

**UNIVERSITY OF EDUCATION, WINNEBA**

**AN INVESTIGATION OF THE FACTORS INFLUENCING THE  
ATTITUDES OF STUDENTS TOWARDS THE STUDY OF  
MATHEMATICS IN ASOKORE D/A TRINITY JUNIOR HIGH  
SCHOOL IN THE SEKYERE EAST DISTRICT –ASHANTI REGION.**



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**MASTER OF PHILOSOPHY**

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**UNIVERSITY OF EDUCATION, WINNEBA**

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STUDENTS TOWARDS THE STUDY OF MATHEMATICS IN ASOKORE  
D/A TRINITY JUNIOR HIGH SCHOOL IN THE SEKYERE EAST  
DISTRICT–ASHANTI REGION.**



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Faculty of Science Education, submitted to the School  
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**MARCH, 2022**

## DECLARATION

### Candidate's Declaration

I Charles Amoah, hereby declare that this dissertation, with 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 dissertation was supervised in accordance with the guidelines for supervision of dissertation as laid down by the School of Graduate Studies, University of Education, Winneba.

**Name of Supervisor:** Prof. Samuel Asiedu-Addo

**Signature:**.....

**Date:**.....

## **DEDICATION**

This thesis is dedicated to my lovely wife Madam Veronica AmoahForson and my son Glorious Agyei Menka Amoah.



## ACKNOWLEDGEMENTS

To start, I sincerely want to thank God Almighty for his inspiration and vision to complete this thesis.

Again, I am very grateful to my supervisor, Prof. Samuel Asiedu- Addo through whose direction and guidance this work has been a reality. I would sincerely like to express my heartfelt gratitude to him, for his patience and valuable suggestion which contributed to the success of this work. God richly you, Prof.

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To my M.Phil. Mathematics 2018 colleagues, I say God bless you all for your corporation and support.

## TABLE OF CONTENTS

<b>Content</b>	<b>Page</b>
<b>DECLARATION</b>	<b>iii</b>
<b>DEDICATION</b>	<b>iv</b>
<b>ACKNOWLEDGEMENTS</b>	<b>v</b>
<b>TABLE OF CONTENTS</b>	<b>vi</b>
<b>LIST OF TABLES</b>	<b>x</b>
<b>LIST OF FIGURES</b>	<b>xi</b>
<b>ABSTRACT</b>	<b>xii</b>
<b>CHAPTER ONE: INTRODUCTION</b>	<b>1</b>
1.0 Overview	1
1.1 Background to the Study	1
1.2 Statement of the problem.	7
1.3 Purpose of the Study	9
1.4 Objective of the Study	9
1.5 Research Question	9
1.6 Significance of the Study	10
1.7 Delimitation	11
1.8 Limitations of the Study	11
1.9 Organization of the Study	12
<b>CHAPTER TWO: LITERATURE REVIEW</b>	<b>13</b>
2.0 Overview	13
2.1 Theoretical Framework	13
2.1.1 The ABC Model of Attitude	13



2.1.2 Input-Output Theory	16
2.1.3 The Ajzen's theory of Planned Behaviour (TPB)	17
2.2 Conceptual Framework	19
2.3 Mathematics Anxiety	20
2.4 Enjoyment of Mathematics	25
2.5 Attitude of Student towards Learning of Mathematics	25
2.6 Perceptions of Students about Mathematics	32
2.7 Methods of Teaching Mathematics	36
2.8 Teaching and Learning Resources	40
2.9 Factors Influencing the Attitude of Students towards the study of Mathematics	43
2.9.1 School Environmental Factor	49
2.9.2 Personal Factor	51
2.9.3 Socio-Economic Factor	53
2.10 Empirical Review	54
<b>CHAPTER THREE: METHODOLOGY</b>	<b>58</b>
3.0 Overview	58
3.1 Research Design	58
3.2 Methods of Conducting Survey Research	60
3.2.1 Longitudinal Survey Research	60
3.2.2 Cross-Sectional Survey Research	60
3.3 Means Used in Conducting the Survey	61
3.4 Study Population	63
3.5 Sampling Technique	63
3.6 Sampling Size	64



3.7 Ethical Consideration	64
3.7.1 Academic Values	65
3.7.2 Honesty	65
3.7.3 Protection of Integrity	65
3.7.4 Control and Ethical Competence	66
3.8 Data Source	66
3.9 Data Collection Method	66
3.10 Data Reliability and Validity	67
3.10.1 Data Reliability	67
3.10.2 Validity	68
3.11 Data Analysis	69
<b>CHAPTER FOUR: RESULTS ANALYSIS AND DISCUSSION</b>	<b>70</b>
4.0 Overview	70
4.3 Research question one: What are the factors influencing the attitude of students' attitude towards the study of mathematics in Asokore D/A Trinity JHS in Sekyere East District?	71
4.4 Research question two: What are the perceptions of students about mathematics in Asokore D/A Trinity JHS in Sekyere East District?	76
4.5 Research Question Three	79
4.6 Discussion	82
<b>CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS</b>	<b>83</b>
5.0 Overview	83
5.1 Summary	83





## LIST OF TABLES

<b>Table</b>	<b>Page</b>
1: Demographic Details of Respondents	70
2: Education Level of Responders	70
3: Factors Influencing the Learning of Mathematics	71
4: Perception of Students About Mathematics	76
5: The Effects of Factors Influencing Students' Attitude Towards the Study of Mathematics on Student's Mathematics Performance	79



## LIST OF FIGURES

Figure	Page
1: The theoretical framework of planned behavior	17
2: Factors Influencing the Study of Mathematics	20



## ABSTRACT

The study investigated the factors influencing the attitude of students towards the study of mathematics in selected Junior High Schools in the Sekyere East District of the Ashanti Region of Ghana. The study was based on the ABC Attitude Model. Purposive sampling was used to select 102 respondents (students) at the *Asokore D/A Trinity JHS in Sekyere East District* for the study. Questionnaire was the sole instrument employed in the study. The SPSS software was used to analyze the data. It was found out that the inability of the students at Asokore D/A Trinity JHS in Sekyere East District to perform well in mathematics is predominantly as a result of the fact that, most of them do not see mathematics as an essential component of daily life activities and therefore do not approach the learning of the subject with any seriousness. The research therefore made the following recommendations; teachers must ensure that their lessons are linked to real life activities, teachers must provide opportunity for all learners to learn by practicing, the headmaster must ensure that the mathematics teachers are equipped with modern pedagogical skills through in-service training, and the Parents must be sensitized during PTA meetings on the need to encourage their wards to learn at home as well as providing their basic needs.



## **CHAPTER ONE**

### **INTRODUCTION**

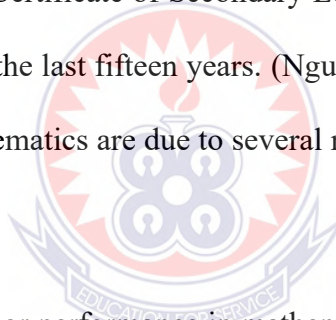
#### **1.0 Overview**

This chapter provides vivid information about this research work, taking into consideration the background to the study, the problem statement, and significance of the study. It also considers the research objectives and the research questions that guide the study. Finally, the limitation and delimitation to the study and also the organization of the study are outlined

#### **1.1 Background to the Study**

The world today looks at mathematics as an engine for the development of all scientific disciplines. It is indirectly used in all facets of life. Mathematics plays a key position when it comes to determining how individuals deal with the various spheres of private, social, and civil life (Abramovich et al., 2019). This explains why most institutions in the world pressurize the students to study mathematics both at basic and secondary education. Mathematics is therefore a core subject at these levels of education in Ghana. It is regrettable, therefore, that in the contemporary times many students struggle with Mathematics and perform abysmally low in their final examinations in most jurisdictions ( Mensah, F.S., 2017).Mathematical ability is crucial for the economic success of societies (Baba et al., 2018; CRDD, MOE, 2017; MOE, NaCCA, 2019; Rittle-Johnson & Schneider, 2015). It is also important in the scientific and technological development of countries (Enu et al., 2015). This is because mathematics skills are essential in understanding other disciplines including engineering, sciences, social sciences and even the arts (Patena&Dinglasan, 2013; Phonapichat et al., 2014; Schofield, 1982). Addotey, (2016) points out that mathematics plays a multidimensional role in science and technology of which its

application outspread to all areas of science, technology as well as business enterprises. Due to the importance that mathematics engulfs; the subject became key in school curriculum. According to (Ngussa & Mbuti, 2017), the mathematics curriculum is intended to provide students with knowledge and skills that are essential in the changing technological world. In Ghana, mathematics is one of the core mandatory subjects to all students in primary, Junior High School and Senior High School. Even though there are many other subjects been though at the primary, Junior High and senior secondary school level, mathematics is seen as the most difficult subject in many parts of the world (Peteros et al., 2019) and Ghana is not exceptional. According to (Mabula, 2015), the overall performance of students in BECE, WASSCE in Ghana and Certificate of Secondary Education Examination in Tanzania has been deteriorating in the last fifteen years. (Ngussa & Mbuti, 2017) point out that, high failure rates in mathematics are due to several reasons which eventually disorient students' learning.



The continued trend of poor performance in mathematics raises concerns to the public on whether or not the education system can supply graduates who possess the essential skills to enable them to cope with the ever-evolving technological society (Hamilton et al., 2010). Factors that can influence mathematics performance are demonstrated by (Kupari & Nissinen, 2013; Tshabalala & Ncube, 2013; Yang, 2013), when they show that poor performance in mathematics is a function of cross-factors related to students, teachers and schools. Among the students' factors, *attitude* is regarded by many researchers as a key contributor to higher or lower performance in mathematics (Mata et al., 2012; Mohamed & Tarmizi, 2010; Ngussa & Mbuti, 2017). Attitude refers to a learned tendency of a person to respond positively or negatively towards an object, situation, concept or another person (Sarmah & Puri, 2014)

Negative attitudes of students towards the study of Mathematics have been identified as one of the major causes of this problem. According to (Sarmah & Puri, 2014), attitudes play a crucial role in students' performance in Mathematics, specializing in Mathematics and the choice of Mathematics related careers. More so, attitudes can change and develop with time (Syyeda, 2016) and once a positive attitude is formed, it can improve students' learning (Akinsola & Olowojaiye, 2008; Syyeda, 2016). On the other hand, a negative attitude hinders effective learning and consequently affects the learning outcome henceforth performance (Joseph, 2013). Therefore, attitude is a fundamental factor that cannot be ignored. The effect of attitude on students' performance in mathematics might be positive or negative depending on the individual student. In response to this problem, this study seeks to investigate factors influencing attitudes attitude of students towards the study of mathematics in Asokore D/A Trinity JHS in Ghana. In accordance with (Syyeda, 2016) attitude has three main components: *affect*, *cognition* and *behavior*. The components are interrelated and involve several aspects contributing to the overall attitude towards learning mathematics. In Ghana, like any other countries within Sub Saharan Africa (SSA), students consistently perform poorly in mathematics and science, which makes Ghana lose economic advantages over other countries Students' achievement in countries within SSA is ranked far below the average point in international assessments (Bethell, 2016). Bethell further points out that the long-run development of countries in SSA requires significant improvements in STEM education if they are to benefit in a competitive global economy driven by new technologies. In this regard, it is important to find ways to improve students' performance in the subject. The study of students' attitudes towards mathematics with associated factors and their connection to academic performance is certainly worth examining. More mathematics lessons are

likely to be taught in schools and colleges throughout the world than any other subject (Bethell, 2016). All the junior high schools' students have to pass Mathematics at the junior high school certificate examination before they are allowed to enter for senior secondary school. It is too bad that, in the most contemporary times many students struggle with Mathematics and perform abysmally low in their final examination in most jurisdictions. In Ghana, both Junior and Senior High Schools students' performance in Mathematics has not been encouraged of late (F. S. Mensah, 2017). Candidates are reported to exhibit poor understanding of mathematics concepts and are unable to form the appropriate Mathematical models which could be tackled with the requisite skills (Chief Examiners Report, 2017). School, classroom, student and teacher factors all impinge on the learning of Mathematics. In particular, the seriousness or otherwise attached to the teaching of Mathematics invariably affects students' performance in their final examinations.

