baumert J. (2001 cited in Yohannis, 2007).Regardless, the strong link between them indicated that attitudes are important outcomes in students' performance. The more students succeed in mathematics the more likely they are to believe that they can succeed; the more students believe they can succeed the more engaged they will become with learning mathematics (Yosph, 1993

From review of related literature different findings stated that a significance positive relationship between students' achievement and teaching methods and Teaching practices (Ademe & Gebre, 1990).Accordingly they suggested between teaching methods, teaching practices and all factors were high and positive, though a low and positive relationship with students' attitude towards mathematics was observed.

For the question what are possible solution to solve problems on factors affecting students' leaning mathematics?

Teacher from Goro responded as:

> "Effort on part of the teacher and parent can bring about constructive change on factors affecting students learning mathematics. On the side of the teacher: trying to find ways how to implement active learning in large class size. Parents of students must follow what their children learn day to day in the class and give equal opportunity for both male and female. If awareness will give to the society on the use of mathematics factors that affect learning may reduce."
>
> April 2, 2014 G. C.

Form the teacher's response improving the way of applying active learning in large class size; giving homework and individual feedback are frequent and necessary in teaching of mathematics than other subjects.

On the same question teacher from Adama secondary school responded as:

> "As to me not only on mathematics there are many factors that affect/ influence the learning of all subjects in this town. Especially when we see in case of mathematics, some of the main factors that affect/ influence students to learn are the perception of their family to the subject, inadequate teaching method, and sequence of content, parents' occupation and Education background. So that to get solution for the above problems is creating awareness to the society, how mathematics will perceived by learners and use of mathematics in real life."
>
> April 7, 2014 G. C.

According to the teacher, the followings are some of the problems, which have observed frequently; thus, both teachers suggested that creating awareness on the uses of mathematics to society, train teachers on how to use active learning in large class size, using appropriate method in the class and properly arranged sequence of content might improve factors affecting learning mathematics.

On the result section about factors affecting student learning mathematics, there were different factors affects government secondary schools in Adama city differently. Problem in one school may not be the problem of the other school. Some of the problems that affect government secondary schools students' math learning were family economic status, family educational background, and method of teaching, school environment and sequence of content.

These factors greatly accounted for the students' positive attitude towards mathematics and without interest and personal effort in learning mathematics by the students; they can hardly perform well in the subject. These findings are similar to those of Sileshi (1993) who found significant correlation between teachers' attitudes and academic achievement of the children. Demisse (2007) found that classroom climate, teachers' behavior and attitudes account for variations in the academic achievement of the pupils. According to Demisse (2007) very important factor involved in motivating students and creating lifelong learners is the parent: Also the relationship between parental involvement and students' motivation is that students are encouraged by seeing their parents take active interest in school.

Thus in this study also respondents result showed that method of teaching, students family Educational back ground, motivation of students, interest in exercising problems on math all these plays a crucial role in students' attitude towards mathematics.

As observed from the result the response of students showed that there was significant difference among the schools on factors affecting students' learning mathematics while there was no significant difference between male and female students. On the other hand there was no statistically significance on teachers' response about factors affecting students' learning mathematics.

During the class observation, the researcher had a chance to observe the physical condition of the classrooms and most of the classrooms are not suitable for active learning, students were lack of motivation, hardly answer questions and not volunteer to solve problems. The investigator noted that during observations prevalent pattern which existed was correction of homework on the black board, followed by teachers introducing a new topic. Students then copied the work which the teacher had done on the blackboard in to their note books. Finally homework was given to students. Students appeared to be very dependent on note taking.

In all schools at the observation time teachers believed that training may improve teaching large class size. In addition to that for active learning teaching aids are necessary, but the school pedagogical center is not well equipped and there are no sufficient teaching materials.

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. summary

The objective of this study was to observe students' attitude towards mathematics and factors affecting their learning. Accordingly the following research questions were formulated for investigation.

1. What is the attitude of secondary school students towards mathematics?
2. What is the status of students' mathematics achievement?
3. What is the correlation between students' mathematics achievement and attitude?
4. What are the factors that affecting students' learning mathematics in government Secondary school of Adama city?

