UNIVERSITY OF EDUCATION, WINNEBA

FACTORS AFFECTING SENIOR HIGH SCHOOL STUDENTS' INTEREST IN MATHEMATICS. A CASE STUDY OF SENIOR HIGH SCHOOL IN ACHIASE DISTRICT

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DECLARATION

STUDENT'S DECLARATION

I, **Yeboah Kennedy Amo**, declare that this thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature:.....

Date:.....

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of thesis as laid down by the University of Education, Winneba.

Name of Supervisor: **Dr. Joseph Issah Nyala**

Signature:.....

Date:.....

DEDICATION

To my wife: Beatrice Yeboah.

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LIST OF ABREVIATIONS

NCCA	National Council for Curriculum and Assessment
BECE	Basic Education Certificate Examinations
WASSCE	West Africa Secondary School Certificate Examinations
TIMSS	Trends in International Mathematics and Science Study
JHS	Junior High school
SHS	Senior High school
CRDD	Curriculum Research and Development Division

ABSTRACT

The study sought to examine factors affecting SHS students' interest in mathematics in Achiase District in the Eastern Region of Ghana. The study adopted a descriptive survey design. The population consisted of all the form two students studying core mathematics in the two senior high schools in Achiase District in the Eastern Region of Ghana. Simple random sampling was used to select five hundred students from the two senior high school in Achiase district for the study. Descriptive statistics such as means and standard deviations, correlation and regression analysis were used to analyse the collected data. The results of the data indicated that government factor, teacher factor, student factor and school factor are the factors affecting students' interest in Mathematics. However, in predicting students' interest in mathematics, the current study revealed that teacher factor is a strong predictor of students' interest in mathematics followed by student related factors whiles school related factors and government factor have the least effect on students' interest in Mathematics. It is recommended that, teachers must revise formal teaching methods which often do not match the students' learning styles and skills needed to be productive in society.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter deals with the introductory section of the study which entails the background of the study, statement of the problem, the purpose of the study, the objective of the study, the research questions, hypotheses, the significance of the study, delimitation of the study and the organization of the study.

1.1 Background to the study

In this era of globalization and technological revolution, mathematics is considered as a first step for every human activity. Mathematics is an embodiment of knowledge, skills and procedures that can be used in a variety of ways. It can be used to describe, illustrate and interpret, predict, explain patterns and relationships in numbers in order to convey and clarify meaning of various issues in life (National Council for Curriculum and Assessment, 2005).

It plays a vital role in the development of human capital and is linked with an individual's well-being and opportunities for better living (Battle & Lewis, 2002). Mathematics is also meant for making a difference locally, regionally, nationally and globally. A country with more advanced mathematical knowledge base is able to build materials needed for development. Some of these developmental projects include, buildings (sky scrapers), study of patterns of outbreak of a pandemic diseases and other industrial applications.

Developed nations seem to have very strong Mathematics policies, which have propelled them to higher heights of development. It appears that no country has

attained any breakthrough in its economic development without the development of minimum Mathematics base. It ensures the acquisition of knowledge and skills that enable individuals to increase their productivity and improve their quality of life. This increase in productivity also leads towards new sources of earning which enhances the economic growth of a country (Saxton, 2000).

Mathematics is also applied in almost all field of study. Example, economics, Geography, Physics, Chemistry, Biology, to mention a few. All these subjects applied the knowledge of mathematics to some extent. Mathematics also provides opportunities for the intellectual gymnastic of the man's inherent powers. Mathematics also essentially helps the students in acquiring essential mathematics knowledge, skills, interests and attitudes for future or immediate application in life. Mathematics should be visualized as a vehicle to train a child to think, reason, analyze and to articulate logically. Apart from being a specific subject, it should be treated as concomitant to any subject involving analysis and reasoning.

Mathematics is seen by society as the foundation of scientific technological knowledge that is vital in socio-economic development of a nation. It is in realization of the vast applications of mathematics that made Eraikhuemen (2003) to posit that a disciplined and ordered pattern of life can only be achieved through the culture of mathematics.

Despite its great importance, it is the only subject that is most dreaded by learners among all subjects offered in schools (Akinoso, 2011; Ashcraft & Faust, 1994;). Students therefore tend to respond to it with less self-confidence, negative feeling and anxiety. This situation is worsened by the compulsory nature of the subject at primary and post primary schools levels, leading to students' poor performance in the subject.

Unodiaku (2012) attributed factors of academic achievement among secondary school students in mathematics to lack of interest. More so, the failure of students in mathematics achievement was also supported by some authors to be associated with lack of interest in studying the subject, (Goolsby, 2013; Idigo, 2010; Okonkwo, 1998). Specifically, Goolsby (2013) attributed factors influencing students' mathematics interest to attitude towards success in mathematics, confidence in learning mathematics, perception of teacher attitude, mathematics anxiety, and Locus of control.

According to Burns (1998), many students have fears and loathsome experiences about mathematics. Such negative experiences are caused by mathematics anxiety which know no boundaries irrespective of age or gender. Mathematics anxiety is the feeling of tension, helplessness, mental disorganization and dread one when required to manipulate numbers and shapes and the solving of mathematics problems (Ashcraft & Faust, 1994).

Students who are infested with mathematics anxiety will lack interest to learn mathematics, and consequently may tend to achieve poorly in the subject. That is since students have negative attitude towards the subject, they tend to develop strong hatred for it and even to the teachers. Some students even tend to fall sick in the mathematics classroom and often indulge in absenting themselves from class. Others refuse to participate in group activities, think-pair-share and other cooperative activities that elicit deeper understanding of mathematics.

Also, there had been a remarkable drop in the mathematics performance of some Ghanaian students over the last decade in national and international large-scale assessments such as Basic School Certificate Examinations (BECE); West Africa

Secondary School Certificate Examinations (WASSCE); and the Trends in International Mathematics and Science Study (TIMSS) (Burt, 2017; Butakor, 2016). Academic performance is affected by a number of factors including admission grade, socio-economic status, school background and many more (Enu, Agyeman & Nkum, 2015).

Socio-economic status is most commonly determined by combining parents' educational level, occupational status and income (Jeynes, 2002). In most of the studies done on academic performance of students, it is not surprising that socio-economic status is one of the major factors studied while predicting academic performance.

Families where the parents are advantaged socially, educationally and economically foster a high level of achievement in their children. For parental support, the highly ranked variables that contributed to poor performance in mathematics were parents not helping wards with their homework, inability of parents to provide wards' essential instructional needs for mathematics studies and parents' inability to approach the school to ascertain how their wards are faring in mathematics (Butakor & Dziwornu, 2018). In addition, lack of interest in mathematics is seen as the major contributor to students' poor performance. Students with low interest in mathematics tend to develop poor attitude towards the subject and hence their low performance of the subject.

Educators, trainers, and researchers have long been interested in exploring variables contributing effectively to learners' interest. Many factors have been identified in literature as reasons associated with students' lack of interest in learning mathematics. These include Student factor, teacher factor, mathematics anxiety, class size,

government factor, infrastructural problem, instructional strategy, among others (Akinoso, 2011; Goolsby, 2013;Okonkwo, 1998). According to Idigo (2012), factors associated with mathematics interest include, student factor, teacher factor, mathematics anxiety, government, lack of infrastructural facilities, lack of instructional materials and problem of large class size.

Anigbo (2016), investigated the factors that affect students' interest in Mathematics in Secondary Schools in Enugu State and found that mathematics interest in secondary school students depends on teachers, students, mathematics anxiety, class size, government, instructional strategy used by the teacher, and availability of infrastructural facilities. The variables, teacher factor, student factor, instructional strategy, mathematics anxiety and infrastructural problems were positively related to students' interest to mathematics, while other variables, class size and government factor had negative relationship with students' interest to mathematics learning.

Moreover, qualification of a teacher is the assurance of the teacher's impulse as well as the determinant of his knowledge, attitude and instructional strategy. Many studies have considered each of these factors either singly or in combination of two, but this study examines the seven identified factors (teacher, student, mathematics anxiety, class size, government, instructional strategy and infrastructural problem) as correlates of students' interest in mathematics learning in senior secondary school mathematics programme. It is therefore necessary to correlate some of the factors affecting students' interest to mathematics learning so as to know the extent of their relationships.

Student factor include lack of interest to learn mathematics caused partly by mathematics phobia and distractions from handsets they carry about even in the

mathematics classrooms as perceived by the researcher while teaching them mathematics. These have led probably to students' lack of reading culture especially mathematics textbooks.

1.2 Statement of the Problem

In order for students to develop different intellectual abilities like the capacity for thought, reasoning, analysis, synthesis, and discovery, among others, and to thereby lead society in a positive and constructive direction, it is essential that teachers cultivate students' interest in mathematics. The way that people understand and learn mathematics is influenced by many different elements. Yet, a requirement for comprehending mathematics is an interest in and a desire to learn the subject. Student interest is declining steadily these days. Many students think that mathematics is extremely complex and challenging to understand. In fact, a lot of students find it challenging to study this subject on their own without guidance from a mentor like a teacher or a colleague, taking into account all of the elements that go into teaching and learning, including the teacher, the learning environment, the learning materials, and the students themselves. This kind of attitude typically develops over time as a result of students' unpleasant experiences with the subject.

In Ghana, as indicated in the Educational Management Information System's Report from 2012 to 2018, comparing the pass rate in Core Mathematics to the pass rate in other core subjects like Social Studies, Integrated Science and English Language, students' academic performance in core mathematics has been very low and inconsistent over the years. Specifically, the reports have shown undesirable and low students' academic performance regarding core mathematics in Senior High schools. Also, the country's Basic Education Certificate Examination (B.E.C.E) and West

Africa Senior Secondary Certificate Examination (W.A.S.S.C.E) demonstrate growing inconsistencies in Mathematics achievement. These inconsistencies is not different in the Achiase District in both WASSCE and BECE. However, research has indicated that students poor performance could be as a result of their lack of interest in mathematics (Hashim etal, 2021,Tambuman, Sinaga & Widad, 2021; Ahin & Yannye 2020; Wong & Wong, 2019; Ufer,Rach & Kosilo, 2017;Anigbo & Idigo 2015,). This implies that student's poor performance in mathematics could be attributed to their low interest in mathematics. As a result, further investigation needs to be carried out in to find out students interest in mathematics.

Researchers in several nations looked at the causes of this widespread issue. Studies have examined the aspects such as the teacher, student, and school-related factors impacting the performance in mathematics to determine the causes of students' poor performance (Miheso, 2002; Olukayode, 2015; Evans, 2020; Wasike et al., 2013; Gablinske, 2014). Other researchers have examined the instructional methods that improve pupils' mathematics skills (Wasiche, 2006). While some researchers have concentrated on the setting and the students, other studies have examined the variables affecting how female students view and feel about mathematics (Wambui, 2009; Vinha, Karino & Laros, 2016). Students' low arithmetic achievement may be attributed to their disinterest in the subject. This motivated the researcher to look into the variables influencing Senior High School students' interest in mathematics. Therefore, the problem of this study is to correlate some factors affecting students' interest to mathematics learning among senior high school students.

1.3 Purpose of the study

The purpose of this study was to investigate factors that affect Senior High School students' interest in mathematics in Achiase District.

1.4 Objectives of the Study

The objective is to:

1. determine the extent to which students have interest in mathematics.
2. determine the extent to which student factor affect students' interest in mathematics.
3. determine the extent to which teacher factor affects students' interest in mathematics.
4. determine the extent to which school factor affect student' interest in mathematics.
5. determine the extent to which government factor affect students' interest in mathematics.
6. determine the extent to which student factor, teacher factor, school factor and government factor predict student interest in mathematics.

1.5 Research Questions

The study sought to answer the following research questions:

1. To what extent do students have interest in mathematics?
2. To what extent do student factor affect students' interest in mathematics?
3. To what extent do teacher factor affect students' interest in mathematics?
4. To what extent do school factor affect student interest in mathematics?

5. To what extent do government factor affect students' interest in mathematics?
6. To what extent do student factor, teacher factor, school factor and government factor predict student interest in mathematics?

1.6 Significance of the Study

The study is significant because it offers insight into factors affecting students' interest in mathematics. The study provided extent to which the scores in the variables (teacher, student, mathematics anxiety, class size, government, instructional strategy and infrastructural problem) individually predict students' interest in mathematics. And the extent to which the independent variables (teacher, student, mathematics anxiety, class size, government, instructional strategy and infrastructural problem) when combined, explain students' interest in mathematics. This could provide guidance for policy makers and stakeholders in education when structuring and identifying the root cause of learners' low interest in mathematics.

1.7 Delimitations

This study concerned with assessing factors affecting students' interest in mathematics in secondary schools in Achiase District. The study was confined to only students offering core mathematics at the senior school level. The study will be done in Achiase District in the Eastern region of Ghana.

1.8 Limitation

Self-reporting scales was used in the questionnaire to measure variables for analysis. This might have affected the result of the study since some of the respondents may

have over-estimated their responses. Also, this study covers only one district in Ghana which is Achiase. Furthermore, factors affecting students' interest is a dynamic stage in Ghana, which means that things are gradually changing on daily basis in the town. That is, the current study should be seen as "snapshots" that were current at the time the research will be conducted; it is expected that certain facts and data may change and become absolute rapidly due to new development.

The use of senior high schools students at Achiase district may be too small to represents the entire senior high school students in the country. The students who took part in this study were students at senor high school in Achiase district in the Eastern Region of Ghana and the outcome might be different from respondents in senior high schools from different districts.