Research findings indicate that effective teachers facilitate learning by truly caring about students' engagement creating the right atmosphere that enhance student learning (Kupari & Nissinen, 2013). They have high yet realistic expectations about enhancing students' capacity to think, reason, communicate, reflect upon and critique their own practice, and they provide students with opportunities to ask why the class is doing certain things and with what effect (Mensah, 2017). The relationships that develop in the classroom become a resource for developing students' attitudes and Mathematics competencies and identities. These resources are very essential to the learning of Mathematics. Psychologists define 'attitude' as any strong belief or feeling or any approval or disapproval toward people and situations (Mata et al., 2012). We have favorable or unfavorable attitudes towards people, politics, academic subjects, etc. People favor the things they think are good and helpful and oppose the things



people think are bad and harmful (Mata et al., 2012). Students' attitude towards mathematics were found to be significantly related to their achievement in this subject (Kalder & Lesik, 2011; Nicolaidou & Philippou, 2004).

In this study, three factors relating to attitude towards mathematics were examined. These are perceived parental influences (Cao, Bishop, & Forgasz, 2006), teacher's affective support (Sakiz, Pape, & Hoy, 2012; Sakiz, 2007) and classroom instruction (Abu Bakar et al., 2010; Tessema, 2010). v Students' attitude towards mathematics were found to be significantly related to their achievement in this subject (Lipnevich et al., 2011; Lubienski, Lubienski, & Crane, 2012; Moenikia & Zahed-Babelan, 2010; Woon, 2005).

In this study, three factors relating to attitude towards mathematics were examined. These are perceived parental influences (Bosson-Amedenu, 2017), teacher's affective support (Abu-Shanab, 2020) and classroom instruction. An exploration of affective beliefs. Paper presented in UGC Sponsored National Seminar on Pedagogy of Teacher Education-Trends and Challenges. Farook Training College, Kozhikode, Kerala, (Abdul Gafoor & Kurukkan, 2015). Factors that can influence mathematics performance are demonstrated by (Kupari & Nissinen, 2013; Tshabalala & Ncube, 2013; Yang, 2013) when they show that poor performance in mathematics is a function of cross-factors related to students, teachers and schools. Among the students' factors, attitude is regarded by many researchers as a key contributor to higher or lower performance in mathematics (Mata et al., 2012; Ngussa & Mbuti, 2017, 2017). Attitude refers to a learned tendency of a person to respond positively or negatively towards an object, situation, concept or another person (Sarmah & Puri, 2014). Attitudes can change and develop with time (Syyeda, 2016), and once a

positive attitude is formed, it can improve students' learning (Mata et al., 2012). On the other hand, a negative attitude hinders effective learning and consequently affects the learning outcome henceforth performance (Joseph, 2013).

According to Umameh, (2011) the world view of many students about Mathematics is wrong. Whiles some perceive Mathematics as a subject of many formulae, others see it as a non-lively and a never changing subject.

Therefore, attitude is a fundamental factor that cannot be ignored. The effect of attitude on students' performance in mathematics might be positive or negative depending on the individual student. In response to this problem, this study seeks to investigate students' attitudes towards learning mathematics in Ghana.

In this context, students' attitude towards an academic subject is a crucial factor in learning and achievement in that subject. Teachers' attitude and beliefs play a very significant role in shaping classroom practices (Holvoet, 2021). Does teacher attitude towards teaching significantly predict student attitude towards the learning of Mathematics and enhance students' achievement? Attitude is very important in teaching and learning any subject, especially in mathematics. Its impact can be either positive or negative in the achievement process. Attitude has to do with the way one conducts him/herself or react to a situation at any point in time.

And also, evidence of the relationship between teacher attitude and student attitude towards Mathematics have been anecdotal hence the need to undertake this study for practical evidence.

## **1.2 Statement of the problem.**

Mathematics is a science of magnitude and number that is very useful virtually in all subject areas. This is because all fields of studies are dependent on it for problem solving and prediction of outcomes. Competency in mathematics learning is vital to any individual and nation in domestic and business deals, scientific discoveries, technological breakthrough, problem-solving and decision making in different situations in life and viewed mathematics as the basis for science and technology and the tool for achieving scientific and technological development (Chen et al., 2021).

The incessant poor achievement in mathematics in primary and Junior High School levels may be attributed to students' lack of interest in learning mathematics. Many factors have been identified in literature as reasons associated with students' lack of interest in learning mathematics. These include Students' factor, teachers' factor, mathematics anxiety, class size, government factor, infrastructural problem, instructional strategy, among others (Akinsola & Olowojaiye, 2008, 2008; Mohamed & Tarnizi, 2010). Poor achievement in mathematics may be traceable to students' lack of interest in studying the subject. Seven factors (teacher, student, mathematics anxiety, class size, government, instructional strategy and infrastructural problem) have been identified as potentially affecting students' mathematics interest (Arthur, 2019). The rate of failure in both internal and external examinations in mathematics subject in Asokore D/A Trinity JHS these days is quite alarming in the Asokore Community in Sekyere East District- Ashanti Region, because, from the record of District Examination Officer from 2016 to 2020 students' performance in Mathematics in BECE is not up to 50%. Per the Ministry of Education (MOE), Mathematics is one of the core subjects taken in primary, Junior High and Senior School in the Ghana Education Service. Its knowledge is applied in all disciplines

including everyday life. Unfortunately, it is evident from statistics that performance in mathematics had remained low over the years. Per the records from the District examination officer the Mathematics performance in BECE is not satisfactory, from 2016 BECE performance in Mathematics was 45%, 2017 –40%, 2018—43%, 2019—48% and 2020 –47% and also all the terminal exams the performance is not encouraging because those who failed in Mathematics are more than those who pass. Through the District Director of Education and Asokore paramount chief has introduced a vacation classes and workshop for both teachers and students in the basic schools in the Asokore town including Trinity JHS. This was in an effort to improve teachers' techniques.

Despite these efforts, students still did not learn Mathematics adequately to enable them to perform better in terminal and BECE. Failure to learn is an indication that there could be other factors such as inappropriate teaching method, lack of resources and students' negative attitudes among others hinder effective learning of mathematics. There could be other factors such as students' attitudes which may hinder them to adequately learn mathematics that had not been fully studied in Asokore in generally and Sekyere East District in particular. To what extent do the factors influence the attitude of students towards the study of mathematics in Asokore D/A Trinity JHS in the Sekyere East District? Therefore, the problem of this study is to correlate some factors affecting the attitude of students towards the study of mathematics in the District.

### **1.3 Purpose of the Study**

The study investigated the factors influencing the attitude of students towards the study of mathematics in selected Junior High School in the Sekyere East District of the Ashanti Region of Ghana.

### **1.4 Objective of the Study**

The general research objective was to investigating the factors influencing the attitude of students towards the study of mathematics in Asokore D/A Trinity JHS in the Sekyere East District Ashanti Region; in pursuance of this, the following specific objectives were considered:

1. To assess the factors influencing the attitude of student towards the study of mathematics in Asokore D/A Trinity JHS in the Sekyere East District.
2. To determine the perceptions of students about the study of mathematics in Asokore D/A Trinity JHS in the Sekyere. East District
3. To assess the effect of factors influencing students' attitude towards the study of mathematics on student's mathematics in Asokore D/A Trinity JHS in the Sekyere East District.

### **1.5 Research Question**

1. What are the factors influencing the attitude of students towards the study of mathematics in Asokore D/A Trinity JHS in the Sekyere East District?
2. What are the perceptions of students about mathematics in Asokore D/A Trinity JHS in the Sekyere East District?
3. What is the effect of factors influencing students' attitude towards the study of mathematics on student's mathematics in the Asokore D/A Trinity JHS in Sekyere East District?

## 1.6 Significance of the Study

The findings of this study would provide knowledge on the background, individual, curriculum and school factors which influence performance of the students in Mathematics. This information would be useful to both parents and teachers and stakeholders in the education sector. The findings would shed light on the teaching methodologies and resources, and their effect on the performance of the students in Mathematics. This would help head teachers and Mathematics teachers to establish good facilities and better teaching strategies which lead to better performance in Mathematics. This work is relevant since poor performance in Science Technology Engineering and Mathematics (STEM) particularly in mathematics is seen as a barrier towards achieving economic and social development, both at the individual and national level.

The results will provide teachers, students, parents, and other education stakeholders with information that will help to develop strategies to improve students' learning of mathematics.

The findings of this research upon completion will help pupils to understand how their attitude towards mathematics can affect their performance in the subject. And also, to determine the extent to which the teacher's attitude towards teaching the subject can affect the pupils' performance in Mathematics. Theoretically, the study has highlighted the factors that influence the students' attitudes in mathematics among Asokore Junior High School pupils in Sekyere East District and this would help education planners and curriculum developers to map out strategies by which performance can be improved.

The study would also have practical significance because it would lead to the improvement of strategies aimed at improving the performance in mathematics by fostering pupils' attitudes in mathematics in Junior High Schools. The study is also expected to contribute to the promotion of knowledge about the factors affecting performance of mathematics among Junior High Schools pupils. Finally, the study will serve as an additional source of information for further studies.

### **1.7 Delimitation**

The conceptual scope of the study covers the factors influencing the attitude of student towards the study of mathematics, perceptions of students about mathematics, effect of factors influencing students' attitude towards the study of mathematics on student's mathematics performance. With regard to organizational context, the study was limited to the investigating the factors influencing the attitude of students towards the study of mathematics in Asokore D/A Trinity JHS in the Sekyere East District in Ashanti Region. All Form one (1), Two (2) and Three (3) Junior High Schools in Asokore Circuit in the Sekyere East District.

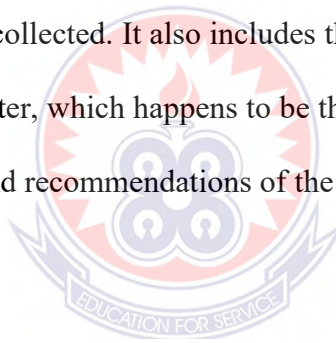
### **1.8 Limitations of the Study**

Setbacks often characterized human endeavors and quite naturally this work has its own challenges. The first challenge is the difficulty in gathering data. Most of the respondents were not willing to participate in the study. Some complain of the regular practices of filling questionnaires every year for student which has not yielded any results. The researcher convinced the respondents with respect to the significance of academic research compelling them to participate. Secondly, most of the respondents were not willing to give a true account of their experience with respect to answering the questions. However, the researcher persuaded them in answering the questions to

the best of their understanding. Finally, every research faces financial challenges and this work also had its own financial challenges; thus, printing of questionnaires, data collection among others. In all these challenges, the researcher did the best to make the study a success.

### **1.9 Organization of the Study**

This thesis is organized into five chapters. Chapter One is the Introduction, which outline the background of the study. Chapter two reviewed literature and theories relating to factors influencing the attitude of students towards the study of mathematics. Chapter Three outlines the design of the study and methodology that was used in carrying out the study. Chapter Four comprises of presentation and analysis of data that was collected. It also includes the interpretation and discussion of the results. The fifth chapter, which happens to be the final chapter, is dedicated to the summary, conclusions, and recommendations of the study.





## CHAPTER TWO

### LITERATURE REVIEW

#### 2.0 Overview

This chapter provides deep information about literature review and also considers the factors affecting the students' attitudes towards the study of mathematics as well as the theoretical and conceptual framework of the study.

#### 2.1 Theoretical Framework

The study is centered on 'The ABC Model of Attitude and Input-Output Theory and the Ajzen Theory of Planned Behavior (TPB).