In order to deal with these research questions, the related literature had properly reviewed. There were three government secondary schools in this city. The subjects were selected from all these schools. 346 students from grade 9 to 10 and 39 mathematics teacher were selected for this study. Since the respondents were properly oriented there was no vague response from the respondent. Hence no respondent was rejected. Therefore all the respondents were involved. In seeking answer for the research question the researcher employed four instruments of data collection. Achievement test, lickert scale questionnaire, interview and classroom observation. The questionnaire for students the same at all grade level while the achievement test were prepared depending on the grade level of students. Initial, these instruments were administered on a pilot test. Based on these items analysis was carried out and the instruments were improved.

The data collected had analyzed using analysis of variance and t-test. Accordingly the following results are documented.

- There was no statistically significant difference of gender in attitude towards mathematics. There was significant difference on students' attitude towards mathematics among the three government schools. In general merging the response of students from the schools in one 167(48.27%) students had positive attitude, 63(18.2%) had neutral and 116(33.53%) had negative attitude towards mathematics.
- Male students scored significantly better than female in both grade 9 and 10 on mathematics test. There was significant difference on mathematics achievement. From students result one can concluded that male students in both grade levels had medium achievement while female students in this grade levels had low achievement in mathematics.
- Mathematics achievement and attitude are closely related variables that play important role in learning mathematics. A positive attitude is a necessary condition for better mathematics achievement. However, difference in achievement may not imply difference in attitude and vice versa.
- There was a significant difference on factors affecting learning mathematics among the schools while there was no statistically significant between male and female students.
- From students response both male and female agreed that family economic status, school environment, family Education status, and motivation on the other hand, the response of teachers also supported this idea and they revealed that family background, teaching method, teachers qualification, peer pressure and sequence of content had great impact on students' learning mathematics in Adama city government secondary schools.

5.2. Conclusion

Students' attitude towards mathematics and their achievement in mathematics are closely related variables that play important role in the learning of the subject. A positive attitude towards mathematics is a necessary condition for better mathematics achievement. Likewise, achieving well in mathematics is a necessary condition for developing a favorable attitude towards mathematics.

From the above findings one may arrive at the following conclusion.

- Mathematics achievement and attitude are closely related variables that play important role in learning mathematics.
- A positive attitude is a necessary condition for better mathematics achievement. However difference in achievement may not necessarily imply difference in attitude and vice versa.
- Gender differences in mathematics achievement do not only due to difference in attitude but also due to other variables including family economic status and educational background, peer pressure.

Generally findings of this study indicated that gender difference is affective factors (including students' attitudes, confidence in learning mathematics, perceived usefulness of mathematics, teachers, peer pressure and parental expectation). Thus the finding in this study was consistent with the research literature. Finally this study cannot be considered perfect and final, the findings seem to have some practical implication to mathematics Education and future direction of research.

5.3. Recommendations

Finally this finding seems to have practical implication to mathematics Education and to conduct further research to examine the relationship between achievement and attitude in mathematics. These implications discussed in the previous sections.

- ✓ The observed significant contribution of the variables up on mathematics achievement in this study call for repeating research on a wider population by including some other variables which possibly contribute to mathematics achievement.
- ✓ Discussion with teachers and attaining a common understanding on a system of teaching large class size is essential.
- ✓ Teachers should assist their students in order to improve their attitude towards mathematics and give awareness to the society on the use of math with real life.
- ✓ The teachers should motivate and support students to overcome factors affecting them learning mathematics.

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APPENDICES

Appendices 'A'

Addis Ababa University

College of Graduate and Behavioral Studies

Department of science and Mathematics Education

Questionnaire to be filled by Secondary School Students

General Direction

I would like to express my appreciation for your time and cooperation, in advance, to fill this questionnaire. The purpose of this questionnaire is to collect information regarding "on Students Attitude towards Mathematics and Factors Affecting Their Learning in Adma Town Secondary schools. This study is purely academic. So, your genuine, frank and timely response are quite vital to determine the success of this study. Therefore, I kindly request your cooperation in filling the questionnaire honestly and responsibly.