1.9 Definition of Terms

Class size. It is the number of students in a mathematics class.

Educational resources. These are in the form of infrastructural resource and materials that are essential ingredients in any teaching and learning situation.

Government factor as associated with students' mathematics interest is concerned with government provision of educational facilities and qualified teaching personnel for effective teaching of mathematics.

Instructional strategy. This refers to the various methods that the teachers adopt to maximise Students learning in the classroom.

Mathematics anxiety. It is the feeling of tension, helplessness, mental disorganization and dread one when required to manipulate numbers and shapes and the solving of mathematics problems.

Students' factor include lack of interest to learn mathematics caused partly by mathematics phobia and distractions from handsets they carry about even in the mathematics classrooms as perceived by the researcher while teaching them mathematics.

Teacher factor. These are those factors that can arouse students' interest in mathematics learning and ensure success in the learning of the subject through the use of appropriate instructional strategies in teaching the student. Teachers' effectiveness in any particular subject is an important determinant in that subject (Akinoso, 2011).

1.10 Organisation of the rest of the Study

This research was organised into five chapters. Chapter one dealt with the introduction of the research that comprises of the background to the study, the statement of the problem, the purpose of the study, the research objectives, the research questions and the significance of the study, delimitation, limitation, definition of terms and the organisation of the rest of the study. Chapter Two describes literature review on the previous research concerned with factors affecting students' quality of academic performance as well as the conceptual framework of the study.

Chapter Three takes a critical look at the research design, the population, the sampling procedure, the data collection instruments, the data collection procedure, the data processing and analysis. Results and discussion of data were presented in Chapter Four. The summary of findings, discussions, recommendations and suggestions for further studies into the problem, based on the findings of this study were discussed in Chapter Five.

1.11 Summary

Chapter One has laid the foundation for the present research study. It has introduced the research problem and the question to be investigated, factors affecting students' quality of academic performance in core mathematics among senior high schools in Ghana. This research is significant due to the paucity of research in this area within the Ghanaian Context.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

This chapter takes a critical look at the literature review on the previous research concerned with factors that affect students' interest in mathematics. This chapter concentrated on the theoretical framework which encompasses the benefits of mathematics as well as factors affecting students' performance in mathematics. This also included students' interest, factors affecting students' interest as well as conceptual framework.

2.1 Importance of Mathematics

Mathematics has been described in many ways through the ages, Mathematics is an inevitable part of science and it is used in almost every field like natural science, engineering, art or economics (Kumar, 2017). Mathematics is the common knowledge that is required in taking admission for engineering, technical, social sciences and even musical education. Mathematical knowledge plays a crucial role in understanding the contents of other school subjects such as science, social studies and even music and art. Science and technology play a vital role in the economic growth and development of a country which ultimately will set a stream line of a modern civilization (Sarma & Ahmed, 2013).

Mathematics serves all most in all fields of science and technology (Sarma & Ahmed, 2013). Applied mathematics has always been leading to important discoveries and giving birth to new discipline. Another great source is Merriam Webster's dictionary and according to this mathematics is defined as the science of numbers and their

operations, interrelation, combination, generalizations and abstractions and of space configurations transformations and generalization. (Kumar, 2017).

2.2 The Study of Mathematics as a Subject in Ghana

Mathematics is a very important discipline that cut across various disciplines like physics, chemistry, commerce, economics and among others. It plays a vital role in the development of human capital and is linked with an individual's well-being and opportunities for better living. Mathematics is considered a first step in all human action in current age of globalization and technological transformation. Mathematics is a collection of abilities, techniques, and knowledge that may be applied in a variety of situations. Not only in Ghana, but around the world, mathematics is regarded as a critical topic in the educational curriculum. It is one of the most important subjects, both in and beyond of the sciences (UK Essays, 2018; Jones, 2000). Developed countries appear to have excellent mathematics policies that have propelled them to greater heights of development. It appears that no country has made any significant progress in its economic development without first developing a basic mathematical foundation. It guarantees that people gain the knowledge and skills they need to become more productive and improve their quality of life. This improvement in productivity also leads to new sources of income, boosting a country's economic growth.

The subject's importance has drawn attention to it, and it is as a result of this attention that instructors, students, parents, and educational specialists have recognized the difficulty with which some students learn the subject. It's also worth noting that some teachers struggle to teach the subject properly. The start of the Third Wave Project in 2008, according to Seah and Wong (2012), accelerated the large-scale examination of

what students value in effective mathematics study. This necessitates the investigation of what students from less developed nations, such as Ghana, who consistently score badly in mathematics value in the study of the subject (Davis, Carr, & Ernest, 2019).

Mathematics is required for pupils in the basic and second cycle since it is thought to be the foundation for the study of other disciplines. Students in the second cycle learn core mathematics; however, there is an additional mathematics course known as elective mathematics that is generally optional, depending on the program studied—business, science, or the arts. As a result, mathematics is important to a wide range of subjects in our educational system. According to Mereku's (2015) the use of information and communication technologies in mathematics teaching and learning is limited. The use of calculators is permitted in the teaching and learning of mathematics at the second cycle level of education, however pupils at the basic level are not permitted to use calculators.

Teachers of mathematics at the elementary level are generally educated, which means that primary school teachers teach practically all subjects (Davis, Carr & Ernest, 2019). Teachers who teach mathematics at the junior high school and senior high school levels are highly qualified. The majority of mathematics teachers in second-cycle institutions hold a Bachelor of Education degree in mathematics or its equivalent. However, it is normal to find teachers at the second cycle level who do not have such qualifications but are still teaching mathematics, owing to teacher shortages or inadequacy. Many of these people may excel in the topic, and their grades determine their fate.

Mathematics at the tertiary level is significantly more complicated and takes a great deal of knowledge and expertise as an instructor, generally at the tertiary level,

whereas students who study mathematics study the topic in greater depth than they did in Senior High. Mathematical research has proven to be quite essential in the country, as many scholars and professionals in subjects such as sciences, banking and finance, economics, and business management, among others, use it on a daily basis. Traders, bus conductors, and everyday Ghanaians perform rudimentary addition and subtraction in their daily tasks, thanks to the limited mathematics they were taught or learned on their own.

2.3 Challenges of Students in the Learning of Mathematics

The learning of mathematics is undoubtedly one of the most challenging subjects many people would agree have come across. According to Bawuah (2013), the difficulty associated with the teaching and learning of the subject is worse when the community where students are taught, do not consider school as a very important factor in their lives; a community where education is not valued; where parents and guardians prefer their wards farming or staying at home to going to school. In such a community, honestly, there is very little a teacher can do to help school children, as he or she may not be sure what the abilities of the student is, how knowledgeable the student is and what their capabilities are with regard to their education. Such people are not consistent in their behaviour towards their education making it difficult for them to follow through with what they are learning, especially when the subject being taught is one considered to be the most difficult and feared. Many people within our societies are of the view that mathematics is a very difficult subject to treat and study, as compared to the many academic subject areas. In Mesler (2004), it was reported that students described mathematics as “difficult, dull, abstract, and disliked” in a survey that sought to ascertain the perception of students about the subject. It is also

not surprising that many students describe the subject as difficult as many grown-ups who are out of school, in recounting their experience in the classroom, associated mathematics with “fear and trembling”. This indicates how long mathematics has been considered as a difficult subject to learn, hence, the challenge also faced by teachers in teaching the subject; because the student whose duty is to learn the subject has already given up due to his/her perception that mathematics is difficult. Thus, the teacher is challenged because the student has no interest in the subject. Some students also argue that the subject is not taught to their understanding. Montague (2003) identified the peculiar areas of mathematics teaching and learning that makes it difficult and challenging for students and teachers to play their roles effectively. The challenges identified include the inability for some people to remember the formulas for solving some mathematics problems, especially when those formulas make no sense to them. Others, in preference, put pen or pencil on paper to pay attention to details in the classroom yet not able to see what those steps in the problem-solving lead to. Yet, some others see what the big picture is and are insightful about the patterns involved in solving the question but are poor at computing and unable to remember the steps involved. Some understand the concepts being taught in the classroom but always give wrong answers to the questions. These are but a few of the problems encountered in the mathematics classroom. The individual experiencing these difficulties will therefore conclude that mathematics is difficult because they do not have any such challenges in their Literature or Social Studies class. In as much as this is a student’s problem, the teacher is to blame as well for his or her inability to understand the problems of students so as to adopt the best of means to meet their needs. Some studies also suggest that the language of and the concept associated with mathematics also make the teaching and learning of the subject difficult. I will agree

with those who argue that mathematics is difficultIt is therefore relevant that studies are conducted into the challenges faced by students in order to ascertain the causes and subsequently provide solution to the problem identified.

2.3 Factors that Influence Students Performance in Mathematics

Mathematics is very important in the development of every country, both developed and developing countries. Mathematics has contributed much in many endeavours of life from real life situations, health, industries, agriculture, aviation, constructions etc. Despite the importance of mathematics, learners find it difficult to develop love for the subject as compare to the love of the other subjects hence they intend to develop poor attitude towards the subject. A lot of studies have been conducted to find out some of the factors that contributed to the poor performance of the learners in this area of study. Some of the studies included the following: A study conducted by Jameel and Alib (2016) to find out the underlying causes behind low achievement in mathematics by covering the perception of teachers, parents and students.

The study revealed strictness while teaching mathematics as the major cause of low achievement in mathematics by the perception of students and lack of exercise as a major cause by the perception of teachers. Likewise, lack of attention as a major cause was revealed by the perception of parents (Jameel & Alib, 2016). Findings of their study also revealed that respondents comprising mothers and fathers felt that the students were not given keen and thorough attention to overcome their difficulty in mathematics and were not assigned homework on regular basis that surely enhances fundamental mathematical knowledge. The findings of the study also revealed that most of the students did not get enough support from their parents or guardians when they were doing homework of mathematics. Home background and community values

can make effective learning that leads towards high achievements. Jameel and Ali (2006) pointed out that, some teachers are very strict when teaching mathematics to students and hence students find it difficult to point out anything that disturb them or bring out their difficulties for redress. These teachers discourage the use of student-centered method that encourages students' participation in the teaching and learning of mathematics. In more serious situations, teachers force students to accept rules and formulae and present them the way the teacher like.

Mathematical knowledge is basic, nevertheless, it is poorly taught in pre-tertiary schools and ultimately mathematical performance remains poor to mark leading towards lower ability of individuals in accordance with their actual abilities (DeCaro, Rotar, Kendra, & Beilock, 2010). Students, particularly girls run away from mathematics. This difficulty reaches at its peak when it is taught by un-qualified and non-professional teachers. Attractive and impressive are not used to present mathematics to the students in the classroom result in the failure of students. Several factors such as learner's interest, lack of qualified teachers, improper curricula and school environment are responsible for the poor achievement in the mathematics by the students.

Teaching mathematics is a complex matter while lack of student's interest on the other hand probably overwhelms the abilities of adults and ultimately causes as one of the most important factors for poor performance in mathematics (Grouws & Cebulla, 2013). The study also revealed that teachers used learning methods that learners did not easily understand and ultimately unable to follow the abstract theories when teaching mathematics. Some of the methods teachers used to teach mathematics do not help students develop conceptual understanding of mathematics. The study also

revealed that the majority of the respondents indicated that their teachers were not having enough potential to teach mathematics.

Teachers need to be true guiders and facilitators for teaching mathematics to their students. Teachers need to impart new knowledge in a clear and charming way by multiple embodiment principles". Most of the mathematics teachers do not make the teaching of mathematics practical and exciting and this leads to negative attitudes and ultimately low performance in mathematics by the students (DeCaro, Rotar, Kendra & Beilock, 2010). A similar study was conducted by Isaack (2015) to find out factors leading to poor performance in mathematics subject in Kibaha secondary schools. They pointed out that the findings indicated teaching and learning of mathematics was facing challenges such as poor teaching environment, mathematics departments were not well-managed, inadequate self-practice and students' poor background in mathematics.

That is to say that, the poor teaching method environment do not encourages people to learn hard and excel in mathematics. Iheanachor (2007) indicated that, there is a significant positive relationship between students' academic performance in mathematics and teachers' educational background. Teachers who have good qualifications in mathematics have their students outperforming better in mathematics than their counterparts with poor qualifications. Teachers are key factors in the achievement of students in mathematics especially with respect to their knowledge base of the subject matter (content).

Experienced teachers couple with good qualification helps teachers to present the content to the understanding of the students. According to Limb and Fullarton (2001), there is an influence of mathematics classroom, teachers and school factors on

students' performances in mathematics. Some of the school factors are gender, family cultural resources, language background and attitudes towards mathematics, which have significant negative effect on students' performance. Mathematics classroom have great influence on the teaching learning as well as the achievement of students in the subject.

Conducive and favourable environment encourages class interactions, group presentation, encourages students to discuss mathematics freely and come out with their challenges to be addressed by the teachers. In addition, good classroom environment promote collaboration and social interaction among the students in mathematics classroom. The family background also contributes much to learner's performance in the mathematics. Some parents discourage their wards to undertake mathematics related courses especially science as they claim to be difficult subjects. Other parents also fail to provide the necessary materials for their wards that are needed to boost their learning. Students attitude towards mathematics also have a great influence on the performance of students at the higher level. Students most at times see mathematics as difficult subject from the lower level of education. In a nutshell, factors such as parents, teachers, classroom environments and teaching resources have great influence on the achievement of students in mathematics.