##### 2.1.1 The ABC Model of Attitude

The ABC Attitude Model is also called a Tripartite Model. It serves as a useful theoretical framework for developing mathematics attitude measures. The ABC Model of Attitude is based on a Hierarchical Model described in (Ajzen, 1985) who conceptualizes an attitude as an amalgam of three separate measurable components: affect (A), behavior (B) and cognition (C). Affect is the emotional component consisting of feelings and emotions that are associated with an attitude object (in our study mathematics). The behavior is the action component consisting of predispositions to act in a particular way towards the attitude object. Cognition is a mental component that consists of belief and perceptions people hold about the attitude object. These three components must be present before we say that an attitude exists. A particular attitude may consist a positive emotion that is, feeling happy in a mathematics classroom (affect), intend to learn more mathematics (behavior) and belief that mathematics is easy to learn (cognition). Students may form a favorable or an unfavorable attitude towards mathematics. Students acquire attitudes over time

through direct experience of learning mathematics or by receiving information about the mathematics subject. Students use the learned attitudes as a guide to their overt behavior with respect to mathematics learning, resulting in consistently favorable or unfavorable patterns of reactions towards the subject. Attitudes are assumed to be precursors of mathematics learning behavior. In predicting behavior based on a particular attitude, (Ajzen & Fishbein, 1977) postulate that there should be a correspondence between measures of attitude and those of behavior. Students' attitude to mathematics represents their evaluation of learning mathematics as a subject. Attitudes can be verbal or non-verbal actions (Ajzen, 2020). Several researchers have attempted to measure attitude using different instruments. Ajzen (ibid) proposes three measures of behavior. They include observable actions performed by the subjects that are recorded by the investigator, individual commitment to perform the behaviors, and self-reported behavior. However, the last two measures can only be considered if it becomes difficult to make direct observations of certain behaviors. High correspondence between attitude and behavior measures can be achieved through standard scaling measures like Likert scale (Ajzen & Fishbein, 1977) which we have adopted in this study.

Attitude refers to a learned tendency of a person to respond positively or negatively towards an object, situation, a concept, or a person. It is also regarded as a belief held by individuals that reflects their opinions and feelings and can be sometimes manifested in behavior (Joseph, 2013). Attitudes, behavior, and feelings are interrelated in such a way that people's attitudes determine their behavior towards objects, situations, and people. They also influence the relationships that exist among these variables with themselves (Joseph, 2013). Attitude is a hypothetical construct that cannot be observed directly, but can be inferred from measurable reactions to the

attitude object (Ajzen & Driver, 1992), as it is the case in our study, learning math. In accordance with (Syieda, 2016), attitude is multidimensional. It takes into account three components: affect, cognition, and behavior. Affect is composed of emotions, beliefs, and vision of the subject. Emotions are the feelings of enjoyment or pleasure in learning the subject or seeing it as boring, difficult, and dull. Beliefs are related to students' confidence in their abilities to learn the subject. Vision represents students' perception regarding mathematics. Cognition represents the students' perceived usefulness of the subject. Conversely, behavior is connected to students' motivation to learn that is reflected with student's actions, commitment, and performance in class. Using these components to understand the students' attitude towards mathematics, we measure the following aspects:

- Self-confidence, anxiety, enjoyment (affect)
- Intrinsic motivation (behavior)
- Perceived usefulness (cognition)

**Self-confidence:** Self-confidence in mathematics refers to student perceptions of self as a mathematics learner that include beliefs about one's own ability to learn and perform well in mathematics (Adelson&McCoach, 2011). The result of Hannula, (Hannula et al., 2004) shows that self-confidence is an important factor that influences students' learning which in turn affects their performance in mathematics. (Hannula et al., 2004) argues that students with high self-confidence believe in their abilities that they can be successful in learning mathematics, thus overcoming the fear of failing. These students are ready to take mathematical challenges which in turn increase their academic achievement; otherwise, students with low self-confidence do not believe in themselves, thus tend to avoid taking mathematics challenges (Adelson&McCoach, 2011). Therefore, this leads into minimizing the chances of expanding their

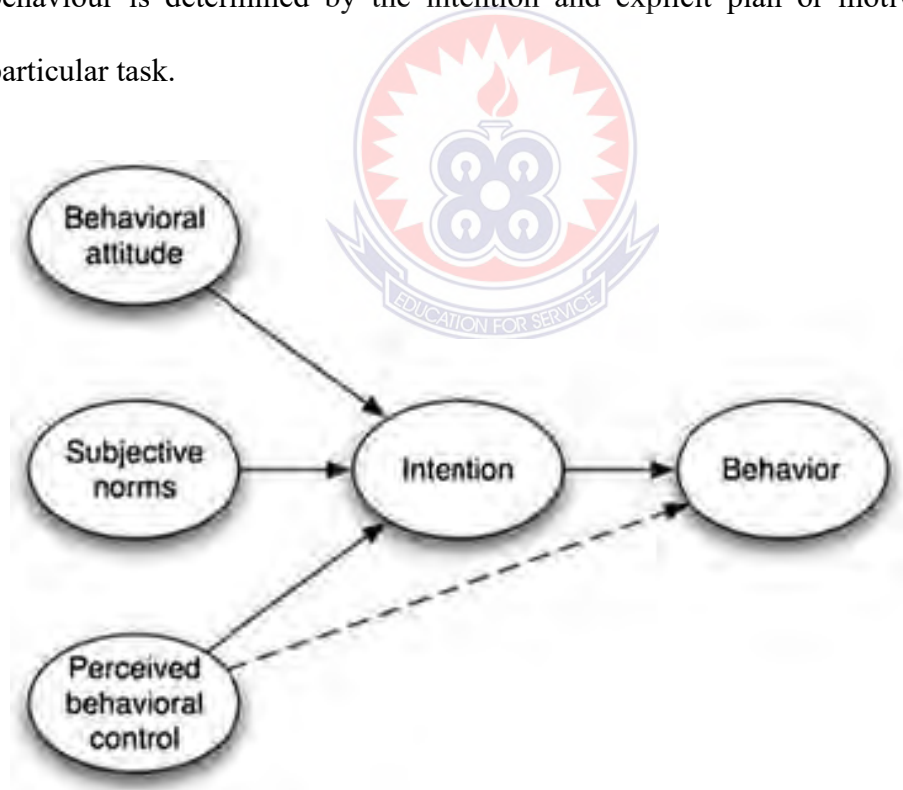
mathematical skills and success. Hence, it is desirable to study the students' attitude towards their own confidence and how it relates to performance.

### **2.1.2 Input-Output Theory**

This study was guided by input-output theory or the production function theory of education as advanced by Cobb and Douglas (1928) as cited in (Simamora & Saragih, 2019) The theory postulates that a school is seen as a firm which receives inputs (teachers, students and resources) and transforms them to educational outputs through a process. In addition, the theory measures output (students' achievement) by standardized achievement test scores. Cobb and Douglas (1928) as cited in (Simamora&Saragih, 2019) view education as a service which transforms fixed quantities of input (students) into individuals with different quality attributes, to enable them to cope with and perform in society after they have left schooling. This is true considering the fact that without teachers, students and resources, teaching and learning cannot take place. Thus, if the government would hire qualified teachers, admit students based on qualification and supply schools with adequate resources, then students' academic performance in the various subject especially mathematics would improve. Thus, the theory explains how student achievement (outputs) is dependent upon school inputs such as adequacy and qualification of teachers, students and teaching and learning resources. A school receives input, that is, teaching personnel, students and teaching/learning resources. A certain process of transformation that is teaching and learning takes place where skills in various subject is are disseminated to students. The process is guided by teachers who utilize their professional qualifications, teaching experience and teaching and learning resources to influence student's writing skills.

### 2.1.3 The Ajzen's theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour also proposes a model which can measure how human actions are guided (Abitegeka, 2018; Ajzen, 2020). The theory as presented in 1985 by LeckAjzen in his article "From Intentions to Actions: The Theory of Planned Behaviour" was a theory adapted from the theory of Reasoned Action which predicts the occurrence of a particular behaviour and provides that behaviour is intentioned (Ajzen, 1985). According to (Ajzen, 2020), this theory emphasizes that human behaviours are governed not only by personal attitudes, but also by social pressures and a sense of control. (Ajzen, 1985) posited that rational considerations also govern the choice and behaviours of individuals and that the individual's behaviour is determined by the intention and explicit plan or motivation to do a particular task.



**Figure 1: The Theoretical Framework of Planned Behavior**

The model presents three tenets which predict the intention to cause a particular behaviour. These are; the attitudes, the social norms and the perceived behaviour control.

**Attitude:** Attitudes towards behaviour are the individual's overall evaluation of the behaviour. This evaluation has two aspects that work jointly. These are the beliefs about consequences of the behaviour (behavioural beliefs) and the corresponding positive or negative judgments about the behaviour (outcome evaluation) (Ajzen, 1991).

**Subjective norms:** the subjective norms of the behaviour are a person's own estimates of the social pressure to perform the target behaviour (Ajzen & Driver, 1992). Subjective norms have two components which work in together. These are the beliefs about how other people who may be in some way important to the person would like them to behave (normative beliefs) and how the individual is motivated to comply (Sánchez et al., 2018).

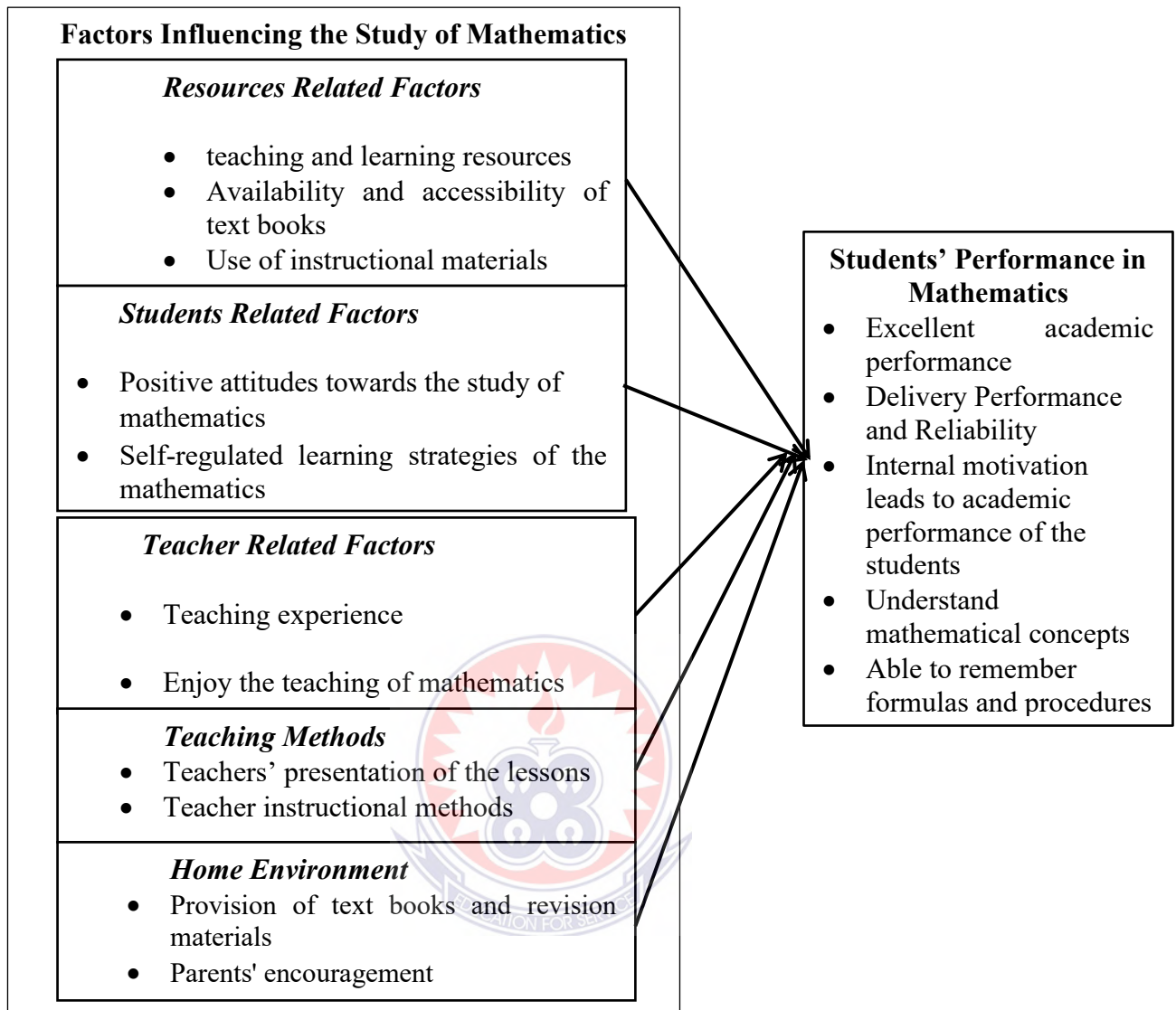
**The perceived behavior control:** the third component of the PBT is the perceived behavioral control which refers to the extent to which a person feels able to execute the behaviour (Kennell, 2021). Practically there are two aspects of the perceived behavioral control. This includes how much a person has control over the behaviour and how confident a person feels about being able to perform or not to perform the behavior (Ajzen, 2020). Behaviour is therefore determined by control beliefs about the power of both situational and internal factors to inhibit or facilitate the performing of the behaviour (Ajzen, 2020).