- ✓ No need of writing your name.
- ✓ The information you give will be kept confidential and used only for this study.
- ✓ There is nothing "right" or "wrong" answer here and rather what is required is to show the level of your personal opinion to each item.
- ✓ If no need of read and write the data collectors to fulfill your response.
- ✓ Please, either tick in the appropriate boxes by using this "✓" mark or enter a words/phrases where required.

Thank you in advance.

Personal Information of the respondents'

Instruction 1: The Items from 1-4 in this section request personal information.

1. Name of School _____

2. Sex: Male ☐ Female ☐

3. Age: Below 14 years _____ 14-20 years_____ Above 20 years_____

4. Educational background: Grade 9_____ Grade 10_____

Partone: questionnaire to be filled by secondary school students on attitude towards Mathematics containing 10 items using five point Likert scale showing: that

1 for strongly disagree, 4 for agree and

2 for disagree, 5 for strongly agree

3 for neutral,

No	Item	1	2	3	4	5
1	Mathematics is important in everyday life					
2	Mathematics is the most important subject for students to study					
3	I have usually enjoyed study mathematics					
4	I am happier in math class than in any other class					
5	I have usually been at easy during mathematics test					
6	I always worry about my ability to some mathematics problems					
7	My friends always help me in solving mathematics problems					
8	Mathematics test questions are more difficult when compared with other subject test questions					
9	I am always under a terrible strain in a mathematics class					
10	I always imitate my friend answer in mathematics					

Response of students among the schools on part one

No	Goro					Adama					Dembela				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	0	0	0	25	111	0	0	0	25	112	0	0	0	18	55
2	0	0	12	12	112	0	0	0	37	100	0	0	0	18	55
3	0	0	12	99	25	0	0	0	75	62	0	0	0	55	18
4	13	25	0	49	49	0	12	12	50	58	0	0	0	37	36
5	16	35	35	25	25	12	12	38	50	25	0	0	0	55	18
6	25	12	25	62	12	51	12	25	37	12	0	0	18	55	0
7	25	12	12	62	25	13	12	0	37	75	0	18	18	37	0
8	26	25	12	25	49	12	50	37	25	12	18	37	18	0	0
9	23	25	12	69	7	50	37	0	38	12	55	0	0	18	0
10	39	12	11	49	25	38	25	12	25	37	18	18	0	0	37

Response of male and female from all schools on part one

No	1		2		3		4		5	
	M	F	M	F	M	F	M	F	M	F
1	0	0	0	0	0	0	30	38	123	155
2	0	0	0	0	7	5	33	34	120	147
3	0	0	0	0	5	7	100	129	53	52
4	7	6	19	18	5	7	63	73	59	89
5	11	17	22	25	30	43	59	71	31	37
6	26	50	12	12	32	36	72	82	10	14
7	20	18	18	24	11	19	60	76	44	56
8	25	31	48	64	31	36	20	30	29	32
9	58	70	22	40	5	7	60	65	8	11
10	47	48	25	30	10	13	29	45	42	57

Part two: questionnaires to be filed by secondary school students on statements of factors affecting students learning mathematics containing 8 items using five point Likert scale showing:

No	Item	1	2	3	4	5
1	Family economic status affects students learning mathematics					
2	Method of teaching affect students learning mathematics					
3	School environment affects students learning mathematics					
4	Family educational status affects students learning mathematics					
5	Class room size do not affect students learning mathematics					
6	Students class activity do not affect learning mathematics					
7	Motivation and readiness affects students learning mathematics					
8	The behavior of subject matter affects students learning mathematics					

Response of students among the schools on part two.

No	Goro					Adama					Dembela				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	0	0	25	62	49	0	0	25	50	62	0	0	18	55	0
2	14	37	37	36	12	12	13	25	50	37	18	55	0	0	0
3	0	25	25	74	12	0	12	0	50	75	0	36	0	37	0
4	0	0	37	62	37	0	13	25	37	62	0	0	18	18	37
5	0	38	0	49	49	12	0	25	50	50	0	0	18	55	0
6	0	12	25	62	37	0	13	12	50	62	0	18	0	18	37
7	49	25	12	25	25	0	0	25	62	50	0	0	18	0	55
8	14	37	48	37	0	12	12	50	50	13	0	0	0	55	18