A lot of researchers pointed out the factors affecting students' performance in mathematics. Study by Demir, Serpil, and Ozer (2009) found that student home background, self-related reasoning in mathematics and learning methods and school environment have effects on students' performance. While Hammouri (2004) indicated that mother's perception of mathematics importance, success attribution to hard work, attitudes towards mathematics and confidence in mathematics ability

significance effects on mathematics achievement, success attribution to luck and friends' perception of mathematics importance have negative direct and total effects on mathematics achievement.

Wang's (2004) conducted studies on family factors and motivation effect on students' mathematics achievement. The results indicated that Chinese students outperformed their US counterparts in mathematics score, even though most factors were significantly related with mathematics achievement for both countries. Findings from other studies revealed significant and positive relationship between attitudes towards mathematics and mathematics performance (Ai, 2002; Singh, Graville, & Dika, 2002). Bull and Scerif (2001) studied a group of children by mathematics tests and showed that mathematical ability significantly correlates with performance in inhabitation, shifting, and working memory, yet it does not have a significant relationship with reading comprehension and intelligent quotient.

2.4 Students Interest in Mathematics

Students' interest in mathematics is greatly influenced by their perceptions of mathematics and their willingness to learn it (Arthur, Asiedu-Addo, & Assuah, 2017). The level of mathematical enthusiasm among students affects their performance and accomplishment. As a result, researchers, educators, and other stakeholders in the field of mathematics have studied achievement and performance (Bong, 2004; Skaalvik & Skaalvik, 2008). In the search by stakeholders for a remedy to the low performance of mathematics among students around the world, especially in Africa, the mathematics interest construct has received very little attention (Linnenbrink-Garcia et al., 2010). Since performance and achievement are motivated by interest, focus on achievements and performance should be linked to interest constructs.

Attitude, self-concept, and self-efficacy among others are predictors of students' successes and performance, but these same factors' relationships with students' interests have gotten less attention than they merit (Githua & Mwangi, 2003). According to the research of Pantziara and Philippou (2007), self-efficacy and fear of failure are more strongly correlated. The study also discovered a stronger link between curiosity and fear of failure. This further revealed the significance of student interest in their mathematical achievement process, which calls for additional research for the purpose of updating the literature.

Despite the importance of the subject, mathematics is usually perceived as a boring, cold, difficult, not practical and as abstract by students (Ignacio, Nieto, & Barona, 2006). If not changed, these unfavorable beliefs held by students may have a negative effect on their performance and interest. The lack of motivation and achievement among students has been linked to the negative attitude they exhibit in their academic lives. Students' attitudes relating to attendance to school and classes, participation and preparedness for mathematics classes (for instance coming to school late, skipping classes, coming to unprepared without books and home works), have been linked with student motivation and achievement (Singh, Granville, & Dika, 2002b).

The interest that the student develops towards a subject determine the academic performance and achievement in the subject. When students develop positive attitude towards a subject, it will intend positively influence the performance and the academic achievement of the student. Students attitude are influence by a lot of factors. Perceived parental influences, teacher affective support, and classroom instruction are significant predictors of attitude toward mathematics (Davadas & Lay, 2018). The interest of primary-school pupils and secondary-school students in the

study of mathematics and technical fields may be influenced by modern teaching methods. This means using graphic programs in lessons and teaching mathematics by means of discovering new concepts. It is necessary to involve primary-school pupils and secondary-school students in mathematics lessons so that they actively participate in the process of learning. In the teaching of mathematics, it is important to support an active approach of primary-school pupils and secondary-school students in acquiring new knowledge. Pupils and students who participate in the learning process will have a better knowledge of mathematics, which is the basis for the study of technical fields.

Davadas and Lay (2018) showed that perceived parental influences, teacher affective support, and classroom instruction are significant predictors of attitude toward mathematics. The research model was able to predict the inter-relationships of the constructs on a moderate level. Nevertheless, the moderate predicting relevance and effect size implied that attitude towards mathematics is multi-faceted with a likelihood of other contributing factors such as students' socio-economic status, gender and past achievements. Therefore, the relational model developed and supported with PLS analysis can be studied further with additional constructs.

Leng (2006) showed that effectiveness of learning depends on environmental factors such as attitudes, interests, teaching teachers, and peers. Tin (2003) found that correlation between attitude, interest, peer influence and perception towards teachers' instruction with upper secondary mathematics achievement. Abu Bakar, Kamaruddin and Tan (2009) reported that evaluation of the influence of attitudes, interest, teaching teachers and peers on students' achievement in mathematics. These factors are rated very important in learning mathematics in order to ensure good performance.

2.5 Factors Affecting Students' Interest in Mathematics

In an effective mathematics classroom to promote students' interest, an observer should find that the teacher is demonstrating acceptance of students' divergent ideas (Protheroe, 2007).

The teacher challenges students to think deeply about the problems they are solving, reaching beyond the solutions and algorithms required to solve the problem. This ensures that students are explaining both how they found their solution and why they chose a particular method of solution. Influencing learning by posing challenging and interesting questions. The teacher poses questions that not only stimulate students' innate curiosity, but also encourages them to investigate further.

Projecting a positive attitude about mathematics and about students' ability to "do" mathematics in one way of eliciting and sustaining students' interest in mathematics classroom. The teacher constantly builds students' sense of efficacy and instills in her students a belief that not only is the goal of "doing mathematics" attainable, but also, they are personally capable of reaching that goal. Mathematics is not presented as something magical or mysterious.

Actively engaged in doing mathematics: Students should be metaphorically rolling up their sleeves and "doing mathematics" themselves, not watching others do the mathematics for them or in front of them. Students are to be placed at the centre of mathematics during the teaching and learning situation. That is to say when students centered methods such as activity, inquiry, discovery are adopted, it helps students to actively involved in the lesson. Students then starts to think and talk among themselves in the mathematics classroom. As students share thoughts, disagree and

agree with others, they intend to like the subject and hence develop interest in the subject area (Protheroe, 2007).

Solving challenging problems: Students should be investigating meaningful real-world problems whenever possible. Mathematics is not a stagnant field of textbook problems; rather, it is a dynamic way of constructing meaning about the world around us, generating new knowledge and understanding about the real world every day. Children like playing games not because they like the game but because the game is challenging. Children love for games develop as the game becomes more challenging. This principle can be applied in the field of mathematics where students are given questions that relate to the real world for them to appreciate the beauty of the subject. Teachers are therefore to give questions meet to the developmental level of students. This will motivate the learners to learn and develop interest for the subject.

Making interdisciplinary connections: Mathematics is not a field that exists in isolation. Students learn best when they connect mathematics to other disciplines, including art, architecture, science, health, and literature. Using literature as a springboard for mathematical investigation is a useful tool that teachers can use to introduce problem solving situations that could have "messy" results. Such connections help students develop an understanding of the academic vocabulary required to "do mathematics" and connect the language of mathematical ideas with numerical representations.

Sharing mathematical ideas: It is essential that students have the opportunity to discuss mathematics with one another, refining and critiquing each other's ideas and understandings. Communication can occur through paired work, small group work, or class presentations. Students should be encouraged to speak freely by sharing ideas in mathematics classroom. Teachers should therefore encourage group activities and use

other form of teaching strategies that motivate learners to actively involve in the teaching learning situation. This when effectively implemented will help students to develop interest in the subject.

Using multiple representations to communicate mathematical ideas: Students should have multiple opportunities to use a variety of representations to communicate their mathematical ideas, including drawing a picture, writing in a journal, or engaging in meaningful whole-class discussions. Teachers are to expose students to different strategies, approaches of methods on how to solve a particular question. Mathematics shouldn't be like; this is the only way this question can be solved. This when done will help students to develop love for the subjects and hence develop interest for the subject.

Using manipulatives and other tools: Students, at the middle grades in particular, are just beginning to develop their sense of abstract reasoning. Concrete models, such as manipulatives, can provide students with a way to bridge from the concrete understandings of mathematics that they bring from elementary school to the abstract understandings that will be required of them as they study algebra in high school. Teachers teach their students how to use manipulatives, and support the use of manipulatives to solve meaningful problems that are aligned with the lesson's objectives.

Instructional approaches to help manipulation should be adapted to boost the achievement of student mathematics (Gurbuz, Catlioglu, Birgin & Erdem, 2010). Mathematical concepts using manipulatives techniques were described as a technique that enables students to draw on their own practical knowledge. By contrast, research has shown that institutions with ample teaching and learning facilities, a favorable

student-teacher relationship, good workload and good rewards and incentives typically do better than those institutions lacking in these aspects (Brudett & Smith, 2003). Nevertheless, the use of teaching and learning resources is another perspective. Orji and.

Abolarin (2012) states that it is not appropriate to use manipulatives if the students are intelligent and the teacher has good knowledge. Haron etal. (2019) argued that the key emphasis is to include students in the classroom activities. Not only do manipulatives boost the cognitive level of students, but they also increase their psychomotor ability (Kontas, 2016). The use of manipulatives should not be regarded as a solution to the difficulties of mathematical learning by students but should rather mean that the manipulation is useful for both teachers and learners (Kontas, 2016).

Acheampong and Faroque (2020) examined the effect of concrete manipulative in the teaching and learning of basic trigonometry. In the study, some students were taught using the conventional technique and others taught with a manipulative approach. The study employed a sample of 140 College of Education students. They concluded that Teachers of mathematics must ensure that the use of manipulative materials are well combined with heuristic methods to allow students to be more interested in the instructional delivery and consequently contributing to the teaching and learning of trigonometry. Meeting the learning needs of students should move away from mechanical exercises into hands on activities with manipulatives which takes more time to use.

In addition, the use of technology can help increase students interest in mathematics. Technology help to bring mathematics to reality. A lot of researches have been conducted on the effect of technology on students' interest in mathematics.

Technology helps students to receive instant feedback from computer programs when trying out ideas encourages pupils to use conjecture and to keep exploring (Clements & Battista, 1990). Pupils are guaranteed correct representations of their input data (Sivasubramaniam, 2000). ICT provides students with feedback immediately when learners are allowed to exploit them. Immediate feedback provides the student with encouragement to continue exploring and trying out new ideas until they find the answers they are looking for (Cheng & Chen, 2008). A good example is the use of geogebra in plotting graphs, the use of Excel in generating graphs etc. Feedback provided by ICT is a formative assessment tool allowing students to understand and manage their learning.

Hennessy, Deaney and Ruthven (2005) emphasis that using ICT supports students to check, trial and refines their work which means ICT facilitates immediate feedback and encourages self-correction. Students they are more likely to find successful resolutions by using the technology to prove their point when disagree while using ICT, (Clements & Battista, 1990). ICT gives rapid and accurate feedbacks to students and this contributes towards positive motivation. It also allows them to focus on strategies and interpretations of answers rather than spend time on tedious computational calculations (Becta, 2003).

Illiyas (2017) conducted a research on the interest in mathematics and academic achievement of High School Students in Chennai District. He concluded that, the students should train and exposed to various problem solving skills as a supportive technique to reinforce the learning of the subject mathematics so as to bring about a better teaching and learning process in the classroom. Special educational programmers must be introduced by the school. Teachers must help them to understand the importance of mathematics in giving out maximum practice. Teacher-

Parent association must be maintained to share their ideas to understand the family background and plan together for the betterment of the children. Parents must help the children to feel that they are accepted, loved, understood and respected. Use of mathematics in day to day life must be improved and the children must be taught about the examination process so as to lead peaceful life various types of co-curricular activities should be organized frequently to promote qualities such as co-operation, tolerance, open-mindedness, sharing of responsibilities to enhance their academic achievement. Hence it is suggested from the findings that interest in Mathematics and academic achievement of high school level students should be motivated and made genius in the schools for success of the effective classroom.

Teacher Affective Support (TAS) is also necessary to encourage positive attitudes towards mathematics (Marchis, 2011). Teachers' strong influence on students' beliefs in their mathematical competency suggest the importance of the teacher's role in mathematics classrooms which leads to improvement in students' mathematics performance (Johnson, 2000). The affective dimensions of teacher support significantly affect students' academic, emotional, behavioural, and motivational outcomes in educational environment (Sakiz, 2007). Components in TAS are specified as caring, respect, concern for, and interest in students, valuing, listening, fair treatment, encouragement, and high expectations (Sakiz, 2007).

According to Rodriguez-Brown (2009) one of the contributions that schools and teachers can make that supports children's transition from home to school is to invite parents to visit the classroom anytime during a preset day. In Rodriguez-Brown (2009), teachers' activities were found to be unique but effective in conveying to parents the teacher's acceptance for the knowledge the parents already have as well as their involvement in their child's instruction.

The context of family and community are critical to a child's school learning but the school is not important in affecting the beliefs and behaviours of adults outside the school who influence the child's learning and development (Redding, 2010). The school and the families it serves can define their own community with its sense of purpose, patterns of relationship, and expectations of all its members according to their roles. Therefore, TAS is also tested as a mediator between Perceived Parental Influences (PPI) and Attitude towards mathematics (ATM) in this study.

Mahamood etal., (2012) examined three factors relating to attitude towards mathematics are examined: these are parental influences, teacher affective support and classroom instruction (Bakar et al., 2010). Perceived Parental Influences (PPI). One of the factors affecting attitude towards mathematics is parental influence (Kerr, 2007; Mahamood etal. 2012). Parental influences can be either direct or indirect. Direct influences include parents helping their children with mathematics difficulties while indirect parental influences include parental encouragement, parental expectation and their own attitude towards mathematics (Cai, Moyer, & Wang, 1997). In a study by Mahamood etal. (2012) regarding parental attitude and involvement in children's education specifically parental aspiration among Form Four students in Selangor, Malaysia, it was revealed that parental involvement is a positive and powerful source of influence towards the achievement of adolescents.