## 2.2 Conceptual Framework

Mathematics learning and capability to achieve good grades in mathematics examination was not only attributed to some unique talent, great effort or good discipline from an individual, but also to favorable attitudes and interest in mathematics (Suparman et al., 2021). Formation of such attitudes can depend on several factors to which the student got exposed while learning such as motivation he/she got from teachers or parents; readiness to learn; mathematical concepts and difficulty or organization of memory of what was learned.

There are various variables used to explain the conceptual framework. The conceptual framework adopted by this study was developed based on Closs and Savitskie's (2013) as cited in (Freiman & Fellus, 2021) model of individual effects that presented a unique relationship between the factors influencing the attitude of students towards the study of mathematics. Factors influencing students' attitude towards study of mathematics constitute the independent variable, while student's performance towards study of mathematics constitute the dependent variable. Factors used to measure the independent variable include resource related factors, student related factors, teachers related factors, teaching methods, and home related factors.

**Figure 2: Factors Influencing the Study of Mathematics**



**Source: Researcher's Field Work, 2021**

### **2.3 Mathematics Anxiety**

Mathematics anxiety is defined as a condition of emotional response towards mathematics whereby students experience negative reactions to mathematical concepts and testing (Chaman & Callingham, 2013). Accordingly, mathematics anxiety is a feeling of tension, helplessness and distress that impede the ability to concentrate and consequently affects learning of mathematics (Yuanita et al., 2018).

Mathematics anxiety is believed to have an impact on attitude and motivation to learn



mathematics, consequently on students' achievement (Getahun et al., 2016). It was established in the study by (Hoorfar & Taleb, 2015) that mathematics anxiety is negatively correlated with metacognitive knowledge which is the ability to reflect, understand, and control one's learning. This means that the more anxious the students are; the less metacognitive knowledge they possess that in the long run hampers their performance. A comparative study conducted in Malaysia and Tanzania by (Mohamed & Tarmizi, 2010) in higher education institutions reveals a negative correlation between mathematics anxiety and achievement, and that anxiety has a significant impact on achievement. Since anxiety is related to students' attitudes and achievement in mathematics, it is worth examining the level of anxiety of students at all levels of education.

Math anxiety is caused by poor test grades, inability (or unwillingness) to complete difficult assignments, negative predispositions of parents, and even the mathematics teacher. Teachers and parents that are afraid of mathematics pass that on to their students and children (Baba et al., 2018). It could be very difficult for students to like mathematics when their parents did not do well in mathematics themselves, and thus do not understand it or do not think it is important. Students could see their parents as having a job and doing well without a great love for mathematics and think that they will be successful without an appreciation of mathematics as well. If the teacher does not value mathematics, his students certainly cannot be expected to value mathematics either.

There are many things the mathematics teacher can do that will provoke his students to dislike mathematics. The teacher may be perceived as not caring about students because he is unwilling to give extra help to students who need it. The students need

to know that their teacher is able and willing to help them. The teacher may become angry or frustrated when his class does not understand the problems. The teacher may also have unrealistic expectations of his students. Covering the textbook problem by problem can turn students off from learning mathematics. Also, giving written work every day, insisting there is only one correct way to complete a problem, and assigning mathematics problems as punishment for misbehavior can cause students to dislike mathematics (Furner & Duffy, 2002). No one enjoys discipline. Making students do mathematics as a form of discipline could very likely cause students to dislike mathematics.

Another major source of math anxiety is the teaching approach of explain practice-memorize (Balt et al., 2022). The mathematics teacher needs to be creative in his teaching methods, so students do not lose interest. This idea is supported by a study conducted by Pyne, Bates, and Turner (1995). They taught elementary mathematics to college students who did not reach the minimum requirements to be enrolled in a course they needed. The researchers determined that these students would be prone to having negative feelings of mathematics. In order to combat these feelings, they decided to concentrate on using different teaching styles, methods of assessment, and support sessions. They encouraged an investigative approach to mathematics. They wanted their students to be doing mathematics instead of listening to or watching the teachers do it. The teachers prompted the students to make their own decisions about what mathematics they needed. They encouraged thinking mathematically, and they used a variety of visual aids. Instead of the usual paper and pencil test, they used continuous assessment. The students were relieved when told that there would be no written exams. The class had a total of twelve teachers for only eleven students, so there were plenty of people to assist the students when they were having trouble

understanding. This was especially useful when the students were performing open ended tasks. Overall, the students enjoyed the relaxed environment. They left the class feeling more confident about their own mathematical ability and their use of mathematics. This example demonstrates the effects that differing teaching styles can have on students' attitudes towards mathematics.

One factor that showed up consistently in a study of math anxiety in different grade levels was gender bias. Many teachers promote the false idea that females cannot perform as well as males in mathematics (Jackson & Leffingwell, 1999). They do not believe that girls are as capable of succeeding in mathematics as boys. Teachers who promote this idea cause girls to give up without even trying. Sometimes teachers are more willing to help males than females, and sometimes teachers even tell students that girls do not need to learn mathematics. The mathematics teacher needs to give equal opportunity to both males and females to succeed in his mathematics classes. The teacher should encourage, instead of discourage, females to take mathematics courses. Also, certain circumstances tend to bring out math anxiety; knowing these circumstances allows the teacher to try to reduce them. The first circumstance that brings about this negative feeling is the presence of an authority figure (Buxton, 1981). The teacher is seen as making judgments about right and wrong; this places a lot of pressure on the student. Although it is not plausible for the teacher to leave their students alone during mathematics class, the teacher can find ways to make their presence less threatening. Many students also have a misconception that they should be able to do mathematics quickly; this emphasis on speed causes nervousness as well. This view of mathematics could stem from so called speed drills that occur frequently in elementary schools. Teachers should emphasize the reasons behind speed drills and differentiate their purpose from the purpose of homework and test

questions. Students need to be shown that mathematics requires concentrated and uninterrupted attention and many times mathematics takes a good amount of time to do correctly. Another way time affects the student is when a student knows he will be having a test or be given homework in the future. This delay causes fear to set in. There is a gradual approach of an undesirable event which one knows he cannot avoid, so he starts to panic. As soon as a mathematics test is mentioned, students start to dread it. This prolonged dread breeds fear and nervousness. The student combines the fear of not succeeding on the test, the uncertainty of being able to do the problems, and the urgency to get it done on time -- all of which cause anxiety. The fact that the classroom is a public place also has an effect on math anxiety. People do not like to admit their fears or supposed inadequacies to other people, so they dread going to class where they may be asked to do a problem on the board in front of other students (Buxton, 1981). Sometimes the teacher can discourage students from doing well in mathematics and cause math anxiety without realizing it. The teacher needs to be aware of the effect his words have on his students and think before speaking. It can be frustrating for the teacher when he feels like he has gone over a certain concept many times but the students are not understanding or grasping the concept the teacher needs to maintain a positive attitude and encourage the students that they can do it. The teacher should never comment on how stupid or slow the students are. He should not get frustrated when students ask questions. Questions are a sign of the desire to learn. Again, the teacher needs to be aware of his words, sighs, and overall body language (Jackson & Leffingwell, 1999).

## **2.4 Enjoyment of Mathematics**

Enjoyment of mathematics is the extent to which the students enjoy doing and learning mathematics (Kupari & Nissinen, 2013). Students' enjoyment while learning can influence their behaviors or cognitive aspect of attitude (Syyeda, 2016). According to PISA 2012 results published by (Conhecimento, 2017), students may learn mathematics because they find it enjoyable and interesting. They further posit that interest and enjoyment affect both the degree and continuity of engagement in learning and the depth of understanding. This means that the more students enjoy doing mathematics the more they are likely to engage in problem-solving thus enhancing their learning and performance. Since enjoyment, students' learning and performance are related, it is worth evaluating the students' status of mathematics enjoyment in order to keep track of students' learning and performance.

## **2.5 Attitude of Student towards Learning of Mathematics**

Attitude towards mathematics has been defined as a negative or positive emotional disposition towards mathematics (McLeod, 1989; Mullis et al., 2012). Accordingly, for the purpose of this study, attitude towards mathematics was defined as a combined measure of like or dislike towards mathematics, an inclination to engage in or avoid activities in mathematics, a belief that one is good or bad at mathematics, and a belief about the usefulness of mathematics as described by (Chinn & Ashcroft, 2013).

Also, Attitude is a sub-domain of affective science and differs from emotion, as it is more cognitive and stable than emotion (Goldin et al., 2016). Attitude also differs from belief, as it is less cognitive than belief. Kalder & Lesik, (2011) stated that while "beliefs are psychologically held understanding premises, or propositions about the world (attitude is related to) manners of acting, feeling, or thinking that show one's

disposition or opinion. Thus, attitude is a relatively stable psychological tendency toward a particular idea, object, or entity with a certain degree of positivity or negativity (Mata et al., 2012). Therefore, students' attitude toward mathematics can be defined as their comprehensive evaluation of mathematics.

Researchers have proposed the existence of several components of attitude toward mathematics from multidimensional perspectives. For example, on the basis of survey data from 318 secondary school students in a study, (Mohamed & Tarmizi, 2010) suggested motivation, enjoyment, self-confidence, and value as components of attitude toward mathematics. Likewise, (Mata et al., 2012) examined 1,496 Italian students' (from grade 2 to grade 13) writing about their personal experiences with mathematics and found three components: "emotional disposition, vision of mathematics, and perceived competence" (p. 15). Similarly, the Trends in International Mathematics and Science Study (TIMSS) researchers examined students' attitude toward mathematics through three components (Martin et al., 2020) enjoyment of mathematics, value of mathematics, and confidence in mathematics. In summary, while different researchers have used different terms, they have commonly measured attitude toward mathematics using three components: like mathematics (LM), value mathematics (VM), and confidence in mathematics (CM).

Researchers (Arthur, 2019; Enu et al., 2015; Mata et al., 2012) have identified important factors that contribute to students' attitudes towards learning mathematics. These include the students themselves, the school, the teachers' beliefs and attitudes and their teaching methods.

Many researchers have examined students' attitudes toward mathematics. However, they have rarely used a person-centered approach, which aids in the examination of different patterns or a combination of variables of each profile. Although few studies have examined the profiles of students' attitude toward mathematics, most have examined students' attitude toward mathematics in combination with other constructs. For example, in their study that examined 293 U.S. college students' attitudes and beliefs toward mathematics, (Kalder & Lesik, 2011) noted three latent profiles, which they described as math negative, math neutral, and math positive. Moreover, (Berger et al., 2020) examined 10,051 Austrian eighth-grade students' attitudes toward mathematics and science using latent profile analysis (LPA) and found six profiles. Regarding students' attitude toward mathematics, they found four types of attitudes: negative, neutral, positive, and very positive. Therefore, we might assume that students' attitudes toward mathematics can be categorized into three or four profiles. However, this assumption should be examined by means of a further study that specifically focuses on students' attitude toward mathematics.

The teachers' teaching methods have a major influence on students' attitudes (F. S. Mensah, 2017). Teachers can do many things to facilitate the classroom learning to alleviate students' engagement level and confidence in learning mathematics. According to (Ruteere et al., 2021), teachers can find ways to encourage student engagement and confidence in learning mathematics. This can be achieved by implementing meaningful activities embedded in real-life contexts.

Generally, a strong relationship has been assumed between students' positive attitude towards mathematics and achievement in the subject (Sarmah & Puri, 2014).



In addition to it, Attitude is defined as a mental set or disposition, readiness to respond and the psychological basis of attitudes, their permanence, learned nature and evaluative character. In the context of mathematics, attitude should be viewed as a predisposition to respond in a favorable or unfavorable way to mathematics. Studies showed a linkage between attitude to success in mathematics (Damrongpanit, 2019; Mata et al., 2012). It is important to develop a positive attitude towards mathematics because there is a correlation between students' attitude towards mathematics and their mathematical results.