Response of male and female from all schools on part two

No	1		2		3		4		5	
	M	F	M	F	M	F	M	F	M	F
1	0	0	0	0	33	35	79	88	56	55
2	12	32	51	53	27	35	42	45	23	26
3	0	0	35	38	10	15	67	94	41	46
4	0	0	6	7	40	40	57	60	50	86
5	6	6	9	29	14	29	75	79	49	50
6	0	0	15	28	10	27	62	68	67	69
7	21	28	12	13	18	37	43	44	59	71
8	10	16	20	29	40	59	68	74	15	15

Appendices ‘B

አዲስ አበባ ዩኒቨርስቲ

ሥነ-ትምህርት ና ጠባይ ጥናት ኮሌጅ

የሳይንስ ና ሂሳብ ትምህርት ክፍል

የተከበራችሁ ምላሽ ሰጪዎች

ለሁለተኛ ደረጃ ተማሪዎች የተዘጋጀ መጠይቅ

ይህ መጠይቅ የተዘጋጀው ለሁለተኛ ደረጃ ተማሪዎች ሲሆን አላማውም ተማሪዎች ን ለሂሳብ ትምህርት ያላቸዉን ዝንባሌ እና በትምህርታቸዉ ላይ ተፅዕኖ የምፈጥሩ ነገሮች ማወቅ ና መፍትሄ መፈለግ ይሆናል፡፡ ለቀረበው መጠይቅ ትክክለኛ ምላሽ እንዲሰጡኝ በአክብሮት እጠይቃለሁ፡፡ የምትሰጡኝ ምላሽ ሚስጢራዊነቱ የተጠበቀ መሆኑን አረጋግጣለሁ፡፡ ስምዎን በመጠይቁ ላይ መጻፍ ስለማያስፈልግ የእርስዎ ማንነት ያለመታወቅ የተጠበቀ ነው፡፡

በቅድሚያአመሰግናለሁ!

ማሳሰቢያ፡- የተከበራችሁ ምላሽ ሰጪዎች ከተሰጡት አምስት የመለኪያ አማራጮች አንዱን በመምረጥየ “✓” ምልክት ያድርጉ

መለኪያዎች

1=በጣም አልስማማም

2=አልስማማም

3=በመጠኑ እስማማለሁ

4=እስማማለሁ

5=በጣም እስማማለሁ

ክፍል 1፡- መጠይቅ

ተ/ቁ	መጠይቅ	1	2	3	4	5
1	የሂሳብ ትምህርት ለተማሪዎች ዕለት ተዕለት ሥራቸዉ ይጠቅማቸዋል፡፡					
2	የሂሳብ ትምህርት ለተማሪዎች በጣም አስፈላጊ ትምህርት ነዉ፡፡					
3	ሁል ጊዜ ሂሳብ መሥራት እወዳለሁ፡፡					
4	ከማንኛዉም ትምህርት ክፍለ ጊዜ የሂሳብ ትምህርት ክፍለ ጊዜ ንእወዳለሁ፡፡					
5	የሂሳብ ትምህርት ሙከራዎች በጣም ይቀሉኛል፡፡					
6	የሂሳብ ጥያቄዎችን ለመስራት ባለኝ ችሎታ አልተማመንም፡፡					
7	የሂሳብ ትምህርት የፈተና ጥያቄዎቸ ከሌሎች ትምህርት የፈተና ጥያቄዎቸ በጣም ከባድ ናቸዉ፡፡					
8	የሂሳብ ትምህርት የፈተና ጥያቄዎች ከሌሎች ትምህርት የፈተና ጥያቄዎች በጣም ይከብዳሉ፡፡					
9	በሂሳብ ክፍለ ጊዜ ሁሌ እጨነቃለሁ፡፡					
10	በሂሳብ ፈተና ላይ ሁሌ ከጓደኛዬ እቀዳለሁ፡፡					