Davadas and lay (2018) conducted a research on the factors affecting students interest in mathematics. The results showed that perceived parental influences, teacher affective support, and classroom instruction are significant predictors of attitude toward mathematics.it was also concluded that attitude towards mathematics is multi-faceted with a likelihood of other contributing factors such as students' socio-economic status, gender and past achievements.

2.6 Theoretical framework for the study

This research was framed within cognitive (Piaget, 1971) and social (Vygotsky, 1978) constructivism theory in order to understand the teacher and learner factors that contribute to learners' interest in mathematics at Achiase District. A constructivism theory places the child in an active role in the learning process. Learning is not "swallowed whole" but lesson material is modified and transformed based on the child's cognitive structures, social interaction, previous learning, and environment. Interaction with, and manipulation of, mathematical programmes is seen as critical to the development of mathematical knowledge, which is in a state of development and modification (Kuhn, 1974). The rationale for the adoption of constructivist learning theory in this study rests on the notion that teaching should begin with content and experiences familiar to the students, so they can make connections to their existing knowledge structures. New knowledge should be presented in the context of real-life rather than abstract applications. Knowledge should be presented in a manner that does not change learners' cognitive models drastically (Biggs & Tang, 2011, p. 77). Furthermore, the adoption of constructivist learning theory was motivated by the idea of the zone of proximal development (ZPD), a principle of constructivism that emphasizes a learner's ability to perform simple tasks when working with a teacher, parent, or capable peers, but which is frustrated when performing the task alone without support (Wass & Golding, 2014). Teaching should enable students to fill the gaps and extrapolate information and materials presented by the teacher. The goal should be to empower learners with skills to be independent, and access relevant information from various sources to answer their problems and challenges (Vygotsky, 1978). Teaching should involve students working in small groups interacting and arguing to find solutions to the learning activities. This attribute of cooperative

learning supports the forms and approaches of constructivism essential in social constructivism. The communication between the teacher and the learner is enhanced when it involves learners working together, where learners are helping one another to create more meaning for mathematical content. Social constructivism applied in mathematics teaching implies that mathematics is taught by emphasizing problem solving, where the interaction will take place among teachers and learners and learners themselves. Learners must be encouraged to create their own strategies for problem solving (Vygotsky, 1978). This is consistent with how Ghanaian mathematics teachers are expected to teach. Their roles include facilitation, mediation, and support of learning. As facilitators they should always view learners as active participants in the learning process. Should learners experience barriers in this process, teachers are expected to mediate through learning support processes. The above discussion is relevant for the teaching and learning of mathematics within the senior phase in this research. Teachers who are not very competent in using constructivist methods and principles in the teaching and learning of mathematics are likely to have a negative influence on the performance of learners in the subject (Makgato, 2012). Since the concern is the poor performance of learners in mathematics and the fact that contributing factors to this situation are less known, examining and understanding these factors from the constructivist perspective hoped to bring solutions to improve the effective teaching and learning of mathematics in line with the principles of constructivism.

2.7 Conceptual framework for the Study

In this conceptual framework, it is conceptualized that student's mathematics interest is influenced by student, teacher, School as well as government related factors.

2.7.1 Student Interest

This refers to the students developing positive attitude towards the study of mathematics. According to Burns (1998), many students have fears and loathsome experiences about mathematics. Such negative experiences are caused by mathematics anxiety which knows no boundaries irrespective of age or gender. Mathematics anxiety is the feeling of tension, helplessness, mental disorganization and dread one when required to manipulate numbers and shapes and the solving of mathematics problems (Ashcraft & Faust, 1994).

One of the most notable consequences of mathematics anxiety is poor mathematics achievement and competence (Ashcraft, 2002). Mathematics interest is a complex behavioural aspect of mathematics. It has so many characteristics and it can be attributed to as many situations as we discuss in mathematics education. The key strategy of mathematics teaching should focus on keeping the students' interest on mathematics. If the students are interested in learning mathematics that should be helpful their academic achievement and also teacher tasks become easier. The importance of interest in mathematics cannot be overestimated. We are living in a very important time in human history, where people are witnessing more and more advertisements and persuasive communications than ever before. Mathematics Interest is a key interest of psychologists, advertisers, and more to understand what makes people change their beliefs or opinions.

Students who are infested with mathematics anxiety will lack interest to learn mathematics, and consequently may tend to achieve poverty in the subject. Most pronounced factor that influences teaching and learning of mathematics is attitude, which as a concept is concerned with an individual's way of thinking, acting and behaving (Olatunde, 2009). The process of learning mathematics is a very complex

cognitive task that can be very imposing on students since it requires a lot of effort from them. Consequently, these students need a lot of motivation to cope with the subject.

It is therefore within the benefit of education to produce instructional strategies that are interesting and stimulating. Educators are now introducing more and various forms of software and multimedia presentation driven media into their classroom activities (Tolhurst, 1995). Students interest in mathematics can be improved in different ways according to (Protheroe, 2007).

2.7.2 Student factors

Students' factor includes lack of interest to learn mathematics caused partly by mathematics phobia and distractions from handsets they carry about even in the mathematics classrooms as perceived by the researcher while teaching them mathematics (Anigbo, 2016). Unodiaku (2012) attributed factors of academic achievement among secondary school students in mathematics to lack of interest of the students.

That is if the students have negative feeling towards the subject, then they intend to dislike the subject. In addition, most of the students think mathematics is a subject intentionally included in the syllabus to punish them. If students develop positive feelings towards the subject, then is likely that student interest in that particular subject is assured. Adequacy of teaching and learning resources; physical, human and instructional materials have been noted to be of crucial importance in determining the achievement of students in the national examinations (Njeru & Orodho, 2003). Moreover, it has very serious implications for the learner, the teacher, the immediate social group with which the individual learner relates and the entire school system.

Attitudes are formed as a result of some kind of learning experiences and may also be learned simply by following examples and illustrations. Attitude towards mathematics presents a disposition towards an aspect of mathematics that has been acquired by an individual through his or her beliefs and experiences but which could be changed (Eshun, 2004). Some authorities regard attitude towards Mathematics as just a like or dislike for Mathematics, while others extend the meaning to embrace beliefs, ability, and usefulness of Mathematics. For Zan and Martino (2008), attitude towards Mathematics is just a positive or negative emotional disposition towards Mathematics. Considering attitude towards Mathematics from multidimensional perspectives, it interprets students' attitude towards Mathematics as a more complex scenario characterized by the emotions that one associates with Mathematics, one's beliefs about Mathematics and how one behaves towards Mathematics. This attitudes if negative is reflected by the fact that students may shy away and would always try to avoid mathematics tasks. A positive attitude towards the subject is an important educational outcome that should be nurtured regardless of the achievement level of the learners who should be helped in order to bring out their best abilities. They influence our social thought and help us to organize and evaluate stimuli into pleasant or unpleasant or negative or positive or useful or not useful. Attitudes have a strong effect on behaviour which helps in understanding and predicting peoples' behaviour in a wide range of contexts. Attitudes though not directly observable are inferred from observable responses and behaviours. They are elicited by certain stimuli and gradually get established into a consistency or a tendency.

2.7.3 Teacher factor

Teacher factor refers to the teachers' knowledge, skills, personality, attitude that affects students during the teaching and learning process. Teachers have great

influence on the students' interest. Teacher that tends to motivate students and encourage student in the teaching process intend to elicit and sustain students' interest. Students' perceptions of mathematics can be significantly influenced by the methods used to teach it to them and by how it is presented to them. Numerous academic areas are taught in a way that demonstrates to students the relevance of the material in terms of real-world and extracurricular applications. Contrarily, mathematics is typically taught to pupils as superfluous information rather than as a tool that can advance society and assist others (Rodriguez, Romero Canyas, Downey, Mangels, & Higgins, 2013). To help students see that the arithmetic they are studying has real-world implications, teachers can add examples from outside the classroom or from "real-life" situations that relate to the mathematics ideas being taught in class. Presenting arithmetic in a way that adheres to a person's personal views is another strategy for teaching mathematics to students (Rodriguez et al., 2013). Some students, for instance, can have aspirations for themselves that include giving back to their community and others. Mathematical concepts can be taught in a way that demonstrates to students how they can use mathematics as a tool to better the world in which they live. This gives students a motivation to study mathematics while also enabling them to relate to the subject on a personal level, which can improve their general mathematics performance and alter their perceptions of mathematics related subjects. The way a teacher feels about the subject they are teaching can have a big impact on how students feel about it. A mathematics phobic instructor is more likely to present mathematical ideas with a pessimistic tone and may not project as much confidence (Shields, 2007). Additionally, teachers in this position are less likely to deliver mathematics in a way that inspires students to pursue professions in

mathematics, which has an impact on how interested students become in mathematics (Rowan-Kenyon, Swan & Creager, 2012).

Qualification of a teacher is the assurance of the teacher's impulse as well as the determinant of his knowledge, attitude and instructional strategy. A qualified mathematics teacher can easily use different approaches/ methods, styles, illustrations, examples, and improvise materials in teaching students' mathematics concepts, principles or ideas which his counterpart (unqualified mathematics teacher) cannot do. This suggests that student mathematics interest is dependent on qualification of the mathematics teacher. A qualified mathematics teacher can arouse students' interest in mathematics learning and ensure success in the learning of the subject through the use of appropriate instructional strategies in teaching the student (Anagbo, 2016). Teachers' effectiveness in any particular subject is an important determinant in that subject (Akinoso, 2011).

Therefore, engaging qualified mathematics teacher who is equipped with various instructional strategies in teaching mathematics enhances students' interest to learn mathematics. Eshiwani (1993) states that school quality of teachers is important in school success in terms of examination performances. Studies have identified a variety of constructivist learning strategies (e.g., students work in collaborative groups or students create products that represent what they are learning) that can change the way students interact with the content (Pallant, 2013).

A qualified mathematics teacher can easily use different approaches/ methods, styles, illustrations, examples, and improvise materials in teaching students' mathematics concepts, principles or ideas which his counterpart (unqualified mathematics teacher)

cannot do. This suggests that student mathematics interest is dependent on qualification of the mathematics teacher.

A qualified mathematics teacher can arouse students' interest in mathematics learning and ensure success in the learning of the subject through the use of appropriate instructional strategies in teaching the student. Teachers' effectiveness in any particular subject is an important determinant in that subject (Akinoso, 2011). Therefore, engaging qualified mathematics teachers who is equipped with various instructional strategies in teaching mathematics enhances students' interest to learn mathematics. This can be done through the teacher's application of his teaching styles, good trained mind and competencies which invariably eliminates anxiety in the students' learning of the subject. And qualified mathematics teacher uses varieties of mathematics games and improvise teaching materials to drive home mathematics concepts, ideas and principles competently.

2.7.4 Government factor

The government has the sole responsibility to provide the school with all the necessary materials, infrastructures, workforce to mine the schools. Schools that have all the necessary resources in teaching mathematics ensure the smooth teaching of the subject. Likewise, schools that lack materials and other necessary things to enhance teaching of the subjects, teachers and students feel worried when the subject is being taught and hence will affects students' interest.

Government can enhance students learning of school subjects (such as mathematics) by reducing the number of unqualified school teachers (mathematics) by 80 percent (NEEDS, 2007). Government is expected to provide schools with instructional materials such as Geo-boards and Heliographs in teaching plane geometry in