Students in general tend to dislike mathematics more than other subjects (Abdul Gafoor & Kurukkan, 2015), however, Mathematics is a compulsory subject in primary and secondary schools in most countries including Ghana (MOE, 2010).

Students' attitude towards mathematics is given various definitions in the literature. For example, (Yang, 2013) defines attitude towards mathematics as liking or disliking of the subject; a tendency to engage in or avoid mathematical activities; a belief that one is good or bad at mathematics; and a belief that mathematics is useful or useless. (M. Mazana et al., 2018) gives a simpler definition. They define attitude as a positive or negative emotional disposition towards mathematics. From this, when defining attitudes towards mathematics, both aspects of beliefs and emotions should be considered. We adopt the definition by (M. Mazana et al., 2018) because it looks better at students in both the cognitive and social perspectives. Several studies have demonstrated that attitudes towards mathematics are directly and significantly associated with students' performance. For instance, (Mensah et al., 2017) conducted a study in Ghana and found a significant positive correlation between students' attitude and performance. Similarly (Nicolaidou & Philippou, 2004) found that attitude



and achievement in mathematics are significantly related. Students' attitude towards mathematics influences the efforts they put in understanding and practicing mathematical concepts and skills.

According to the National Research Council (2000) as cited in (Sarmah & Puri, 2014), Students' beliefs about their competence and their expectations for success in school have been directly linked to their levels of engagement, as well as to emotional states that promote or interfere with their ability to be academically successful. Thus, attitudes determine the effort a student is likely to put in his learning of the subject (mathematics). It is therefore necessary for mathematics teachers to strive and sustain positive attitudes towards mathematics for good performance in the upper classes (Coddling et al., 2009). Several studies have demonstrated that attitudes towards mathematics are directly and significantly associated with students' performance. For instance, (Mensah et al., 2017) conducted a study in Ghana and found a significant positive correlation between students' attitude and performance. Similarly, (Nicolaidou & Philippou, 2004) found that attitude and achievement in mathematics are significantly related. The Trends in International Mathematics and Science Survey (TIMSS) results of 2007 reported in (Michaelides et al., 2019; Mullis et al., 2012) also indicate that 4th grade and 8th grade students with a more positive attitude had higher average achievement in mathematics as compared to those with less positive attitudes. In another earlier study conducted by (Schofield, 1982), a significant relationship between attitude and achievement was also established depicting stronger relationships in boys than in girls. In a more recent study, (Ngussa & Mbuti, 2017) conducted a study in Arusha, Tanzania, involving secondary school students. They established a moderate relationship between student's attitude and performance when

teachers use humor as a teaching strategy. They concluded that the enhancement of students' positive attitude can boost students' performance in mathematics.

Attitude as a concept is concerned with an individual's way of thinking, acting and behaving. 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. Mobilizing a set of different definitions concerning attitudes presented since 1935, (Nicolaidou & Philippou, 2004) defines an attitude towards mathematics as “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.” When emphasizing the importance of individual experiences, the contexts where students interact with others and with mathematics become important focal points. According to (Ajzen & Fishbein, 1977), attitudes express our evaluation of something or someone. They are based on our knowledge, feeling and behavior and they may influence future behavior, a target is essential for attitude. Attitudes are highly composite and they can affect learning comprehensively. Attitudes influence performance and performance in turn influences attitudes. Attitudes are regarded by several researchers, as an important or key factor to be considered when attempting to understand and explain variability in students' performance in mathematics (Mata et al., 2012), Mobilizing a set of different definitions concerning attitudes presented since 1935, (Guntur & Retnawati, 2020) defines an attitude towards mathematics as “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.” When emphasizing the importance of individual experiences, the contexts where students interact with others and with mathematics become important focal points. According to (Hagan et al., 2020), attitudes express our evaluation of something or

someone. Attitudes are highly composite and they can affect learning comprehensively. According to (Berger et al., 2020), teachers should motivate students because most of them do not receive necessary support from home. Furthermore, this motivation is mostly easily incorporated into elementary classrooms because by middle and high school, students have more solidified attitudes (Pulgar et al., 2022). Lack of motivation could mean an apathetic attitude or lack of self confidence in school.

Learning mathematics does not only involve thinking and reasoning, it is dependent on the attitudes of the learners towards learning and mathematics (Anthony, 2011; Getahun et al., 2016). Hannula et al., (2004) state that attitudes consist of cognitive, affective and behavioral reactions that individuals display towards an object or the surrounding based on their feelings or interest. The cognitive component of attitude is what the individual thinks or believes about mathematics (Akinsola&Olowojaiye, 2008; Hannula et al., 2004; F. S. Mensah, 2017). The affective component of attitude is the feeling or emotions of the individual associated with learning mathematics (Hagan et al., 2020). Thus, the affective component is the source of driving the engagement of students towards mathematics. Furthermore, the affective aspect is also influenced by the belief formed from the cognitive component of attitude, which creates a mindset that becomes constant over time and influences the feelings of the students towards learning mathematics (Nicolaidou & Philippou, 2004). As such, the cognitive and affective components of attitude are interrelated and deeply interact with each other (Yuanita et al., 2018).

Joseph, (2013) identified important factors that contribute to students' attitudes towards learning mathematics. These include the students themselves, the school, the teachers' beliefs and attitudes and their teaching methods. The teachers' teaching method have a major influence on students' attitudes. Teachers can do many things to facilitate the classroom learning to alleviate students' engagement level and confidence in learning mathematics (Sun et al., 2022). According to (Sullivan, 2020), teachers can find ways to encourage student engagement and confidence in learning mathematics. This can be achieved by implementing meaningful activities embedded in real-life contexts.

## **2.6 Perceptions of Students about Mathematics**

Perceptions towards mathematics are vital towards the effective facilitation of learning and teaching the discipline. This concept influences the instruction of mathematics both positively and negatively, the school system, family background and student's attitudes towards the school altogether have an effect on the way students view mathematics. (Arthur, 2019) remarks that the way mathematics is taught in the classroom and perceived by the students makes the teachers believe whether they are actually presenting it in a valid and dependent way that does not disaffect loads of students from pursuing it at higher levels of learning. Several researchers have indicated that student's positive discernment towards mathematics can steer many into mathematics success. Therefore, an approach to get better of the student's attitude towards mathematics at a young age would present the opportunity for many students to perform well in mathematics while at a higher level of education. Perceptions and beliefs about mathematics lays heredity in the people's lived and past experiences which comprises both cognitive and affective dimensions (Arthur et al., 2017b). Cognitively, it relates to a person's understanding or knowledge and

credence's in addition to other cognitive demonstrations while affective domain refers to a person's attitudes, feelings and emotions about mathematics. (Yang, 2013) argues that many students are petrified of mathematics and feel powerless in the presence of mathematical ideas. They consider Mathematics as unbearably a "difficult, frosty and abstract subject whereby in some cultures. Buxton, cited by Sam (2002) viewed mathematics as "fixed, absolute, external, intractable and uncreative" or "a timed-test. Several academics have attempted to make clear of this phenomenon through the widespread beliefs on mathematical myths highlighting that "studying mathematics is a question more of ability than effort"(McLeod, 1989) or some people are born with those natural abilities for mathematics". Many people especially students believe that it is only academically gifted mates that can be powerful in the presence of mathematics or those who 'inherited mathematical ability'. (McLeod, 1989) argues that, the role of parents towards the child's better mathematical performance should not be underestimated. Parents play a primary role towards building students' beliefs and attitudes mathematics and thus better performance. Akellot & Bangirana, (2019) parents' take on mathematics greatly communicates sense of the subject to the child and greatly influences the way it is facilitated thus arousing the interest of the children to pursue it with a good attitudes and results into better performance in the long run. Student feeling and perception about mathematics is a major factor that affects his or her attainment and realization of full potential. (Ajzen & Fishbein, 1977) defines attitudes towards mathematics as alienated measures of like or disliking of mathematics, a tendency to engage in or avoid mathematics activities, he belief that mathematics is useful or useless. Teacher's attitudes towards mathematics could presuppose an inclination to pass on what they have received as a duty or as a valuable asset of knowledge that could be beneficial in

their learners. On the contrary the learner's attitudes towards mathematics could be valued in relation to natural disposition environmental exposure, scales of value or personal disposition, which needs investigation to establish the missing link in the achievement of mathematics. A positive attitude towards mathematics reflects a positive emotional disposition in relation to the subject and, in a similar way, a negative attitude towards mathematics relates to a negative emotional disposition. Opoku-Asare et al., (2015) on attitude towards Mathematics and academic achievement, points out that in order to succeed in a subject, positive attitude towards the subject is a necessary prerequisite. Abdul Gafoor & Kurukkan, (2015) found that students' attitude towards Mathematics tend to be more positive in classroom where students perceived greater leadership and helping / friendly behaviors in their teachers and more in their classrooms where students perceived their teachers as admonishing and enforcing strict behaviors.

Similarly, (Young & Shtulman, 2020) conducted a study that examined the influence of student's attitude towards mathematics in the junior secondary school. Perceptions and beliefs about mathematics originate from past experiences; comprising both cognitive and affective dimensions (Grant et al., 2011). From a cognitive point of view, it relates to a person's knowledge, beliefs, and other cognitive representations while from an affective domain it refers to a person's attitudes, feelings and emotions about mathematics. Many students tend to identify mathematics with arithmetic. Doing mathematics is normally associated with calculations. It is widely maintained in the literature that negative images and myths of mathematics are widespread among the students. Many students view mathematics as a difficult, cold and abstract subject. It is perceived by many students as an exclusive discipline (Gafoor&Kurukkan, 2015). From epistemological and pedagogical perspectives, it is perceived as a subject

that involves a lot of work. The subject is seen as an obstacle, often dreaded and as hard work. Mathematics is also viewed as a static and objective discipline, available for discovery by mathematicians, in turn to be transmitted by teachers and received by the students. Many students seem to concentrate on computations as the essence of mathematics. Many believe that mathematical activity includes procedures that are divorced from real life, from discovery and from problem solving. The fact that mathematics is usually presented as a body of absolute truths which exists independently of the learners and taught in a hierarchical, linear and prescriptive fashion reinforces the view that mathematics is a difficult subject. There is also a claim that mathematics is only for the clever ones, or only for those who have inherited mathematical ability (Wu, 2002).

Adeluku (2012) investigated the influence of instructional materials in teaching and learning of Mathematics in senior secondary schools in Cross River State. A two-group pre-test post- test quasi-experimental design was adopted for the study. One research question and one hypothesis were formulated to guide the study. A total of 100 senior secondary one (SSI) mathematics students were selected from five (5) schools in Yankuur Local Government Area of Cross River State through simple random sampling and stratified random sampling techniques. Fifty SSI students (experimental group) were taught with instructional materials and another forty (control group) were taught without instructional materials. A validated mathematics achievement test was used to gather data for the study and split –half was carried out using the Person Product Moment Correlation Coefficients to obtain the reliability coefficient of 0.67. Independent t-test was used to test the hypothesis at 0.05 significant levels while the Person Product Moment Correlation Coefficient was used to test the hypothesis at the 0.05 levels of significance. The study revealed that



students taught with instructional materials performed significantly better than those taught without instructional materials and also that the use of instructional materials generally improved students' understanding of concepts and led to high academic achievements

## **2.7 Methods of Teaching Mathematics**

Mathematics teachers use different discourse patterns in presentation of their work. (Abdul Gafoor & Kurukkan, 2015) carried out a study to investigate the effects of different teaching methods on immediate and retained attitude towards mathematics and the topic of mathematics achievement level of tenth grade students. Traditional instructional practices that center on teacher dominated pedagogy predominates our schools (Nabie et al., 2013). The author observes that learning activities in most secondary school's center on the textbook and past examination papers. (Opoku-Asare et al., 2015) argues that student's perceptions of mathematics may be affected negatively by the way the subject is presented. The author observes that this applies to all other subjects. Research on teaching behavior indicates that there are teaching methods that influence student's attitude more positively than others. The author further argues that teachers who made use of hands- on activities to illustrate concepts in science and mathematics, as indeed in other subjects as well, helped the students develop a liking in those subjects (Opoku-Asare et al., 2015). The author further observes that the lack of curiosity and innovativeness evident in many spheres of human endeavor all around us may be a reflection of the teaching methods that dulled curiosity rather than nurturing it. Greater attention should be paid to improving classroom aspects of teaching quality (Kupari & Nissinen, 2013) reinforces this by arguing that teaching methods should nurture an environment of students' creativity in learning. Teaching methods are used to impart knowledge to students they are the



means by which the teacher attempts to impart the desired learning or experience (Addotey, 2016). The methods used in teaching vary from one country to another, depending on the information or skills that are being taught and also be influenced by the aptitude and enthusiasm of the student. Various studies had been conducted concerning teaching methods, for example (Akinsola & Olowojaiye, 2008), found that, qualification of teachers and students' environment factors do not influence student's poor performance but teachers' methods of teaching influence poor academic performance.