ክፍል 2፡- መጠይቅ

ተ/ቁ	መጠይቅ	1	2	3	4	5
1	የወላጅ የኑሮ ሁኔታ በተማሪዎች የሂሳብ ትምህርት አቀባበል ላይ ተፅዕኖ አለዉ፡፡					
2	የመምህራን የማስተማር ዘዴ በተማሪዎች የሂሳብ ትምህርት አቀባበል ላይ ተፅዕኖ አለዉ፡፡					
3	የትምህርት ቤት አቀማመጥ እና ዉስጣዊ ሁኔታ በተማሪዎች ሂሳብ ትምህርት አቀባበል ላይ ተፅዕኖ አለዉ፡፡					
4	የወላጅ የትምህርትደረጃ በተማሪዎች የሂሳብ ትምህርት አቀባበል ላይ ተፅዕኖ አለዉ፡፡					
5	በክፍል ዉስጥ የተማሪዎች ብዛት በሂሳብ ትምህርት አቀባበላቸዉ ላይ ተፅዕኖ የለዉም፡፡					
6	የተማሪዎች የክፍል ዉስጥ እንቅስቃሴ በሂሳብ ትምህርት አቀባበላቸዉ ላይ ምንም ተፅዕኖ የለዉም፡፡					
7	የተማሪዎች መነቃቃት እ ናዝግጁ አለመሆን በሂሳብ ትምህርት አቀባበላቸዉ ላይ ተፅዕኖ አለዉ፡፡					
8	የሂሳብ ትምህርት ዉስጣዊ ይዘት በተማሪዎች የሂሳብ ትምህርት አቀባበል ላይ ተፅዕኖ አለዉ፡፡					

Appendices 'C'

MATHEMATICS ACHIEVEMENT TEST

Mathematics achievement test for grade 9

Addis Ababa University

College of Graduate and behavioral studies

Department of science and mathematics Education

Time allowed 60 minutes

Direction: Attempt the following questions properly and choice the correct answer from the given alternative and write your answer on the space provided.

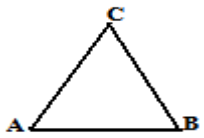
____1. If A={X+Y Є B: XЄB and YЄB} where B= {-1, 0, 1} then the number of subset of A is:
A) 16 B) 8 C) 4 D) 3

____ 2. Which one of the following is perimeter of regular hexagon inscribed in a circle of radius 6 cm? A) 60 cm B) 48 cm C) 36 cm D) 24 cm

_____3. Which one of the following equal to "X", if $(x-3)^3 = (2x-1)^3$

A) 1 B) 0 C) 4 D) 3

_____4. In ΔABC given below if $\overline{AB}$= 21 cm, $\overline{BC}$ = 14 cm and m (<B) =60^0, what is the length $\overline{AB}$



A) 7 cm B) 77 cm C) 7(13-63) cm D) 7(13-33) cm

_____5. Which of the following is the length of right angled triangle?

A) 5,8,10 B) 4,6,10 C) 9,12,13 D)5,12,13

_____6. The number of possible outcomes of tossing two coins and rolling a die simultaneously is:

A) 4 B) 12 C) 24 D)36

____ 7.What must be added to X^2+10X to make a perfect square?

A) 10 B) 25 C) 16 D) 36

____ 8. Out of 30students, 10 play football, 24 play basketball,4 play both football and basketball. Which of the following is the number of students who play football only?

A) 24 B) 20 C) 10 D) 4

___9. If f(x) = 4x+ 9 and g(x) = 2x-8, then one equal to(f+ g)(3)

A) 21 B)-2 C) 19 D)-4

___10.The product of two consecutive integers is 72, and then these numbers are:

A) 9 and 8 B) 9 and -8 C) 8 and -9 D) -8 and -9

___ 11. If x = 0.4545….. and y = 0.1313…., then3y-2x is:

A) 17/100 B) 17/99 C)7/3 D-17/33

___12. Which of the following is decimal notation of 2.6 x 10^{-4}?

A) 0.00026 B) 0.0026 C) 0.026 D) 0.000026

___ 13.Which of the following is true about linear function 3x-2y-2 = 0?

A) The slope is -3/2 B) y-intercept is1 C) x-intercept is -2/3 D) The slope is 3/2

___14. The vertex of the function f(x) = $-x^2$ + 4x +5 is:

A) (-2,9) B) (2,-9) C) (2,9) D) (2,0)