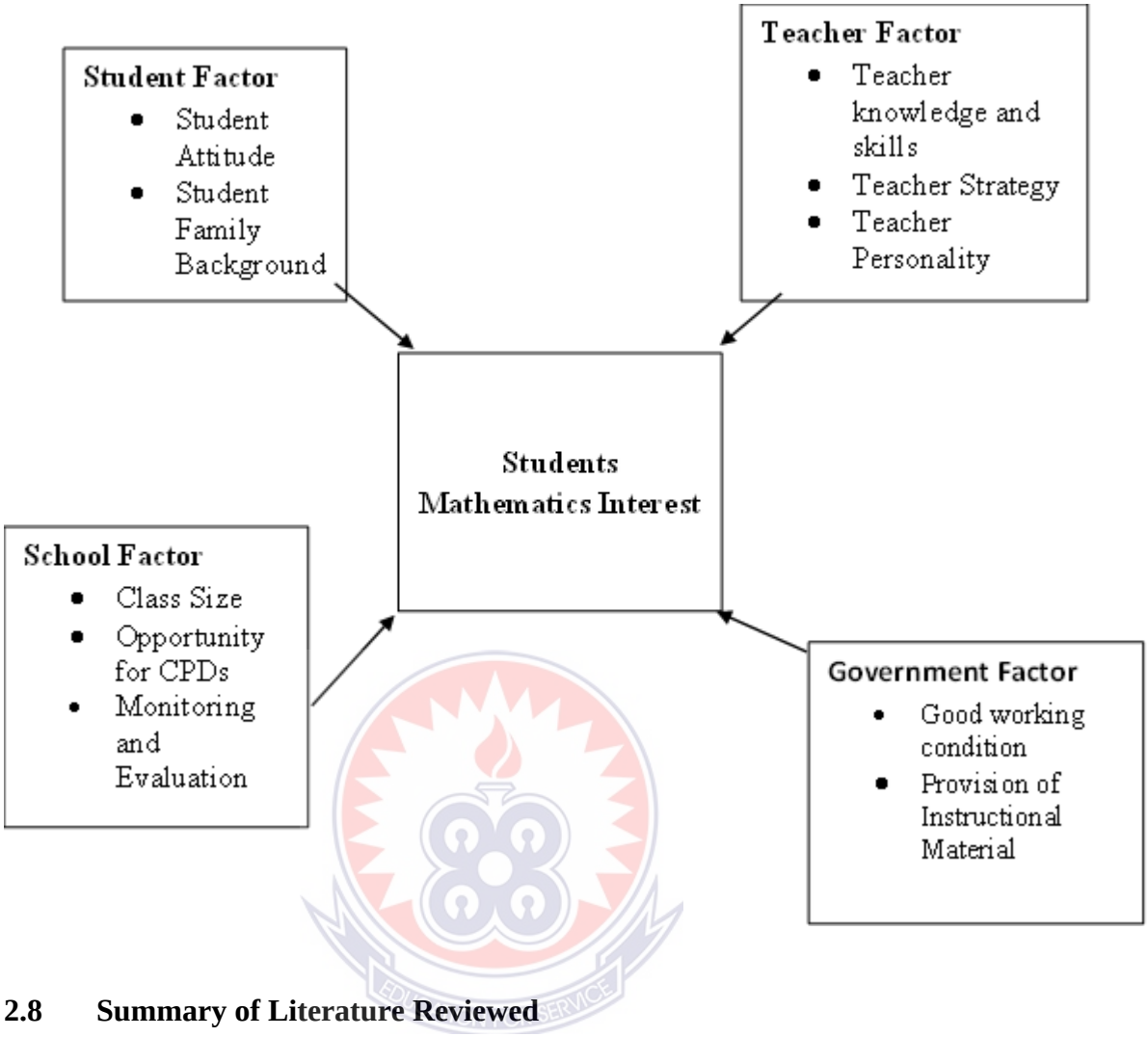
secondary schools (Ozigbo, 1994) and computer aided instruction in teaching statistics and probability to students (Ozofor, 2001). Government intervention by providing educational facilities, instructional materials and conducive mathematics learning environment may correlate positively with students' mathematics interest. Njeru and Orodho (2003), identified adequacy of resources both human and physical to determine performance in national examinations. To improve the performance therefore requires improvement in the provision of teaching and learning resources. In addition, adequacy of teaching and learning resources; physical, human and instructional materials have been noted to be of crucial importance in determining the achievement of students in the national examinations (Njeru & Orodho, 2003).

2.7.5 School Factor

These refers to all the favourable factors that are in the school that enhance and promote teaching and learning. This includes all the policies in the school designed by the administrators to enhance academic works. In schools, where there are fovourable and conducive learning environment, students intends to develop interest in the studies of the subject which mathematics is included and vice versa.

Afemikhe (2008) who all reported that school resources account for more of the variations in students' achievement in school subjects such as mathematics. Furthermore, Dambe, etal. (2008) reported that few effective studies undertaken in developing countries, those educational resources are very important input in achievement. The use of teaching resources particularly in mathematics will shift the psychological phobia, anxiety and abstraction associated with mathematics to real life situation and practically oriented.

Figure 2.1: Summary of conceptual framework



2.8 Summary of Literature Reviewed

Most Research on mathematics interest have pointed to the fact that interest played a crucial role in learning mathematics hence determines the student's success in the subject (Arthur etal, 2017; Illiyas, 2017; Grouws & Cebulla,2013).Research also supported the fact that a positive attitude towards the subject is an important educational outcome that should be constantly nurtured regardless of the achievement level of the learners who should be guided in order to bring out their best abilities and potentials. Bearing in mind various variables that play a role in determining the learner's interest, the literature stresses the need for more understanding on the effect of these variables in the learning of the subject which has always received very little

attention from the stakeholders. This study sought to create more awareness and understanding on the common factors which affects students' interest in learning mathematics and suggest more recommendations for improvement in performance through attitudinal change. The low performance and little engagement in an academic work by the learners may imply that the attitudinal change has not succeeded or different variables are given priority since attitude is implicit, but should continue as an area of concern among all the stakeholders in education. This calls for a more concerted effort in order to change some of the student's beliefs regarding the nature of learning and the factors that affect it. It also necessitates the development of strategies in educational contexts to improve student mathematics interest and engagement as well as improving on the teacher's supports system.

CHAPTER THREE

METHODOLOGY

3.0 Overview

This chapter describes the methodology that was used to study factors affecting Senior High School students' interest in mathematics in Achiase district. The chapter includes the following sections: research design, population and sample, data collection instrument, pilot study, Sampling procedure, data analysis methods and ethical considerations.

3.1 Research Design

Research designs are types of inquiry within qualitative, quantitative, and mixed methods approaches that provide specific direction for procedures in a research study (Creswell 2013). Descriptive survey is a type of research design adopted for the study. Descriptive survey provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. It includes cross-sectional and longitudinal studies using questionnaires or structured interviews for data collection with the intent of generalizing from a sample to a population (Fowler, 2008).

The purpose of this survey is to generalize from a sample to a population so that inferences can be made about some characteristic, attitude, or behavior of this population. Survey research design provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. It includes cross-sectional and longitudinal studies using questionnaires for data

collection with the intent of generalizing from a sample to a population (Fowler, 2008). This research adopted the longitudinal studies using questionnaire.

Surveys have been found to have the ability to provide an opportunity to reach a large sample size which increases the generalization of the findings. They also provide an opportunity for the respondents to respond to the items on the survey, a place and time convenient to them as well as producing responses that are easy to code (Gray, 2004). There is greater anonymity associated with surveys. They also provide consistent and uniform measures and respondents are not affected by the presence and or attitudes of the researcher (Sarantakos, 2013). Surveys are also capable of providing descriptive, inferential and explanatory information that can be used to ascertain correlations and relationships between the items and themes of the survey (Byrne, 2007).

On the other hand, surveys also have their own deficiencies among which are the inability to ask probing questions as well as seek clarifications, inability to determine the conditions under which the respondent responded to the questionnaire items as well the ability to generate high unresponsive rate (Sarantakos, 2013). The survey was an appropriate design for this quantitative research since it helped to answer the stated research questions and achieve the objective of this research. The survey was also chosen because its strength in this research outweighs its weakness hence it is suitable for this study.

3.2 Study Area

The study was carried out in the Achiase District. Achiase is the capital of the newly created district which was carved out of the Birim South District in February 2019 in the Eastern Region of Ghana. The district has two senior high schools, these are

Achiase SHS and Aperade SHS. Its population is about 55, 765. Achiase district is a farming community area followed by petty trading.

3.3 Population of the study

The target population for this study was all students in the Public Assisted Senior High School and mathematics teachers in Achiase District in the Eastern Region of Ghana. Table 3.1 shows the population for the study.

Table 3.1: Population of the study

School	Number of students		Number of Teachers
	Boys	**Girls**	
Achiase SHS	700	1000	90
Aperade SHTS	200	250	30
Total	**900**	**1250**	**120**

From Table 3.1, all the schools in the district are Government Assisted Co-educational institutions. Achiase SHS has student population of 1700 comprising 700 boys and 1000 girls with mathematics teaching staff strength of 90. Aperade SHS has a total student population of 450 with mathematics teaching staff of 30 teachers. The student's population were made up of 200 boys and 250 girls. Out of this 10 teachers were selected from Achiase senior school and 5 teachers from Aperade senior high school by purposive sampling.

3.4 Sample and Sampling Techniques

There are two senior high schools in Achiase district in which both of them were used for the study. Form two students were involved in the study. The total student population for the form two was two thousand one hundred and fifty (2,150). Of these, simple random sampling was used to select three hundred (300) students from

Achiase senior high school and two hundred students (200) from Aperade senior high school which sum up to five hundred (500) students for the study. Also fifteen (15) mathematics teachers were purposively selected from the two chosen schools. In view of the above, the sample for the study was five-hundred (500) students and fifteen (15) mathematics teachers.

3.5 Data Collection Instruments

Data were collected in the second semester of 2021 – 2022 academic year. Questionnaires were the instruments employed in data collection. This is because large amounts of information can be collected from a large number of people in a short period of time and in a relatively cost-effective way (Creswell, 2013). The results of the questionnaires can usually be quickly and easily quantified by either a researcher or through the use of a software package, can be analyzed more 'scientifically' and objectively than other forms of research instruments. Positivists believe that quantitative data can be used to create new theories and/or test existing hypotheses (Creswell, 2013).

Table 3.2 shows the purpose of this study linked to the data sources.

Table 3.2: Purpose of the study linked to the data source

Purpose of the study	Data Source(s)
1.The extent to which students have interest in mathematics.	• Student Questionnaire
2. The extent to which student factor affect students' interest in mathematics	• Student Questionnaire
3. The extent to which teacher factor affects students' interest in mathematics.	• Student Questionnaire
4. The extent to which school factor affect student' interest in mathematics.	• Teacher Questionnaire
5. The extent to which government factor affect students' interest in mathematics.	• Teacher Questionnaire

Questionnaires were used to collect the required information from students and teacher respondents. The questionnaires were structured according to the objectives of the study. Students were given questionnaire (See Appendix A) which requires them to provide their demographic details and also answer a five-point, self-report Likert scale questionnaire. Section B, C and D of this questionnaire (See Appendix A) requires student to rate themselves honestly on forty questions regarding their interest in mathematics and how student and teacher factors influence their interest in leaning mathematics. Teacher respondents were also given questionnaire (See Appendix B) to answer using a 5point, Likert-type scales, ranging from (1) strongly disagree to (5) strongly agreed." To ensure the data acquired was valid and reliable, pre-testing was done to determine whether the questions were acceptable, answerable and well

understood. The feedback was used to validate the instruments in readiness for the study.

3.6 The Pilot Study

A pilot study is a small-scale test of the methods and procedures to be used on a larger scale. The fundamental purpose of conducting a pilot study is to examine the feasibility of an approach that is intended to ultimately be used in a larger scale study. Pilot studies are important as they may provide advance warning about whether the main study will succeed or not. It needs to be pointed out that the success of a pilot study does not necessarily imply success of the main project. Potential practical problems in following the research protocol were detected through the pilot study.

The pilot study offered the opportunity to test the instruments on the subjects with similar characteristics as those in the main study. This was important for refining the wording, ordering, layout, filtering, and so on, and in helping to prune the instruments. Thus, constructs such as internal validity of the questionnaires were improved based on the results of the pilot study. Also, the questionnaires were pilot tested with samples that have the same characteristics as the population and the internal validity was ensured by using Cronbach alpha.

The questionnaire was pilot-tested in Akim Oda and modified before the actual research was carried out.The questionaire was pilot-tested at Akim Oda because the population have similar characteristics to that of the population for the study. This was achieved through the use of self-administered questionnaire without the presence of the researcher to collect data for the study. This was conducted by randomly selecting a sample of one hundred core mathematics students. The results of the pilot test were presented. According to Cohen, Manion and Morrison (2007), pilot test is

important for the following reasons; to check the clarity of the questionnaire items, instructions and layout , to gain feedback on the validity of the questionnaire items, the operationalization of the constructs and the purposes of the research, to identify omissions, redundant and irrelevant items, to gain feedback on the attractiveness and appearance of the questionnaire, gain feedback on the layout, sectionalizing, numbering and itemization of the questionnaire, to check whether the questionnaire is too long or too short, too easy or too difficult, to identify which items are too easy, too difficult, too complex or too remote from the respondents' experience, to identify commonly misunderstood or non-completed items (by studying common patterns of unexpected response and nonresponse (Verma & Mallick 1999: 120).

3.7 Validity and reliability of the survey instruments

The validity and reliability of the survey were much more important for the statistical analysis of factors affecting students' interest in mathematics. The feedback of the respondents helped the researcher to improve the quality of the survey in terms of content coverage, content validity and reliability. In this research, the construct validity and the internal reliability of each of Part B, Part C, Part D, Part E and Part F survey were found. In the context of this study, the pre-test exercise was very critical as it gave the researcher a before-hand knowledge of the understanding of the study respondents on the questions contained in the questionnaire. Subsequently, the questionnaire was subjected to reliability. This signified the comprehensibility of respondents on the research subject matter and responses to the questions were more accurate. The validity of the questionnaire was also improved by the research supervisor through validation.

Reliability coefficients are measured by using a scale from 0.00 (very unreliable) to 1.00 (perfectly reliable) (Gray, 2004). It has been suggested that for an item to be considered reliable, a value of Cronbach's alpha should be 0.7 or more (Anastasi, 1982; Kline, 2000, Tavsancil, 2002). However, the value of the reliability coefficient for the questionnaire instrument was 0.74. This value indicates a high degree of reliability of the instrument. However, the value of the reliability coefficient for the questionnaire instrument was 0.74. This value indicates a high degree of reliability of the instrument.

3.8 Data Collection Procedure

The researcher collected a letter from the department of Mathematics to be given to the district education director and the headmasters to seek permission to undertake this research in their schools. The researcher administered the questionnaire by himself. There are two types of self-administered questionnaire: those that are completed in the presence of the researcher and those that are filled in which the researcher is absent (at home, in the workplace) (Cohen, Manion, & Morrison, 2007).

This was achieved through the use of self-administered questionnaire without the presence of the researcher to collect data for the study. This enabled respondents to complete the questionnaire in private, to devote as much time as they wish to complete, to be in familiar environments, to avoid potential threat or pressure to respondants caused by the researcher presence. It is inexpensive and is more anonymous than having the researcher presence.

The presence of the researcher is helpful in that it enables any queries or uncertainties to be addressed immediately with the questionnaire designer. Further, it typically ensures a good response rate (undertaken with teachers at a staff meeting or with

students in one or more classes). It also ensures that all the questions are completed (the researcher can check these before finally receiving the questionnaire) and filled in correctly.