Traditional instructional practices that center on teacher dominated pedagogy predominates our schools (Mereku, 2010) . The author observes that learning activities in most Junior High school's center on the textbook and past examination papers. (Opoku-Asare et al., 2015) argues that student's perceptions of mathematics may be affected negatively by the way the subject is presented. The author observes that this applies to all other subjects. Research on teaching behavior indicates that there are teaching methods that influence student's attitude more positively than others. The author further argues that teachers who made use of hands- on activities to illustrate concepts in science and mathematics, as indeed in other subjects as well, helped the students develop a liking in those subjects (Mereku, 2000). In his study (Ampadu, 2014) argues that instead of imparting factual information, the teacher should create situations where learners will ask questions, experiment and discover facts and relationships. Information transmission pedagogy stifles intellectual development because it weakens vigor and efficiency of thought.

Many studies have identified that teaching mathematics in real life contexts enhance students' enjoyment of mathematics lessons (Anthony, 2011; Boaler et al., 2016). The relationship formed between the student and the task fosters students' engagement in the mathematical tasks. By creating, exploring and verifying mathematical ideas students tend to see the importance of mathematics (Duchaine et al., 2021). In (Boaler et al., 2016) study, students who were taught in a traditional manner viewed mathematics as a collection of procedures. In contrast, those students who were taught in a context viewed mathematics as an active and inquiry-based discipline. (Akinsola & Olowojaiye, 2008) worked on a project that trailed teaching mathematics in a context. The project included the views of both teachers and students on the impact of teaching mathematics in a context. Students who are taught using a sporting context may feel that the task is more enjoyable since it is different from repetitive mathematics exercises (Aksu & Colak, 2021). Aksu & Colak, (2021) claim that connecting mathematics to the sports fields can provide a context for measurement, estimation and tessellation in mathematics problems. If students had played a game such as basketball, then that experience could provide a visual model to help them decide what mathematics is needed to solve the problem. Since sports are often a part of students' everyday life (Afriansyah, 2016), they don't have to deal with an enormous amount of information and feel more engaged in the tasks. Students feel at ease in solving mathematical problems in context because problems can be solved at different levels and in different ways (Van den Heuvel-Panhuizen, 2020). Students are often able to solve problems using their own informal strategies rather than the formal procedures they are unsure of. Students are able to represent the task using their own symbols and words before carrying out further solving and interpretation (Barnes, 2005).

Ampadu (2012) examined students' perception of their teachers' teaching methods on how it impacted on their learning experiences. The sample of the study involved 258 students from 12 junior highschool (12-14 years) who were randomly selected to complete a semi-structured questionnaire. The study revealed that students' perception of their teachers' teaching varies as the results established that both teacher – centred and student –centred teaching approach were used by mathematics teachers. The results of the study revealed that teachers' action and inaction impact positively or negatively on students' learning experience as the majority of the respondents reported that their learning experiences are to a larger extent controlled by the teacher.

(Asikhia, (2010) conducted a study on students' and teachers' perception of the causes of poor academic performance in Ogun State secondary schools, Nigeria. The study had a targeted population consisting of all (SSII) students in Ogun State. That is 135 (SSII) students and 50 teachers were selected from five (5) secondary schools for the study through stratified random sampling.

The instrument used for data collection was a self-designed questionnaire on the perception of students' poor academic performance. The data obtained were analyzed using frequency count and chi-square statistical analysis. Findings showed that teachers' qualification and students' environment did not influence students' performance but teachers' method of teaching influence performance, In addition, some of the factors of poor academic achievement identified were motivational orientation, self – esteem, emotional problem, study habits, teacher consultation and poor interpersonal relationship.

## 2.8 Teaching and Learning Resources

Teaching aids or instructional materials include all physical resources that may be employed in instructions whereby students learn with the aid of objects rather than by reading books or listening to the teacher only. The role of physical experience in concept materials gives children the experience that enables them to form their ideas. However, when they lack such concrete materials, like teaching aids, their comprehension is greatly hindered (Christou & Parmaxi, 2022).

And also, Teaching and Learning resources refers to any tool that teachers use to assist their students in adequately learning the target language; means used to increase students access to that language; every instrument that contributes greatly to students' progress; anything which is used by teachers and learners to facilitate the learning; and the keys to have influence on what goes on in the classroom, just to list a few (Bouck & Park, 2018). Research proves that teaching and learning materials highly facilitate learning and greatly draw learners' attention to the target language (Buba & Umar, 2015). Teaching and Learning Materials (TLMs) can be seen as any material that aids the teaching and learning process in classrooms. TLMs are mostly used by teachers to stimulate and engage the interest of learners during the learning processes (Suurtamm, 2022).

Ampadu, (2014) see teaching and learning materials as instructional materials that aid students to understand a given lesson. They went further to add that teaching and learning materials, also known as instructional materials is any audio-visual or teaching aid which contributes to the learning process. According to them, TLMs are now referred to as instructional media or multimedia in these modern times. Some examples of TLMs mostly used by instructors are real objects such as photographs

and sketches and drawings. The role of TLMs in promoting the understanding and raising positive attitudes of students towards studies cannot be overemphasized. According to (Oppong Frimpong, 2021), the use of TLMs arouses the interests of learners and as well promotes self-learning and transfer of knowledge. It also provides an opportunity for students to participate actively in class thereby leading to a revamping of self-confidence among learners especially females. Finally, the use of TLMs brings Mathematics closer to the student by making the subject very practical and real.

Despite the significance of teaching and learning materials in Mathematics education, some teachers still teach the subject in abstraction without recourse to any teaching aid. (Bouck et al., 2020) postulated that such teachers end up being frustrated and aggravated for the inability of their students to perform well in the subject. Research studies have shown that most schools in developing countries such as Ghana are not equipped with the required instructional materials. Teachers in such schools are left to their fate to either improvise these materials or to do without them (Cukurbaşı & Kiyici, 2018). The impact of this situation on the academic performance of learners in Africa is quite devastating. Inappropriate and or no use of teaching and learning materials during teaching and learning processes does not only reduce the morale, interests and enthusiasms of learners, but also, it leads to the development of apathy, rote learning, poor academic performance and unfavorable attitudes towards studies among learners (Amir et al., 2021).

According to SMASSE Project (2005) as cited in (Protus et al., 2020) mathematics as a subject requires an integration of both theoretical and practical work to make it easily understood by the students. This therefore calls for application of a myriad of

teaching aids to enable learners to concretize mathematics principles, concepts and facts. The mathematics teacher thus, must apply the student- centered approach to teach. This requires various resources / learning materials and facilities to facilitate the teaching – learning process (Matthews, 2020). In his study, (Amir et al., 2021) observed that factors which influence students’ achievement in science subjects and mathematics are directly related to the students’ attitude towards these subjects. He reveals that factors include availability of resources such as laboratories, libraries, textbooks, laboratory equipment and chemicals. (Agcaoili, 2018) asserts that educational philosophy should aim at improving normal school practices. For additional resources for teachers, (Amir et al., 2021) found that the availability of textbooks has positive relationship to attitude and achievement in both primary and secondary schools. Every student should have a mathematics textbook because of the nature of the subject, which requires continuous assessment. Textbooks determine the sequence, scope and the pace of mathematics programme; it should therefore provide adequate exercise for pupils necessary for mastery of concepts and skills. In view of the importance of textbooks of teachers and students, their availability is likely to be reflected in the student’s performance in Mathematics (Batlolona et al., 2019). It is imperative that the availability of textbooks and other teaching aids given the seriousness they deserve in schools since they assist to achieve Mathematics goals and objective through student’s involvement.

(Oluwaleyimu, 2021) examine the effect of mathematic instructional materials on the learning and teaching of mathematics as well the effect of these instructional materials on the academic performance of some secondary school students in Isolo Local Government Area of Lagos State. A well designed and simple questionnaire was distributed to mathematics teacher in these selected schools to accurately evaluate the

effect of instructional materials on the application of learning mathematics in secondary schools in Nigeria. The researcher adopted the survey research design with a sample of 20 teachers and eighty (80) students selected randomly. A questionnaire was used to collect the data. The findings after testing hypothesis, three indicate that there was significant positive difference in the performance of secondary school students in mathematics when they were taught the subject with instructional materials in the teaching and learning of mathematics, obviously improves the performance of the students.

## **2.9 Factors Influencing the Attitude of Students towards the study of Mathematics**

In this study, three elements regarding to attitude towards mathematics are examined: these are parental influences (Mahamood et al., 2012), teacher affective support and classroom instruction . Perceived Parental Influences (PPI). One of the factors affecting attitude towards mathematics is parental influence (Mahamood et al., 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 (L. Chen & Wang, 2022). In a study by Mahamood et al. (2012) regarding parental attitude and involvement in children's education specifically parental aspiration among Form Four students in Selangor, Malaysia, it changed into discovered that parental involvement is a positive and powerful source of influence towards the achievement of adolescents.

Teacher Affective Support (TAS). Teachers' support is also necessary to encourage positive attitudes towards mathematics (Abdul Gafoor & Kurukkan, 2015; Hasan et al., 2020). 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 (Ankomah, 2021; Duchaine et al., 2021). The affective dimensions of teacher support significantly affect students' academic, emotional, behavioural, and motivational outcomes in educational environment (Sakiz, 2007) as cited in (Lei et al., 2018). Components in TAS are specified as caring, respect, concern for, and interest in students, valuing, listening, fair treatment, encouragement, and high expectations.

Students' learning of and performance in mathematics is affected by a number of factors, including students' attitude towards the subject, teachers' instructional practices, and school environment. According to (Ampadu, 2014; Tamur et al., 2020), teachers play an important role in determining the students' academic achievement. However, researchers have never reached a consensus on the specific teacher factors that influence students' academic achievement. Furthermore, there is no information concerning the influence of teacher related factors (qualification, experience and attitude) on students' academic performance in various subject especially mathematics.

Literature shows that students' attitude is affected by numerous factors. They include such factors as the school, peer students, home environment and society (Yang, 2013). Researchers such as (Arfiana & Wijaya, 2018; Arthur et al., 2017a; Batlolona et al., 2019) identified factors that include connecting mathematics with real life, using instructional materials, teachers' personality, teachers' content area knowledge, bad



instructional practices, teachers' emotional support, lack of commitment by students' and teachers' classroom management as having influence on students' mathematics achievement. Teachers' affective support, class activities, subject content and amount of work, scarcity of teachers, peer and parental influence and inadequate resources are all necessary determinants of students mathematics achievement(Enu et al., 2015; Joseph, 2013) Furthermore, factors such as, creating insecurities in students' mathematics ability and teacher failure to provide explanations for the mathematical concepts being taught.

According to (Yılmaz et al., 2021), factors responsible for students liking of mathematics are good teaching and course enjoyment. While factors such as boring teachers, students' failure to solve mathematics problems, failure to understand the topic well, friends talking during lectures, receiving a bad grade for an examination are related to the students' disliking of mathematics.

According to (Berger et al., 2020; Enu et al., 2015) 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 impotent in affecting the beliefs and behaviours of adults outside the school who influence the child's learning and development (Syedda, 2016). The school and the families it serve 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 PPI & Attitude towards mathematics (ATM) in this study.

Students' attitude towards mathematics influences the efforts they put in understanding and practicing mathematical concepts and skills. According to the National Research Council (2000) as cited in (Baker et al., 2018), Students' beliefs about their competence and their expectations for success in school have been directly linked to their levels of engagement, as well as to emotional states that promote or interfere with their ability to be academically successful. Thus, attitudes determine the effort a student is likely to put in his learning of the subject (mathematics). It is therefore necessary for mathematics teachers to strive and sustain positive attitudes towards mathematics for good performance in the upper classes.