___15.If the sum of the roots the equation kx2 + 8x + 3 = 0is -8/3, then the roots are:

A) -4 and 4 B)-4/3 and 4/3 C)-7/3 and 73 D) 1and 3

___16.The solution set of /3x -4/ =5 is:

A) {-1/3,3} B) {1/3,3} C) {1,0} D) {3,4}

___17.The range of f(x) = x2 – 2x + 1 is:

A) (0, ∞) B) [0, ∞] C) [∞,0] D) (∞,0)

___18.What is the probability of getting two head and one tail in tossing three coins simultaneously?

A) 3/8 B) 5/8 C)1/2 D)1/4

___19. An iron wire bent in a shape of quarter of a circle has radius of length r = 4cm. What is the length of this iron wire?

A) 4 Π cm B)2 Π cm C) 6 Π cm D) Π cm

___20 If the ratio of the area of two similar triangles is 4:9, then what is the ratio of their corresponding sides?

A) 2:3 B) 3:2 C) 4:9 D)1:2

Appendices 'D'

MATHEMATICS ACHIEVEMENT TEST

Mathematics achievement test for grade 10

Addis Ababa University

College of Graduate and behavioral studies

Department of science and mathematics Education

Time allowed 60 minutes

Direction: Attempt the following questions properly and choice the correct answer from the given alternative and write your answer on the space provided.

___ 1. A right circular cylinder with radius of the base 5 cm and height 8 cm is open from the top. What is the total surface area of this cylinder?

A) 200Π cm^2 B) 105Π cm^2 C) 80Π cm^2 D) 130Π cm^2

___ 2. Let f be a polynomial function in x. If the degree of f(x) is greater than or equal to 1, then what will be the remainder when f(x) divided by x+3?

A) X-3 B) 3 C) f(-3) D) f(3)

___ 3. From the following points which one is nearest to point (-2, 5)?

A) (-1,2) B) (0,0) C) (-4,5) D) (-2,9)

___Which one of the following is not equal to $\cos 72^0$?

A) $\sin 792^0$ B) $\cos(-648)^0$ C) $\cos 432^0$ D)$\sin 18^0$

___ 5. Which of the following is a line parallel to 5x-2y=0?

A) 2y= -5 B) 2x+5y= -4 C) -5x-2y=1 D)-5x+2y=6

___ Which of the following is equal to csc (11/2 Π)?

A) -1 B) 1 C) 0 D) undefined

___ 7. Of the following one is the solution set of $25^{1-x}= 125$.

A) 5/2 B)2 C) 3/2 D) 1

___ 8. If $\log_a 4 = x$, $\log_a 3 = y$ and $\log_a b = z$, then which one is equal to $\log_b 36$?

A) 2y+x/z B) y^2+x/z C)z(2y+x) D)z/(y^2+x)

__ 9. Which of the following is the area of a square inscribed in a circle of radius 2 cm?

A) $16\Pi cm^2$ B) $8\Pi cm^2$ C) $4\Pi cm^2$ D) $2\Pi cm^2$

__ 10. One of the following is true if $\Delta ABC \equiv \Delta DEF$.

A) $\Delta ABC \equiv \Delta EFD$ B) $\Delta CBA \equiv \Delta FED$ C) $\Delta BAC \equiv \Delta DEF$ D) $\Delta ACB \equiv \Delta FED$

__11 The distance between two points (2,3) and (1,-1) is:

A) 17 units B) 16 units C) 9 units D) none

__12 The equation of a straight line passing through p (-2,1`) and perpendicular to the equation of a line 6x + 5y = 10 is:

A) 6y + 5x +16 = 0 B) 6y – 5x + 16 = 0 C) y = 5x – 10 D) 6y – 5x – 16 = 0

__13. If P (2,-1) and Q(-3,5)are point on the coordinate plane, so that P is the midpoint of QR, then what are the coordinate of point R?