On the other hand, having the researcher present may be threatening and exert a sense of compulsion, where respondents may feel uncomfortable about completing the questionnaire, and may not want to complete it or even start it. Respondents may also want extra time to think about and complete the questionnaire, maybe at home, and they are denied the opportunity to do this.

Having the researcher present also places pressure on the researcher to attend at an agreed time and in an agreed place, and this may be time consuming and require the researcher to travel extensively, thereby extending the time frame for data collection. Since the benefit of the self-administration without the presence of the researcher out ways that of the self-administration with the presence of the researcher for this research, the former was much preferred.

3.9 Ethical clearance

In conducting a research ethical issue is essential and must be paid attention to. Researchers need to protect their research respondents; develop a trust with them; promote the integrity of research; guard against misconduct and impropriety that might reflect on their organizations or institutions; and cope with new, challenging problems (Israel & Hay, 2006). Ethical questions are apparent today in such issues as personal disclosure, authenticity, and credibility of the research report; the role of researchers in cross-cultural contexts; and issues of personal privacy through forms of Internet data collection (Israel & Hay, 2006). The researcher obtained the Ethics approvals from the University of Education (Winneba) Ethical Approved Board. The

aim and the objectives of this research were stated clearly to show what the research was about.

The researcher will state the respondents involved and how the research could carry low risk of harm to respondents or no harm at all. For instance, sensitive information that will be provided by the students will be treated with care and the students' anonymity and confidentiality of their information will be assured. This encouraged the respondents to contribute their maximum cooperation in providing vital information for the study.

3.10 Data Processing and Analysis

The data were exported to the Statistical Package for the Social Sciences (SPSS) version 21. Only responses from completed questionnaires were analysed. Before the analyses of the data, the researcher did preliminary data screening. This involved checking for missing values, checking for assumptions of outliers and normality. The data entries were done by the researcher in order to check the accuracy of the data. Data were cleaned before running any analysis. Cleaning the data helped the researcher to get rid of errors that could result from coding, recording, missing information, influential cases or outliers. Arithmetic mean was used to analyse the research questions while the standard deviation was used to ascertain the homogeneity or otherwise of the respondents' mean ratings. Any items with mean between 4.50-5.00 affects students' interest in mathematics to a very high extent, an item with mean ratings of 3.50-4.49 affects the students' students' interest in mathematics at a high extent and an item with mean ratings of 2.50-3.49 affects students' interest in mathematics at a moderate extent. Furthermore, items with mean ratings of 1.50-2.49 and 0.50-1.49 affect the students' academic performance to a low and very low extent

respectively. Also, Linear multiple regression analysis was used to determine the extent to which: student factor, teacher factor, school factor and government predicts student interest.

3.11 Chapter Summary

The methodology adopted in this chapter was informed by the research questions, and the Purpose of the research. The aim of the research is to examine factors affecting students' interest in mathematics in Achiase district. Therefore, the Post positivism paradigm which is quantitative research method was used for the study. This was achieved through the use of a survey. With the survey; the respondents were given a questionnaire to fill by the researcher. The data generated from the survey was analysed using SPSS. The ethics in conducting research was also followed prior to the data collection. In the next chapter, data was collected and analysed with the aim to answer the research questions.

CHAPTER FOUR

RESULTS, DATA ANALYSIS AND DISCUSSIONS

4.0 Overview

This chapter discusses the results of the survey data. The purpose was to explore the factors affecting Senior High School students' interest in mathematics in Achiase district. The **data were analysed in line with the research questions.** The sequence of the presentation and the discussion of the results obtained in this study were discussed in accordance with the six research questions. The research questions are:

- The extent to which students have interest in mathematics.
- The extent to which student factor affect students' interest in mathematics.
- The extent to which teacher factor affect students' interest in mathematics
- The extent to which school factor affect student interest in mathematics.
- The extent to which government factor affect students' interest in mathematics.
- The extent to which student factor, teacher factor, school factor and government predicts student interest in mathematics.

4.1 Respondents Background

At the initial session of the research, respondents were tasked to fill out a questionnaire which requires them to provide their demographic details. Table 4.1 and 4.2 depicts the demographics of the respondents.

Table 4.1: Demographics of the teacher the respondents.

Description	Respondents (n=15)	Percentage (%)
Gender		
Male	12	80.0
Female	3	20.0
Age		
20-29	1	6.7
30-39	7	46.7
40-49	6	40.0
50+	1	6.7
Years of Teaching		
0-4	2	13.3
5-15	8	53.3
16-25	5	33.3
Level of Education		
Bachelor's Degree	13	86.7
Master's Degree	2	13.3

From Table 4.1, the respondents were male (80.0%) dominated with just 3 female (14.3%) mathematics teachers participating in the study. The respondents (53.4%) were composed of relatively young mathematics teachers and six (40.0%) of the respondents having forty to forty - nine years. Howev er only one (6.7%) of the respondents is above fifty years. With regards to teaching experience, two of the respondents (13.3%) had four years and below years of teaching experience and eight of the respondents (53.3%) had between five to fifteen years of teaching experience. Five of the respondents (33.3%) had more than fifteen years of teaching experience. This purports that, the respondents were made up of more of teachers with teaching experience below fifteen years. Also, thirteen of the teacher respondents (86.7%) had Bachelor's Degree, however, only two of the respondents (13.3%) had their Master's degree. This also indicates that majority of the teacher respondents are first degree holders which is the entry qualification to teach at the second cycle schools.

Table 4.2: Demographics of the student respondents

Description	respondents (n=500)	Percentage (%)
Gender		
Male	214	42.8
Female	286	57.2
Age		
11-15	191	38.1
16-20	286	57.1
Above 20	23	4.8
Level		
SHS2	500	100.0

Table 4.2 depicts that, 500 second year Senior High School (SHS) students participated in the study of which 42.8% were male and 57.2% were female. This indicates that more female students participated in the study than male and this can be attributed to higher number of female students in the district. Of these 500 student respondents, 191 of them were between the ages of eleven to fifteen and 286 of the students' respondents fall within the ages of sixteen to twenty years. Moreover, only twenty - three of the students representing 4.8% were above the age of twenty. This shows that more of the student were within the SHS school going age.

4.2 The extent to which students have interest in mathematics.

In order to find out students' interest, a questionnaire for students' interest in mathematics was used. It is necessary to examine the percentage of the students who possessed low, moderate and high level of interest in mathematics. Based on the scores in respective interest items, students with mean score below 2.7 were identified as those who possessed low level of interest and students with scores above 3.6 were identified as those who possessed high level of interest. Then, students with scores

between and equal 2.7 and 3.5 were considered as those who possessed moderate level of interest. The percentage of the students in low, moderate and high levels of interest were 70 % (N=349), 21% (N=105) and 9 % (N=46) respectively (see Table 4.3).

Table 4.3: Level of Students' Interest in Mathematics

Level o f Interest	Score	N	Percentage (%)
Low	$x < 2.7$	349	70
Moderate	$2.7 \leq x \leq 3.5$	105	21
High	$x > 3.5$	46	9
Total		**500**	**100**

From Table 4.3 it can be seen that 349 of the respondents representing 70% had a low level of interest in the study of mathematics whereas 46 of the respondents representing 9% also rated with high level of interest in the study of mathematics. However, 21% of the respondents have moderate interest in the study of mathematics.

4.3 The extent to which student factor affects students' interest in Mathematics.

Research Question two was analysed by using descriptive statistics such as means and standard deviations to determine the student factors affecting students' interest in mathematics. In addition, correlation was used to find the relationship between student factors and students' interest in Mathematics. Finally multiple linear regression was used to determine the extent to which student factors affect student interest in mathematics. Data relating to student factors were analysed and presented in Table 4.4, Table 4.5 and Table 4.6.

Table 4.4: Respondents' Mean Ratings on the Extent Student-Related Factors Affect Students' Interest in Mathematics

No.	Student Factors	$\bar{X}$	SD	Remarks
	Students Attitude			
1	The study of mathematics makes me nervous	3.80	1.26	High Extent
2	Study of mathematics frustrates me.	3.28	1.31	Moderate Extent
3	I get sinking feeling when studying mathematics	3.48	1.14	Moderate Extent
4	Mathematics is difficult to learn	3.48	1.23	Moderate Extent
	Parent Background			
5	My parents are not good in mathematics	3.39	1.32	Moderate Extent
6	My parents motivate me to study mathematics	3.75	1.42	High Extent
7	My parents support me when doing mathematics assignment	2.56	1.45	Low Extent
8	My parents provide all the resources for the study of mathematics.	3.35	1.27	Moderate Extent
	OVERALL	**3.39**	**1.30**	**Moderate Extent**

Data presented in Table 4.4 reveal that only item one with mean rating of 3.80 affect students' interest in mathematics to a high extent. That is, students admitted that, the study of mathematics makes them nervous. Also, to find out whether their parents support them when doing mathematics assignment, it was revealed that parental support during mathematics assignment is very minimal. However, six items with mean ratings of 3.28, 3.48, 3.48, 3.39, 3.75 and 3.35 respectively affect students' interest at a moderate extent. The grand mean of 3.39 indicate that the respondents rated student-related factors as affecting students' interest in learning mathematics in Achiase District at a moderate extent.

Table 4.5: Correlation between Student Related Factors and Student Interest in Mathematics

		Interest
Student Attitude	Pearson Correlation	.429**
	Sig. (2-tailed)	.000
Parent Background	Pearson Correlation	.435**
	Sig. (2-tailed)	.000

Table 4.5 shows the correlation between student factors affecting their interest in mathematics and students' interest in mathematics. The result from Table 4.5 at 95% confidence level indicated that there is a significant positive correlation between student attitude and students' interest in Mathematics (r = 0.429, P =0.000). Also, the results indicated that there is a significant positive correlation between students' parent background and students' interest in mathematics (r = 0.435, P= 0.00). However, to determine whether these factors have impacts on students' interest in mathematics, a linear regression was used as illustrated in Table 4.6.

Table 4.6-Effect of Student Related Factors on Students Interest in Mathematics

Model	Unstandardized Coefficients		Standardized Coefficients	Sig	F(Sig)
	B	Std. Error	Beta		
(Constant)	1.644	.306		0.00	23.261 (0.000)
Students Attitude	.302	.096	.272	0.00	
Parent Background	.288	.087	.285	0.00	

R=0.490, R Square = 0.240, Adjusted R Square =0.230, Std. Error of the Estimate = 0.978

From Table 4.6, it can be seen that approximately 24.0% of the variation in the students' interest in mathematics is explained by the variations in student factors (students' attitude towards mathematics, parent background). Since the F-calculated is in the region ($p < 0.05$), there is evidence from Table 4.6 that at least one of the student factors affects students' interest in mathematics. Both the standardized and unstandardized coefficients indicate that both students' attitude and their parents' background affect their interest in mathematics. However, both standardized and unstandardized coefficients indicate that student's attitude have higher influence than students' parents' background. For instance, the standardized coefficient for student attitude was 0.302 whiles that of parent background was 0.288.

4.4 The extent to which teacher factor affects students' interest in mathematics

Research Question Three was anal ysed by using descriptive statistics such as means and standard deviations to determine teacher factors affecting students' interest in mathematics. In addition, correlation was used to find the relationship between teacher factors and students' interest in Mathematics. Finally multiple linear regression was used to determine the extent to which teacher factors affect student interest in mathematics. The results are shown in Table 4.7, Table 4.8 and Table 4.9.

Table 4.7: Teacher Factor Affecting Students Interest in Mathematics

Teacher factor	Mean	Std. Deviation
Teachers' knowledge		
1. My teacher has sufficient knowledge about mathematics;	3.080	1.557
2. My teacher can use a mathematical way of thinking.	3.106	1.410
	3.093	**1.295**
Teachers' Strategies		
3. My teacher knows how to select effective teaching approaches to guide student thinking and learning in mathematics.	2.720	1.622
4. My teacher can use a mathematical way of thinking.	2.721	1.48
5. My teacher has various ways and strategies for developing my understanding of mathematics.	3.853	1.494
6. My teacher knows how to assess student performance in a classroom.	2.840	1.576
7. I can adapt my teaching based-upon what students currently understand or do not understand.	3.480	1.616
	3.166	**.948**
Teachers' Attitude		
8. I get a sinking feeling when I think of teaching mathematics	3.440	1.664
9. Have positive attitude towards the teaching of mathematics	2.9000	1.60849
	3.326	**1.220**
Teachers' Personality		
11. The presence of the teacher make me feel happy towards teaching and learning of mathematics.	3.5733	1.47619
12. My teachers personality motivate me to learn Mathematics	3.5333	1.58714
	3.5533	**1.33128**
Overall Teacher Factor	**3.2850**	**.88669**

The overall mean score of 3.285 indicated that students agreed that teacher factor has the potential of affecting their interest in mathematics. In addition, they also indicated

that teacher's knowledge, teachers teaching strategy, teachers' attitude towards teaching of mathematics as well as teachers' personality have effect on their interest in the study of mathematics. For instance, students agreed that the presence of their teachers in the classroom make them feel happy towards teaching and learning of mathematics. However, most learners disagreed that their teachers know how to select effective teaching approaches to guide student thinking and learning in mathematics (mean = 2.720, SD = 1.622).