Classroom Instruction (CI). Classroom processes serve as a mechanism through which teacher attitudes, student attitudes, and student's achievement-related behaviour can affect student achievement (Al-Zoubi & Suleiman, 2021). CI is a broad term that covers instructional strategies and materials and equipment used in the classroom during the teaching and learning process. The choice of instructional strategy can influence students' affect towards mathematics (Bouck & Park, 2018). Teacher attitude, student attitude and student's achievement-related behaviour may change as teachers and students interact in the classroom. Classroom instructional strategies that provide students with multiple opportunities to learn are modeling, student-centered, cooperative-learning, collaborative discussion, and spatial thinking (Welch et al., 2015). These instructional practices have the potential to impact students' attitudes towards mathematics positively

Previous achievement has also been related to students' attitude towards mathematics (Berger et al., 2020; Mathai, 2014). Previous achievement is linked to the students' belief that positive results from past examinations will help them to learn mathematics (Y. M. Mazana et al., 2019). Students who struggle with mathematics early in school normally develop an aversion towards the subject (Mathai, 2014). In (Arsaythamby & Zubainur, 2014) study of cross lagged effects between attitude and achievement, achievement demonstrated causal predominance over attitude across their secondary school sample. That is, changes in prior attitude did not result in any significant changes in later achievement, but changes in prior achievement did result in significant changes in later attitude.

Studies found that home environment and parental involvement with the student can influence his attitude toward mathematics (Dudaite, 2016). Parents mostly recognize the critical need to be involved in their children's education, but it is also commonly acknowledged that many parents felt their inadequacy in helping their children because of their own low confidence with their mathematical ability (Roberts et al., 2022). Chen and Liu, (2021) claimed that parents are more inclined to help their children with reading but not with mathematics due to their perception that mathematics is less important to everyday life and the low confidence with their mathematical ability. More parental involvement in their child's mathematics education could contribute towards positive attitude towards mathematics in their children and increasing the tendency for the child to pursue a science, technology, engineering and mathematical related career (Michaelides et al., 2019). In (Patena & Dinglasan, 2013) children understand that their school achievement is of great importance to their parents, and that their parents' expectations are high. The natural

desire of children to please their parents translates into an added incentive for immigrant children to do well in school (Yuanita et al., 2018)

Students' gender and their socio-economic status have also been associated with their attitude towards mathematics. In general, male students have a more positive attitude towards mathematics and experience less anxiety (L. Chen & Wang, 2022). However, other studies (Dudaite, 2016) report no gender difference. Socio-economic status which is indicated by the educational achievement, occupation, social class income (Arcoverde et al., 2022) of the parents are also linked to students' academic success (Simamora & Saragih, 2019) but (Syyeda, 2016) found the relationship to be insignificant.

Teachers' affective support has also been identified as a factor influencing students' attitude towards mathematics (Yılmaz et al., 2021). (Akpan & Umobong, 2013) explained teacher affective support as teacher being caring, respectful, concern for and have genuine interest in the students, valuing, listening, fair-treatment, encouragement and high expectations. Marchis (2011) cited in (Zsoldos-Marchis, 2020) found that most of the students in his study think that their teacher likes mathematics and that he or she is a good mathematician. More than half of the students get encouragements from their teacher when having difficulties with mathematics and three-quarter of the respondents agreed that their teacher explains mathematics enthusiastically. Marchis (2011) cited in (Zsoldos-Marchis, 2020) concludes that the most important factor for attitude toward learning mathematics is the teacher ( $r = 0.600$ ). The second highest factor was self-efficacy ( $r = 0.468$ ). It is imperative therefore, that teachers employ effective instructional methods by

developing relationships with the students so that they can experience active and critical engagement (Belbase, 2020; Bishara & Kaplan, 2022).

### **2.9.1 School Environmental Factor**

The school environment has also been identified as a major factor that influences gender differences in students' attitudes towards the study of Mathematics (Enu et al., 2015). The nature and type of environment learners find themselves does affect the type of attitude being developed. Students who find themselves in a hostile environment are more likely to develop negative attitudes than those in a congenial environment (Salifu, 2022). In a study on students and teachers' perceptions of the causes of poor academic performance in Nigeria, (Asikhia, 2010) stated that in conducive school environment such as large class size has not only contributed to the negative attitudes of learners but also, it has contributed to the poor academic performance of students. Classroom size, social interaction within the school (between students and school authorities, or among students themselves), methods of assessment in the school and the content of the curriculum are some features of the school environment that influences learners' attitude and interests in Mathematics (K. Young et al., 2019).

Several studies have examined the role of the environment in learning mathematics. The learning environment is a critical factor in performance and learning. When the environment is strong, students can learn effectively (Kwame Boateng, 2020). Students receive maximum learning as well as develop an affirmative attitude towards a subject in an environment where they are much involved; a good teacher student relationship exists, and the teachers (Akman, 2021; Lei et al., 2018) employ creative teaching methodologies. The relationship between the learning environment and

attitudes can never be avoided by trying to focus on factors that affect students' mathematical performance. Similarly, (Yang, 2013) found the positive relationship between upshots and perceptions about attitude. This is to say that for students to receive maximum learning, an atmosphere of comfort, motivation and experimentation in the classroom should reign. The styles of teaching and content have a helpful effect on learning and success in mathematics (Akpan & Umobong, 2013). Thus, inappropriate teaching methods and inadequate understanding of mathematical concepts therefore lead to problems and make it difficult to determine the relevance of mathematics for their lives (Getahun et al., 2016). Flowing from the above, it is suggestive that suitable pedagogical approaches and teachers' deep mathematical insights have what it takes to help students come out of the bondage of negative attitudes toward mathematics and its resultant effects of poor academic performance.

A study by (Joseph, 2013) established a series of elements of the school environment (teacher support, student interaction and student expectations) that are largely related to student attitudes and behaviour. This study concluded that in a class or school environment that teachers consider as encouraging, tend to foster students' sense of control and confidence in their ability to succeed. Suffice it to maintain that how students perceive teacher characteristics largely shape their attitudes towards mathematics (Gunasegar & Maat, 2022). Additionally, (Gunasegar & Maat, 2022) recognized a strong correlation between the learning environment and the attitudes of students towards mathematics. As a result, students who are more in tune with the learning environment and whose teachers are more optimistic tend to adopt a more productive attitude towards mathematics (Gunasegar & Maat, 2022). The results of (Ngussa & Mbuti, 2017) have confirmed that students tend to have a positive attitude

toward mathematics when teachers feel supportive. Thus, to some extent, issues of students' adverse attitudes toward mathematics can be addressed through teachers' supportive roles in the classroom.

These researchers considered that the learning influenced factors which relate to environment factors, teachers' affective support, parental influences, course content, classroom instruction, and teachers' attitudes. But the researches which relate to the relationship between teachers' affective support and students' learning effect are not enough. However, few studies have explored the relationships between students' learning cognition, learning self-efficacy, learning initiative, teachers' affective support, environment factors and the learning effect in Chinese social science majors' mathematics education.

### **2.9.2 Personal Factor**

In addition to environmental factors, researchers also think that students' personal factors can influence their effectiveness of mathematics learning. Studies have so far suggested that mathematics education methods should be improved with regard to students' personal factors. Students' attitude towards mathematics has been the main factor that influences the learning outcomes of mathematics. Many researchers believe in the important role of students' attitude in reshaping their cognitions and behaviors about mathematics learning.

Besides, prior studies and investigations found that students' effectiveness of mathematics learning have relationship with their personal factors and environment factors, psychological factors is the mainly factor. (Enu et al., 2015) recognized that students' concerns about mathematics, such as anxieties and attitudes can significantly affect their learning of mathematics. (Simamora & Saragih, 2019) used

empirical evidences to prove that the use of technology may be a variable influencing student' attitude towards the process of teaching learning mathematics, and mathematics anxiety may also be a factor which influences their attitude.

Self-directed learning arithmetic ability, and motivation or concentrations are some of the individual factors. In addition, the causes of poor attainment in school are complex usually consisting of many factors combine to give a low level of learning such as physical, intellectual, emotional and social are slow maturation, poor and low average intelligence (Pandian, 2010). Research also shown that students' attitude towards problem solving in terms of patience, confidence and willingness has positive relation with students' mathematics achievement (Mohamed &Tarmizi, 2010).

A study conducted by (Mohamed & Tarmizi, 2010) found that students with high level of perseverance will not stop trying until they manage to get the answer and they will continue to work on a problem until they succeed in solving. Her study reported that most students immediately try to work out the problem without first planning any strategies to do so which resulted only moderate number of students are able to solve the mathematical questions. Her study indicates that the students have lack of patience to carefully read and understand the questions given. Therefore, her findings indicate that patience towards problem solving is essential to achieve good results in mathematics. According to (Berger et al., 2020), students' commitment in mathematics refers to students' motivation to learn mathematics, their confidence in their ability to succeed in mathematics and their emotional feelings about mathematics. Students' commitment in mathematics plays a key role in the acquisition of mathematics skills and knowledge (MOE, NaCCA, 2019). Therefore, confidence towards problem solving is believed to play a significant role in



mathematics achievement and might be one of the factors that influence students in mathematics achievement. Likewise, impoverishment of facilities, lack of instructional materials and declining quality of teachers has also contributed to the decline of educational standards in general and the impact was bad on the quality of teaching in Mathematics. Taking this problem in to account their crucial contribution towards the development of the country educational Sectors; consideration should be seen on quality of teachers and lack of instructional materials (Arthur et al., 2017a).

### **2.9.3 Socio-Economic Factor**

Social economic status is most commonly determined by combining parents' educational level, occupational status and income (P.-Y. Chen et al., 2021). In most of the studies done on academic performance of students, it is not surprising that social economic status is one of the major factors studied while predicting academic performance. According to (Aksu & Colak, 2021), one's educational success depends very strongly on the social economic status of the parents. Ankomah, (2021) believes that families where the parents are advantaged socially, educationally and economically foster a high level of achievement in their children.

Home settings and social factors influence students' attitudes toward mathematics. Examples of such factors include parents' level of education, parental expectations and occupation of parents (Unameh, 2011). The concept of mathematical society, of hard, cold, abstract, theoretical and supra-rational questions also influences the way students perceive it (Sitabkhan & Ampadu, 2021). However, studies have shown a positive attitude of students on the subject. Teachers with greater self-efficacy and higher goals and objectives for themselves as well as their students are likely to cope successfully with barriers and problems (Akman, 2021). There is thus the need for

teachers to engage their students with practical learning as well as provide them with some real-world applications (Sukon, 2021). It goes on further to argue that teachers should teach passionately because passionate teachers perform quality academic work. Several studies have also shown that students' sympathy and attitude towards mathematics is characterized by low, extraordinary, or average grades (M. Mazana et al., 2018) Thus, students who score higher marks in mathematics will turn to have stronger affection and attitudes towards the subject and vice-versa. In support of this, (Garrido-Lopez et al., 2018) maintained that self-efficacy of students, attitudes are correlated, and that self-efficiency in mathematics is influenced through previous grades and marks. Suggestive that students with poor previous grades

## 2.10 Empirical Review

The Trends in International Mathematics and Science Survey (TIMSS) results of 2007 reported in (Kupari & Nissinen, 2013) also indicate that 4th grade and 8th grade students with a more positive attitude had higher average achievement in mathematics as compared to those with less positive attitudes. In another earlier study conducted by Schofield (1982), a significant relationship between attitude and achievement was also established depicting stronger relationships in boys than in girls. In a more recent study, (Ngussa & Mbuti, 2017) conducted a study in Arusha, Tanzania, involving secondary school students. They established a moderate relationship between student's attitude and performance when teachers use humour as a teaching strategy. They concluded that the enhancement of students' positive attitude can boost students' performance in mathematics. However, (Joseph, 2013) in his study of community secondary school students in Kagera, Tanzania found that the majority of students (55%) had a general negative attitude towards mathematics, with a positive and significant correlation between attitude and performance ( $r = 0.33$ ). Teacher

attitude and method of teaching can greatly influence students' attitude (Adabor, 2008). Kundu & Kumari, (2021) posit that teacher's attitude contributed significantly to student attention in classrooms. (Kalder & Lesik, 2011) opined that teacher attitudes which have been found to be influenced by several factors including the teacher workload caused by inadequate teaching staffs, high rate of teacher absentees and transfers influence students' performance. Studies have shown that there are several factors that influence students' academic performance. (Agbenyega, 2007) observed that teachers' professional status is related to teaching behaviors and interactions they have with children. (Kalder & Lesik, 2011) argued that teachers' educational qualifications and experience significantly influenced students' academic achievement. Although, there has been no consensus on the specific teacher factors that influence students' academic performance, the important role of the teachers in the learning is unquestionable. Despite the government effort in hiring teachers in secondary schools, there is increased concern over the teacher in-put, hence the introduction of teacher performance contract. This implies that if teachers are not well trained, they will not be able to apply specific abilities hence lack a basic foundation for teaching. Lack of teaching experience will make them more dictatorial in the classroom because they have not mastered the content and acquired classroom management skills to deal with different types of classroom problems. Finally, if the teachers' attitudes and interests are less favorable, then the student is likely to develop negative attitude toward the teacher or mathematics subject. Further, (Yılmaz et al., 2021) advanced the argument that attitudes of students towards a subject have an implication on their academic achievement. He adds that if students have a positive attitude towards a subject there are high chances of them performing well in the subject. In this study, the researcher also focused on resource related factors where

frequency of use of teaching and learning materials and textbook ratio were considered. Resource related factors include textbooks, visual, audio visual and web-based resources. Frequency of use of teaching and learning materials is important because it assists teachers to add concreteness to their presentation of subject matter. It also encourages learner involvement, aid learners in conceptualizing abstract ideas and understanding, mastery and retention of the ideas or concepts (Adabor, 2008; Mohamed & Tarmizi, 2010). The study also focused on the textbook because it is the standard resource used by the schools and therefore easy to measure.