A) (7,7) B) (7,-7) C) (6,7) D) (10,11)

__14. The solution set of the inequality $x^2 + 4x + 4 < 0$ is:

A) (1,-1) B) R C)(1/2,3) D) none

__15 Which of the following is false about the exponential function $f(x) = (1/a)^x$, a > 1?

A) It crosses y axis at (0,1) B) Decreasing function C) It cannot cross x axis D) Increasing function

__16 Which of the following is an angle in standard position co-terminal with 3Π/2?

A) 5Π/2 B) Π /2 C) -5Π/2 D) Π /3

__17. Suppose $\log_3 2 = a$ and $\log_3 5 = b$, then $\log_3 0.0002$ equals:

A) -3a 4b B) 3a + 4b C) a-b D) b-3a

__18. If X is a 2nd quadrant and cosX =-4/5, then cscX is:

A) 5/3 B) 3/5 C) -3/5 D) 1

__19. Which of the following points are collinear?

A) (2,1),(-1,-1),(2,0) B) (-2,0),(0,2),(3,5) C) (-1,1),(0,0),(-2,1) D) (1,3),(1,-3),(3,3)

__20. A colony of bacteria is under condition in laboratory, so that the population increases exponentially with time. At the end of 2 hours there were 10,000 bacteria. At the end of four hours there were 40,000 how many bacteria were there initially?

A) 10,000 B) 2,000 C) 5,000 D) 2,500

Appendices 'E'

Addis Ababa University

College of Graduate and Behavioral Studies

Department of science and Mathematics Education

Questionnaire to be filled by Secondary School Mathematics Teachers

General Direction

I would like to express my appreciation for your time and cooperation, in advance, to fill this questionnaire. The purpose of this questionnaire is to collect information regarding "on Students Attitude towards Mathematics and Factors Affecting Their Learning in Adama Town Secondary schools. This study is purely academic. So, your genuine, frank and timely response are quite vital to determine the success of this study. Therefore, I kindly request your cooperation in filling the questionnaire honestly and responsibly.

- ✓ No need of writing your name.
- ✓ The information you give will be kept confidential and used only for this study.
- ✓ There is nothing "right" or "wrong" answer here and rather what is required is to show the level of your personal opinion to each item.
- ✓ If no need of read and write the data collectors to fulfill your response.
- ✓ Please, either tick in the appropriate boxes by using this "✓" mark or enter a words/phrases where require

Thank you in advance.

Personal Information of the respondents'

Instruction 2: The Items from 1-5 in this section request personal information.

1. Name of School _____

2. Sex: Male ☐ Female ☐

3. Age: 20-25 years ___ 26-30 years___ 31-35 years___ 36-40 years___ > 40 years

4. Educational Qualification: Diploma___ BSC/BA/BED____ Others___

5. Work Experience: Below 5 years____ 5-10 years____ 11-15 years_____ 16-20 years____

> 20 years____

Part one: questionnaire to be filled by mathematics teachers on attitude towards mathematics containing 5 items using five point Likert scale showing:

1 for strongly disagree, 4 for agree and

2 for disagree, 5 for strongly agree

3 for neutral,

No	Item	1	2	3	4	5
1	Mathematics helps students to overcome real life activities					
2	Mathematics is difficult than any others subject					
3	Students class performance affects students learning mathematics					
4	Students inability on examination affect them learning Mathematics					
5	Mathematics help students in learning other subjects					

Part two: questionnaire to be filled by mathematics teachers on status of secondary school students' mathematics achievement containing 5 items using five point Likert scale showing:

No	Item	1	2	3	4	5
1	Students poor mathematical skill leads to low performance and achievement					
2	Students encouragement in class affect their mathematics achievement					
3	Students confidence on mathematics affects their achievement					
4	Resource materials on mathematics affects students' performance and achievement					
5	Mathematics anxiety influence students mathematics achievement					

Part three: questionnaire to be filled by mathematics teacher on factors affecting secondary school students learning mathematics containing 6 items using five point Likert scale showing:

1 for strongly disagree, 4 for agree and

2 disagree, 5 for strongly agree

3 neutral,

No	Item	1	2	3	4	5
1	Family back ground affects students learning mathematics					
2	School administration support to mathematics teacher affects students learning mathematics					
3	Teaching method affects students learning mathematics					
4	Teachers' qualification affects students learning mathematics					
5	Peer pressure affects students learning mathematics					
6	Sequence of content affects students learning mathematics					