Table 4.8: Correlation between teacher factors and students' interest in mathematics

Teacher Factor		**Interest**
Teachers' knowledge	Pearson Correlation	0.597**
	Sig. (2-tailed)	0.000
Teachers Strategies	Pearson Correlation	0.373**
Teachers Attitude	Pearson Correlation	0.491**
	Sig. (2-tailed)	0.000
Teachers Personality	Pearson Correlation	0.401**
	Sig. (2-tailed)	0.000

Table 4.8 shows the correlation between teachers' factors affecting students' interest in mathematics. The result from Table 4.8 indicated that there is a significant positive correlation between teachers' knowledge and students' interest in Mathematics (r = 0.597, P =0.000). Also, the results indicated that there is a significant positive correlation between teachers teaching strategies and students interest in mathematics (r = 0.373, P= 0.00). In addition, a significant positive correlation was also found

between teachers' personality and students' interest in mathematics (r = 0.401, P = 0.000). However, to determine whether these factors have impacts on students' interest in mathematics, a linear regression analysis was done as illustrated in Table 4.9.

Table 4.9: Coefficient of predictors (teacher's knowledge, teachers' strategies and teachers' attitude) on students' interest in Mathematics

Model	Unstandardized Coefficients		Standardized Coefficients	Sig	F(Sig)
	B	Std. Error	Beta		
(Constant)	1.096	0.286		0.000	28.570 (0.00)
Teachers knowledge	0.363	0.063	0.421	0.000	
Teachers Strategies	0.183	0.079	0.156	0.022	
Teachers Attitude	0.165	0.075	0.181	0.030	
Teachers Personality	0.088	0.065	0 .106	1.370	

Multiple R = 0.664, R^2 = 0.441, Adjusted R^2 = 0.425, Standard Error = 0.844
Significant at P < 0.05

Source: Field survey (2022)

From the Table 4.9, it could be seen that approximately 44.1% of the variation in the students' interest in mathematics is explained by the variations in teacher factors (teachers' knowledge, teachers teaching strategies, teachers' attitude, and teachers' personality). Since the F-calculated is in the region (p < 0.05), there is evidence from

Table 4.9 that at least one of the teacher factors affects students' interest in mathematics. Both the standardized coefficient and unstandardized coefficient indicated that both teacher related factors with the exception of teachers' personality have impact on students' interest in mathematics. However, both standardized coefficient and unstandardized coefficient indicate that teacher's knowledge (B= 0.363, P = 0.000) have higher influence on students' interest in mathematics followed by teachers teaching strategies adopted in teaching (B = 0.183, P = 0.022) whiles teacher personality have no influence on students' interest in mathematics (0.088, P = 1.370).

4.5 The extent to which school factor affects student interest in mathematics

Research Question four was analysed by using descriptive such as means and standard deviations to determine the school factors affecting students' interest in mathematics. In addition, correlation was used to find the relationship between school factors and students' interest in Mathematics. Finally multiple linear regression was used to determine the extent to which school factors affect student interest in mathematics. The results are shown in Table 4.10, Table 4.11 and Table 4.12

Table 4.10- Descriptive Statistics of School Factors Affecting Students Interest in Mathematics

	Mean	Std. Deviation
1. The class size is small for effective teaching and learning of mathematics	3.013	1.493
2. My school provide opportunities for the teachers to upgrade themselves in mathematics training	2.793	1.586
3. My school provide in-service training for new teachers in the teaching of mathematics	2.900	1.608
School Factorv	***2.9022***	***1.217***

Table 4.10 indicates that most students did not agree to the fact that school factor affect their interest in Mathematics resulting in below average score (mean = 2.902, standard deviation = 1.217). For instance, most of the students disagreed to the fact that "My school provide opportunities for the teachers to upgrade themselves in mathematics training". To ascertain whether school factor affects students' interest in Mathematics, correlation and simple linear regression was used as shown in Table 4.11 and Table 4.12.

Table 4.11- Correlation between School Factor and Students Interest in Mathematics

		Interest
School Factor	Pearson Correlation	0.268**
	Sig.(2-tailed)	

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

Table 4.11 shows a positive correlation between school factor and students interest in mathematics. This indicates that when school related factors are favorable, it will motivate learners to study hard and vice versa. However, the effect of school factor on students' interest can only be ascertained through the use of linear regression model.

Table 4.12-Effect of School Related Factor on students Interest in Mathematics

Model	Unstandardized Coefficients		Standardized Coefficients	Sig	F(Sig)
	B	Std. Error	Beta		
(Constant)	2.949	0.228		0.000	11.431
School Factor	0.245	0.072	0.268	0.001	0.001

R = 0.268, R square = 0.072, Adjusted R Square = 0.065, Std. Error = 1.0773

From the Table 4.12, it could be seen that only 7.2% of the variation in the students' interest in mathematics is explained by the variations in school factor. Since the F-calculated is in the region ($p < 0.05$), there is evidence from Table 4.12 that school factor have effects on students interest in mathematics as indicated by both the standardized coefficient (B = 0.268) and unstandardized coefficient (B = 0.245).

4.6 The extent to which government factor affect students' interest in mathematics.

Research Question Five was analysed by using descriptive statistics such as means and standard deviations to determine the government factors affecting students' interest in mathematics. In addition, correlation was used to find the relationship between government factor and students' interest in Mathematics. Finally multiple linear regression was used to determine the extent to which government factors affect

student interest in mathematics. The results are shown in Table 4.13, Table 4.14 and Table 4.15.

Table4.13: Description Statistics of Government factors Affecting Students Interest in Mathematics

	Mean	Std. Deviation
1. Government has provided competent and qualified teachers for the teaching of mathematics	1.9133	1.26881
2. Government has provided enough teaching resource for the teaching of mathematics	2.4933	1.54027
3. Government provides motivation for students to learn Mathematics	2.5267	1.50479
4. Good working conditions and teachers' motivation are provided by the government.	2.2000	1.42838
Government Factor	**2.2833**	**1.09784**

Table 4.13 shows the government related factors that affect students' interest in mathematics. The overall average (mean = 2.283, SD = 1.097) indicated that students disagree that government factor can affect their interest in Mathematics. For instance, the students disagreed that government has provided enough teaching resources for the teaching of mathematics (mean = 2.493, SD = 1.540). This indicates that the government does not have direct influence on students' interest in teaching and learning of mathematics.

Table 4.14: Correlation between Government factor and Students' Interest in Mathematics

		Interest
Government Factor	Pearson Correlation	.199*
	Sig. (2-tailed)	.014

Table 4.14 shows positive correlation between government factor and student interest in Mathematics. This means that there is a positive relationship between government factor and student interest in mathematics. However, to determine whether there is effect of government factor on students' interest in Mathematics, a simple linear regression was employed as in Table 4.15.

Table 4.15- Effect of Government Factor on Students' Interest in Mathematics

Model	Unstandardized Coefficients		Standardized Coefficients	Sig	F (Sig)
	B	Std. Error	Beta		
(Constant)	3.198	0.207		0.000	0.000
Government Factor	0.202	0.082	0.199	0.014	0.014

R = 0.199, R Square = 0.040, Adjusted R Square = 0.033, Std, Error = 1.096

From the Table 4.15, it can be seen that only 4.0 % of the variation in the students' interest in mathematics is explained by the variations in government factor. Since the F-calculated is in the region ($p < 0.05$), there is evidence from Table 4.12 that government factor may affect students' interest in mathematics. Both the standardized coefficient and unstandardized coefficient indicate government factor have influence on students' interest in mathematics.

4.5 Research Question Six: To what extent do student factor, teacher factor, school factor and government predicts student interest.

Research Question six was analysed by using correlation to find the relationship between components that affect students' interest in mathematics (School Factor, teacher factor, Government factor, Student Factor) and students' interest in mathematics. Also, Linear multiple regression analysis was used to determine the extent to which student factor, teacher factor, school factor and government predict student interest.

Table 4.16: Descriptive Statistic of Factors Affecting Students Interest in Mathematics

Factors Affecting Students interest in Mathematics		Interest
School Factor	Pearson Correlation	0.268**
	Sig. (2-tailed)	0.001
Teacher Factor	Pearson Correlation	0.637**
	Sig. (2-tailed)	0.000
Government Factor	Pearson Correlation	0.199*
	Sig. (2-tailed)	0.014
Student Factor	Pearson Correlation	.490**
	Sig. (2-tailed)	.000

Table 4.16 shows the correlation between factors affecting students' interest in mathematics (teacher factor, student factor, government and school factor) and students' interest in Mathematics. The results indicate that there is positive correlation between all the factors affecting students' interest in Mathematics and Students

interest in Mathematics. However, the highest positive correlation was found between teacher factor and students' interest in mathematics (r = 0.637, P = 0.000) followed by student factor and students' interest in mathematics (r = 0.490, P = 0.000) whiles the least correlation was found between government factor and students' interest in mathematics (r = 0.119, P = 0.000).

Table 4.17: Effect of Predictors (Student Home Background, Textbook and Other Materials, School Factor, Government Factor, Teacher Factor) on students Interest in Mathematics

Model	Unstandardized Coefficients		Standardized Coefficients	Sig	F(Sig)
	B	Std. Error	Beta		
(Constant)	0.802	0.297		0.008	21.983 (0.000)
School Factor	0.061	0.067	0.066	0.366	
Teacher Factor	0.725	0.109	0.577	0.000	
Government Factor	0.081	0.084	-0.179	0.032	
Student Factor	0.144	0.113	0.119	0.207	

R = 0.658, R square = 0.433, Adjusted R Square = 0.413, Standard Error = 0.853

From Table 4.17: It can be seen that approximately 43.3% of the variation in the students' interest in Mathematics is explained by the variations in the factors (School factor, teacher factor, government factor and student factor). Since the F-calculated is in the region ($p < 0.05$), there is evidence from Table 4.17 that at least one of the factors (School factor, teacher factor, government factor and student factor) affects students' interest in mathematics. Based on the standardized and unstandardized

coefficients, it could be seen that some of the factors have more influence than the others. From Table 4.17. It could be seen that teacher factor is strong predictor of students' interest in mathematics followed by student related factors whiles school related factors and government factor have the least effect on students' interest in Mathematics.

4.6 Discussion of the Results

Research question one was to find out the extent to which students have interest in mathematics. The current study revealed that 349 of the respondents representing 70% had a low level of interest in the study of mathematics whereas 46 of the respondents representing 9% also rated with high level of interest in the study of mathematics. However, 21% of the respondents have moderate interest in the study of mathematics. The results in this study clearly indicate that more of the students have low level of interest for mathematics. The results of this study is in line with the findings made by Arthur, Asiedu-Addo and Assuah (2017) who investigated students interest in mathematics and concluded that students' interest in mathematics is very low and it is greatly influenced by their perceptions of mathematics and their willingness to learn it.

With reference to the research Question two which seeks to find out the extent to which students factor affect their interest in Mathematics. The current study pointed out that student agreed that student related factors have the potential of affecting students' interest in mathematics. The study also indicate that the two determinant of student factors are students' attitude towards the study of mathematics and students parental background. With respect to students' attitude, students indicated that the study of mathematics do not make them nervous. And the study of mathematics does

not frustrate them. This means that student's attitude towards the study of mathematics may not be due to its study but other related factors.

In addition, with reference to student's parent background, they indicated that their parents support them when doing mathematics assignment but most of them disagreed to the item "My parents provide all the resources for the study of mathematics". This may mean that, parents provide some resources to their wards towards the study of mathematics but perhaps not all. However, the study indicated that students attitude towards the study of Mathematics was the most influential factor in students interest in Mathematics followed by students' parents background. This is not surprising because attitude have a great potential in students' interest towards a particular subjects. When students have positive attitude towards the study of a subject, they interest to develop interest in that subject and vice versa.

This finding is in line with the statement that perceived parental influences, teacher affective support, and classroom instruction are significant predictors of attitude toward mathematics (Davadas & Lay, 2018). As students share thoughts, disagree and agree with others, they intend to like the subject and hence develop interest in the subject area (Protheroe, 2007). Socio-economic components like participation in the class, family pay, and mother's and father's schooling, educator understudy proportion, presence of prepared instructor in school, sex of understudy and distance of school are likewise influenced the students' academic performance (Raychauduri et al., 2010).

In an investigation by Mahamood et al. (2012) in regards to parental attitude and contribution in children schooling explicitly parental goal among Form Four students in Selangor, Malaysia, it was uncovered that parental association is a positive and

amazing wellspring of impact towards the accomplishment of teenagers in mathematics. The setting of family and local area are basic to a children school adapting however the school isn't feeble in influencing the convictions and practices of grown-ups outside the school who impact the kid's learning and improvement (Redding, 2010). Students' factor include lack of interest to learn mathematics caused partly by mathematics phobia and distractions from handsets they carry about even in the mathematics classrooms as perceived by the researcher while teaching them mathematics (Anigbo, 2016).

In response to the research question three which seeks to identify the extent to which teacher related factors affect students interest in mathematics. The current study revealed teachers attitude, teachers knowledge, teachers teaching strategies and teachers personality have potentials in affecting students' interest in mathematics. The study also indicated that teachers knowledge have higher influence on students interest in mathematics followed by teachers teaching strategies adopted in teaching whiles Teachers personality have no influence on students interest in mathematics.

That is the knowledge of the teacher in a particular concepts determine how well he or she can communicate that concept to the learners. If teachers are able to communicate effectively to the understanding of students, students intend to develop positive attitude towards hence increasing their interest in Mathematics. This means that teachers with sufficient knowledge about mathematics are likely to elicit and sustain students' interest in mathematics than their counterparts.