Response of teacher on students' attitude

No	Goro					Adama					Dembela				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	0	0	0	7	7	0	0	0	5	9	0	0	0	3	8
2	7	0	7	0	0	5	5	4	0	0	4	3	4	0	0
3	0	0	0	7	7	0	0	5	9	0	0	0	2	7	2
4	0	0	7	7	0	0	0	0	14	0	0	0	3	8	0
5	0	0	0	7	7	0	0	0	6	8	0	0	0	5	6

Response of teacher on students' mathematics achievement

No	Goro					Adama					Dembela				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	0	0	0	7	7	0	0	9	0	5	0	0	0	7	4
2	0	0	0	6	8	0	0	0	10	4	0	3	0	0	8
3	7	7	0	0	0	0	9	0	5	0	0	8	3	0	0
4	0	0	0	7	7	0	5	0	9	0	0	3	8	0	0
5	0	5	3	6	0	0	0	5	9	0	0	4	4	3	0

Response of teacher on factors affecting students' learning mathematics

No	Goro					Adama					Dembela				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	0	0	0	2	12	0	0	0	5	9	0	0	0	6	5
2	0	0	7	7	0	0	0	5	4	5	0	0	0	6	5
3	0	0	0	5	9	0	0	0	4	10	0	0	0	4	7
4	0	0	0	8	6	0	0	0	9	5	0	0	0	8	3
5	0	0	0	7	7	0	0	0	8	7	0	0	0	8	3
6	0	0	0	4	10	0	0	0	5	9	0	0	0	4	7

Appendices 'F'

Addis Ababa University

College of Graduate and behavioral studies

Department of science and mathematics Education

Interview guide for some selected secondary school mathematics Teachers of Adama Town

Date of Interview _____

Time: Starting time _____

Finishing Time _____

Objectives

The objective of this interview is together necessary information about Students Attitude towards Mathematics and Factors Affecting their Learning. . That helps to get additional information for further investigation of the study. The interview is prepared in unstructured and open ended questions. Therefore, I would like to express my appreciation for your time and cooperation, in advance, and interviewed in the issues. So, your genuine, frank and timely response are quite vital to determine the success of this study. Therefore, I kindly request your cooperation to interview in the issues honestly and to give your responses for the following questions.

1. What are the major factors that influence student's attitude towards mathematics?
2. What are possible solutions to solve problems and factors affecting students learning mathematics?
3. How students' attitude towards mathematics affects their mathematics achievement?
4. How students improve their mathematics performance and achievement?

Appendices 'G'

Addis Ababa University

College of Graduate and behavioral studies

Department of science and mathematics Education

Students class room performance observation checklist

Instruction: This instrument is designed for assessing the class room participation and interaction of the learners in math class. It covers a class room activities /performance.
In using the instrument the observer followed the steps given below:

Step 1-Students use copy of the instrument;

Step2-Put a tick mark under 'yes' or 'no' according to activities/performance observed.

Direction: Mark under 'yes' if the students mentioned above engaged in the activities given below and mark under 'no' if he/she does not engaged.

1	The behavior to be observed	YES	NO
2	Worried and confused in the class		
3	Shy and fear to involve in class activities		
4	Follow direction		
5	Demotivated(seems to have no interest)		
6	Participate in group(pair work)		
7	Participate actively in the class		
8	Ask question actively		
9	Answer question actively		
10	Tearing others/criticizing		
11	Not volunteer to solve problems		

Appendices 'H'

SAMPLE DETERMINATION FORMULA

Addis Ababa University

College of Graduate and behavioral studies

Department of science and mathematics Education

Formula used to determine sample size.

$$n = \frac{N}{1+N(e)^2} \text{ …….. (*)}$$

Where n… sample size

N…… accessible population

e…… the desired level or precision is 0.05

According to (Israel 2012 as cited in Abdisa, 2013) also portion allocation formula to determine sample size for each item given by:

$$n_h = N_h \frac{n}{N} \text{ ..... (**)}$$

Where: n_h-the sample of male and female students or mathematics teachers

N_h- number of students in selected secondary school

n -total number of sample size

h -total number of population