With the teaching strategies, it is believed that student centered approaches' have the potential to increase students' interest in Mathematic than the teacher centered approaches. However, students indicated teachers' personality like "My teachers'

personality motivate me to learn mathematics" do not affect their interest in mathematics. This is supported by the following studies. A qualified mathematics teacher can arouse students' interest in mathematics learning and ensure success in the learning of the subject through the use of appropriate instructional strategies in teaching the student (Anagbo, 2016).

Teachers' effectiveness in any particular subject is an important determinant in that subject (Akinoso, 2011). Studies have identified a variety of constructivist learning strategies (e.g., students work in collaborative groups or students create products that represent what they are learning) that can change the way students interact with the content (Pallant, 2013). Teachers' effectiveness in any particular subject is an important determinant in that subject (Akinoso, 2011). Therefore, engaging qualified mathematics teachers who is equipped with various instructional strategies in teaching mathematics enhances students' interest to learn mathematics.

Various classroom practices have been recognized as subverting the interest and worth understudies join to mathematics and science, like the utilization of cutthroat, public persuasive methodologies, regular utilization of public drill and practice, and tricky utilization of acclaim and analysis (Turner et al., 2002). Illiyas (2017) conducted a research on the interest in mathematics and academic achievement of High School Students in Chennai District. He concluded that, the students should train and exposed to various problem solving skills as a supportive technique to reinforce the learning of the subject mathematics. So as to bring about a better teaching and learning process in the classroom. Special educational programmers must be introduced by the school.

Teachers must help them to understand the importance of mathematics in giving out maximum practice. Teacher-Parent association must be maintained to share their ideas

to understand the family background and plan together for the betterment of the children. The decision of instructional technique can impact students, attitude towards mathematics (Schukajlow et al., 2012). Teacher disposition, student attitude and students' academic achievements related conduct may change as instructors and understudies associate in the classroom (Reyes & Stanic, 1988).

With respect to the research question four which seeks to identify the extent to which school related factors affects students' interest in Mathematics. The current study indicated that school related factors can affect their interest in mathematics. For instance the class size can directly affects students' interest in mathematics. This is because a small class size will encourage the adoption of students centered approaches which motivate learners and increase their interest in Mathematics than the teacher centered strategies. However, teachers disagreed that "My school provide opportunities for the teachers to upgrade themselves in mathematics training" and school provide in-service training for new teachers in the teaching of mathematics.

This is consistent with the following findings. Afemikhe (2008) who all reported that school resources account for more of the variations in students' achievement and interest in school subjects such as mathematics. Yu and Singh (2016) clarified that interest probably won't be an immediate indicator of mathematics performance, also, it very well may be because of the complementary impacts with individual factors (for example self-viability or self-guidelines) or school-related factors (for example classroom practices). Adino (2015) revealed that non-availability and inadequacy of teaching and learning resources hampered performance in Mathematics and hence affect their interest in Mathematics.

In line with the research question five which seeks to identify the extent to which government factor affect students' interest in Mathematics. The results indicated that government factor have influence on students interest in Mathematics. However, the results indicated that government factor may not directly affect students' interest in Mathematics. For instance the teachers disagreed that government have provided enough teaching resource for the teaching of mathematics, government provide motivation for students to learn mathematics and good working conditions and teachers' motivation are provided by the government. This indicated that even though the government have obligations in the classroom teaching and learning through provision of teaching aids, recourses, competent teachers but these may not necessary affects students interest in the study of Mathematics.

This is supported by the following studies: Government can enhance students learning of school subjects (such as mathematics) by reducing the number of unqualified school teachers (mathematics) by 80 percent (NEEDS, 2007). Government is expected to provide schools with instructional materials such as Geo-boards and Heliographs in teaching plane geometry in secondary schools (Ozigbo, 1994) and computer aided instruction in teaching statistics and probability to students (Ozofor, 2001). Government intervention by providing educational facilities, instructional materials and conducive mathematics learning environment may correlate positively with students' mathematics interest. Njeru and Orodho (2003) identified adequacy of resources both human and physical to determine performance in national examinations. To improve the performance therefore requires improvement in the provision of teaching and learning resources. In addition, adequacy of teaching and learning resources; physical, human and instructional materials have been noted to be

of crucial importance in determining the achievement of students in the national examinations (Njeru & Orodho, 2003).

With regard to the last research question which seeks to the extent to which: student factor, teacher factor, school factor and government predicts student interest. The current revealed that teacher factor is strong predictor of students' interest in mathematics followed by student related factors whiles school related factors and government factor have the least effect on students' interest in Mathematics. This finding is surprising because the other studies have highlighted the effect of school related factors on students' interest in mathematics. Teacher factor is not surprising because most of the classroom responsibilities like choosing of the content, teaching aids, teaching strategies, assessment methods all rest on the shoulders of the teachers.

All these have the potential to affect students' interest in Mathematics. Therefore, it can be concluded that, teachers are critical factors that determine to some extent students interest in Mathematics. This finding is in line with the following studies. Jammeel and Ali (2006) pointed out that, some teachers are very strict when teaching mathematics to students and hence students find it difficult to point out anything that disturb them nor bring out their difficulties for redress. These teachers discourages the use of student centered method that encourages students' participation in the teaching and learning of mathematics.

In more serious situations, teachers force students to accept rules and formulae and present them the way the teacher like. Mathematical knowledge is basic, nevertheless, it is poorly taught in pre-tertiary schools and ultimately mathematical performance remains poor to mark leading towards lower ability of individuals in accordance with their actual abilities (DeCaro, Rotar, Kendra, & Beilock, 2010). Most of the

mathematics teachers do not make the teaching of mathematics practical and exciting and this leads to negative attitudes and ultimately low performance in mathematics by the students (DeCaro, Rotar, Kendra, & Beilock, 2010).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Overview

This chapter presents the summary of the research findings, conclusion as well as recommendations and suggestions for further research works.

5.1 Summary of the Study

The purpose of the study was to investigate factors that affect Senior High School students' interest in mathematics. The study was conducted in senior high schools in Achiase district in the Eastern region of Ghana. The current study was guided by six research questions:

1. To what extent do students have interest in mathematics?
2. To what extent do student factor affect students' interest in mathematics?
3. To what extent do teacher factor affect students' interest in mathematics?
4. To what extent do school factor affect student interest in mathematics?
5. To what extent do government factor affect students' interest in mathematics?
6. To what extent do student factor, teacher factor, school factor and government predicts student interest in mathematics?

The major instrument used for collecting data was questionnaire. Simple random sampling was used to select five hundred students from two senior high schools in Achiase district for the study. Descriptive statistics such as means and standard deviations, correlation and regressions analysis were used to analysed the collected data.

The study revealed six main findings in respect to the research question.

The current study revealed that 349 of the respondents representing 70% had a low level of interest in the study of mathematics whereas 46 of the respondents representing 9% also rated with high level of interest in the study of mathematics. However, 21% of the respondents have moderate interest in the study of mathematics. The results in this study clearly indicate that more of the students have low level of interest for mathematics.

Student related factors have the potential of affecting students' interest in mathematics. The study also indicated that the two determinant of student factors are students' attitude towards the study of mathematics and students' parental background. With respect to students' attitude, students indicated that the study of mathematics do not make them nervous. And the study of mathematics does not frustrate them. This means that student's attitude towards the study of mathematics may not be due to its study but other related factors.

The study also indicated that teachers' attitude, teachers' knowledge, teachers teaching strategies and teachers personality have potentials in affecting students' interest in mathematics. The study also indicated that teacher's knowledge have higher influence on students interest in mathematics followed by teachers teaching strategies adopted in teaching whiles teachers personality have no influence on students interest in mathematics.

The study further pointed out that school related factors affect students' interest in Mathematics. For instance, the class size can directly affect students' interest in mathematics. This is because a small class size will encourage the adoption of

students centered approaches which motivate learners and increase their interest in Mathematics than the teacher centered strategies.

The study also showed that government factor have influence on students' interest in Mathematics. However, the results indicated that government factor may not directly affect students' interest in Mathematics.

In determining the factor that predicts students' interest, the results indicated that teacher factor is strong predictor of students' interest in mathematics followed by student related factors whiles school related factors and government factor have no significant effect on students' interest in Mathematics.

5.2 Conclusion

The current study indicated that students perceive government factor, teacher factor, student factor and school factor as the factors affecting their interest in Mathematics. However, in predicting students' interest in mathematics, the current study revealed that teacher factor is strong predictor of students' interest in mathematics followed by student related factors whiles school related factors and government factor have the least effect on students' interest in Mathematics. According to the above results, it can be seen that there is a relationship between teacher factors and students' interest in mathematics and student factors and their interest in mathematics. Thus, teachers must revise formal teaching methods which often do not match the students' learning styles and skills needed to be productive in society.

5.3 Recommendations

Based on the conclusions, it is recommended that;

1. Teachers should prepare adequately before going to class.
2. Teachers should vary their teaching strategies to meet the individual needs of the students.
3. The class size should be relatively small to enhance effective teaching and learning.
4. The headmasters must implement policies that provide conducive environment for teaching and learning.

5.4 Suggestions for Further Research

Based on the current study it is suggested that

1. Further research must employ qualitative studies in order to get in-depth understanding of the problem.
2. The current study was conducted at Achiase district in the Eastern region of Ghana, the study can therefore be replicated in other districts to determine what persist there.
3. Research should be conducted to find out other factors that predict students interest in Mathematics as the best model from this study accounted for only 43.3%.
4. Further studies can be conducted to find out what actually happened during Mathematics instruction.

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APPENDIX A

MATHEMATICS QUESTIONNAIRE FOR STUDENTS

The aim of this research is to identify the factors affecting SHS student interest in mathematics in Achiase district.

Thank you for taking time to complete this questionnaire. Please answer each question to the best of your knowledge. Your thoughtfulness and responses will be greatly appreciated. Your responses will be kept completely confidential.

SECTION A: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

1. Age : 11 – 15years ☐ 16 – 20years ☐ Above 20years ☐
2. Gender : Male ☐ Female ☐
3. Level : SHS2 ☐ SHS3 ☐

Please tick (√) and rate yourself honestly in the appropriate column for your response to the following statements.

SECTION B: STUDENT INTEREST IN MATHEMATICS

Statement	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. I have interest in the study of mathematics.					
2. I have interest in pursuing					

mathematics at the higher level.					
3. I feel excited when learning mathematics.					
4. I can apply mathematics in real life situation.					
5. I feel comfortable when solving mathematics questions.					

SECTION C: STUDENT FACTORS THAT AFFECT STUDENTS' INTEREST IN LEARNING MATHEMATICS

Statement	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Student Attitude					
6. The study of mathematics do not make me nervous					
7. Study of mathematics does not frustrate me.					
8. I do not get sinking feeling when studying mathematics					
9. Mathematics is difficult to learn					
Students' family					

Background					
10. My parents are good in mathematics					
11. My parents motivate me to study mathematics					
12. My parents support me when doing mathematics assignment					
13. My parents provide all the resources for the study of mathematics.					

SECTION D: TEACHER FACTORS THAT AFFECT STUDENTS' INTEREST IN LEARNING MATHEMATICS

Statement	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Teacher Knowledge and skills					
14. My teacher is able to make me understand mathematics very well.					
15. My teacher always uses teaching and learning					

materials to teach mathematics.					
Teacher Strategy					
16. My teacher uses different method in guiding students thinking and learning of mathematics.					
17. My teacher can use a mathematical way of thinking.					
18. My teacher has various ways and strategies for developing my understanding in mathematics.					
19. My teacher knows how to assess student performance in a classroom.					
20. My teacher always introduce new topic in mathematics based on what we already known.					
Teacher Attitude					
21. My teacher gets a sinking feeling when he thinks of teaching mathematics.					

22. My teacher has positive attitude towards teaching of mathematics					
23. My teacher teaches mathematics with excitement					
Teacher Personality					
24. The presence of my teacher makes me feel happy towards teaching and learning of mathematics.					
25. My teacher personality motivate me to learn mathematics					

APPENDIX B

TEACHER QUESTIONNAIRE

Dear Respondent,

This exercise is purely for academic purposes only and your confidentiality is assured.

Thank you for your cooperation.

Please answer the following demographic questions:

1. What is your age? ……..……..

2. What is your Gender? Tick (√) where applicable

☐ Male ☐ Female

3. What levels of education have you attained? Tick (√) all that apply

☐ College diploma ☐ Master's Degree

☐ Bachelor's degree ☐ Ph.D.

Please answer the following questions regarding your teaching experience:

3. How many years of teaching experience do you have?
……..……..…

4. What grade(s) are you currently teaching? ……..……

SECTION E: GOVERNMENT FACTORS THAT AFFECT STUDENTS' INTEREST IN LEARNING MATHEMATICS

Statement	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
26. Government have provided					

enough teachers for the teaching of mathematics.					
27. Government have provided enough teaching resources for the teaching of mathematics.					
28. Government provide motivation for students to learn mathematics					
29. Good working conditions and teacher motivation are provided by the government.					
30. Availability of instructional materials for learning of mathematics.					
31. Availability of quality books for teaching and learning of mathematics					
32. Adequate learning books, workbooks and other materials for learners for mathematics instruction					

SECTION F: SCHOOL FACTORS THAT AFFECT STUDENTS' INTEREST IN LEARNING MATHEMATICS

Statement	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
33.The class size is small for effective teaching and learning of mathematics					
34. My school provides opportunities for teachers to upgrade themselves in mathematics training.					
35. My school provides in-service training for new teachers in the teaching of mathematics					
36. My school has a system for monitoring and evaluating the teaching and learning of mathematics.					