Further, it is the center piece of a course syllabus and can be used for self-study. In addition, textbooks are written by experts in the pertinent field and are therefore considered reliable sources. In research conducted in U.S. the researcher studied the relationship between students' attitude and academic achievement in college mathematics by inviting 218 fresh students to complete a set of questionnaires. The results indicated that student's attitude was highly correlated with their achievement with college calculus. (Klein & House, 1995). In pursuit for solution, earlier research by (Barnby et al., 2014) investigated the Mathematics teaching methodologies and language factors, and gender disparities all in relation to performance. However, these studies seem not to provide sufficient solution in the domain of attitudes in relation to mathematics achievement amongst students. (Dudaite, 2016; Simamora & Saragih, 2019) have also highlighted this aspect in research which shows that learning environments at home, at school, and within the peer group accounted for a significant amount of variance in student attitudes and, furthermore, that class ethos had a significant impact on the scores achieved by students for these attitudes. According to Fishbein Model of value – expectancy (Ajzen & Fishbein, 1977), he argued that a person's attitude determined his/her intended behavior, which could

ultimately affect the outcome. Based on the model, he stated that a person would hold certain attitudes towards an object by evaluating it. After going through his process, the person then decides whether to hold a favorable or unfavorable view towards it. Indeed, such a positive or negative attitude could further influence the person's intentions to engage in various behaviors with regard to that particular object (Ajzen & Fishbein, 1977). Based on the person's behavior, this could be regarded as a significant predictor of the final outcome. Attitudes will affect behavior, influencing what the learner selects from the environment, how he will react towards teachers, towards the material being used and towards the other students.



## CHAPTER THREE

### METHODOLOGY

#### 3.0 Overview

This chapter discusses in detail the methodological choice and the research design process of the study. In addition, the chapter set the procedures to collect, analyze and report data. It has used separate procedures for the quantitative and qualitative approach as both encompass distinct purpose to serve. Besides, the approaches implemented to enhance the validity and reliability of the studies are also explained in detail. These include; the research design, population of study, sample size and sampling technique, method of data collection and data analysis method, validity and reliability of the data.

#### 3.1 Research Design

A research design sets the procedure on the required data, the methods to be applied to collect and analyze this data, and how all of this is going to answer the research question (Abbott & McKinney, 2013). McMillan, (2014) describe the research design as the plan for selecting subjects, research sites and data collection procedure to answer the research questions. Bloomfield & Fisher, (2019) also describes the research design as the blueprint or an outline for conducting the study in such a manner that maximum control will be exercised over factors that could interfere with the validity of the research results. McMillan state that the research design shows which individuals will be studied and when, where and under which circumstances they will be studied so that the results that the design provides will be judged to be credible. (Bickman et al., 2009) asserts that designing a research study helps researchers to plan and implement the study in a way that will help researchers obtain

the needed results, and therefore increasing the probability of obtaining information that could be compared with the real situation.

This research was non-experimental which means that no experiments or intervention was carried out (Johnson, 2001). It was purely a quantitative survey design which employed the use of face to face administered questionnaires to gather data for the research (Kothari, 2017). Survey research is defined as the process of conducting research by designing series of questions to elicit responses from a sample of respondents (Johnson, 2001).

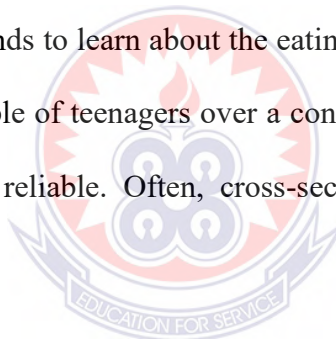
Quantitative research provides a researcher with data that is quantifiable, this is because numbers are assigned to answers so that researchers can objectively measure and compare. It is particularly useful method for collecting data when the sample size is large. The data collected from surveys are normally subjected to statistical analyses to draw meaningful research conclusions (Kothari, 2017). Surveys have demonstrated to be efficacious and trustworthy research methods. Surveys are not only used in academia, but it is the obvious choice for the business community. Cooperate institutions, Political Parties, the media, and even governments now rely on survey research to attain accurate and quality data. Survey research method provides the opportunity for collecting quantitative data for information from a pool of respondents by asking multiple survey questions. Survey research allows for variety of methods to recruit participants, collect data and utilize a plethora of methods of instrumentation (Bishop & Verleger, 2013).

### **3.2 Methods of Conducting Survey Research**

Survey research methods can be derived based on two critical factors: Survey research tool and time involved in conducting the research. These two categories are longitudinal and cross-sectional survey researches.

#### **3.2.1 Longitudinal Survey Research**

Longitudinal survey research involves conducting survey research over a continuum of time and spread across years and decades (Inokuchi et al., 2021) The data collected using this survey research method from one time period to another is qualitative or quantitative. Respondent behaviour, preferences, attitudes are continuously observed over time to analyze reasons for a change in behaviour or preferences. For example, suppose a researcher intends to learn about the eating habits of teenagers. In that case, he/she will follow a sample of teenagers over a considerable period to ensure that the collected information is reliable. Often, cross-sectional survey research follows a longitudinal study.



#### **3.2.2 Cross-Sectional Survey Research**

Researchers conduct a cross-sectional survey to collect insights from a target audience at a particular time interval. This survey research method is implemented in various sectors such as retail, education, healthcare, SME businesses, etc. Cross-sectional survey research can either be descriptive or analytical. It is quick and helps researchers collect data in a brief period. Cross-sectional survey research is a very reliable method in situations where descriptive analysis of a subject is necessary.(Fang et al., 2021) This research was based on cross sectional survey because of the setting and the participants involved made it the obvious choice.



### **3.3 Means Used in Conducting the Survey**

Even though there are several media through which a researcher can get responses from respondents in their study, the face-to-face approach was adopted. Researchers have rated this approach high because the response rate for this method is the highest, but it can be costly. It also takes less time to administer more questionnaires especially when you are dealing with structured questionnaire (Fang et al., 2021). This data collection and analysis are more convenient and extensive and therefore reliable. In this particular study, the questionnaires were administered within thirty minutes in each selected school. The school agreed to organize the participants at the assembly hall to respond to the questionnaires. It was so fast and convenient and reliable. This is because the participants responded to the questions independently and under tension free environment. The researcher adopted the design because the research focused particularly on Deaf community. Again, with help of the Likert Scale, it was possible to select a large sample for the study. The benefits of large sample in research is cannot be stretched enough (Weijters et al., 2021).

Research design is necessary because it makes possible the smooth sailing of the various research procedures, thereby creation research as professional as possible, yielding maximum information with a minimum expenditure of effort, time and money (Bickman et al., 2009; Myers et al., 2013). An explanatory study sets out to explain and account for the descriptive information. So, while descriptive studies may ask ‘what’ kinds of questions, explanatory studies seek to ask ‘why’ and ‘how’ questions (Smeyers, 2001). A descriptive research approach thus attempts to systematically describe attitudes towards an issue (Amadasun, 2015).

On the other hand, a correlation research approach attempts to discover or establish the existence of a relationship between two or more aspects of a situation (Creswell, 1994). Correlation analysis also facilitates determination of the relationships between the independent variables and their influence on the dependent variable (Arvapally et al., 2021). It builds on exploratory and descriptive research and goes on to identify actual reasons a phenomenon occurs. Explanatory research looks for causes and reasons and provides evidence to support or refute an explanation or prediction. It is conducted to discover and report some relationships among different aspects of the phenomenon under study. As in other areas of research, mixed method designs are viewed as preferable in implementation research because they provide a better understanding of research issues than either qualitative or quantitative approaches alone (Creswell, 1994).

In such designs, qualitative methods are used to explore and obtain depth of understanding as to the reasons for success or failure to implement evidence-based practice or to identify strategies for facilitating implementation while quantitative methods are used to test and confirm hypotheses based on an existing conceptual model and obtain breadth of understanding of predictors of successful implementation (Adamson, 2004). The study therefore is conducted in Asokore D/A Trinity JHS in Sekyere East District in the Ashanti region of Ghana. The research design adopted is both descriptive and explanatory. Descriptive survey research design was adopted in factors influencing the attitude of students towards the study of mathematics, perceptions of students about mathematics, and whether the teaching methods have impact on students' attitudes towards learning of mathematics because these objectives are descriptive in nature. The study adopted quantitative research design since a structured questionnaire was used in collecting data for the study.

### **3.4 Study Population**

A population is the entire set of individuals or other entities to which study findings are to be generalized (Creswell, 1994; Kothari, 2017) refers population to all items in any field of inquiry which is also known as the universe. A study population comprises of individuals, households, or organizations with similar characteristics about which a researcher wants to make inferences (Etikan & Bala, 2017). The population of this study comprised all the Junior High School in the Sekyere East District.

### **3.5 Sampling Technique**

According to (Kothari, 2017), sampling techniques can be divided into two: probability or representative sampling; non-probability sampling. Purposive sampling is confined to specific types of people or institutions who/which can provide the desired information, either because they are the only ones who have it or conform to some criteria set by the researcher (Delice, 2010). This involves identifying and selecting individuals or groups of individuals that are especially knowledgeable about or experienced with a phenomenon of interest (Etikan & Bala, 2017) The study therefore adopted both convenience and purposive sampling techniques in soliciting data for the study.

Firstly, the choice of the school was based on proximity to the researcher. More so, the school is one of the best performing schools in the district. It was therefore considered the best option for the study for convenience. On the selection of the participants, the researcher purposefully used all the students in the school even though participation was voluntarily. According to (Etikan et al., 2016) purposive sampling is whereby researchers use their own judgement in selecting participant for a

study. Apuke, 2017 and Etikan and Bala, (2017) explain that researchers use purposive sampling when they want to use individuals who meet specific criteria or condition or having specific expertise. The students were used because the purpose of the study was to find out the factors that affect students' mathematical interest.

### **3.6 Sampling Size**

(Kothari, 2017) defines a sample as a part of the total population. Kothari refers it to a collection of units chosen from the universe to represent it. (Kothari, 2017) suggests that a sample size of at least 30% is considered acceptable. A sample according to (Delice, 2010), is a subset of a target population, normally defined by the sampling process. The sample selected consisted of Form (1), Form two (2) and Form (3) Junior High School students in Asokore D/A Trinity JHS in the Sekyere East District. The total population of the school was 140 students, and 18 teachers, however one hundred and two (102) students were available for the study.

### **3.7 Ethical Consideration**

Even though there are numerous rules and principles of quantitative research designs that guarantee the credibility the research, issues of ethics still need to be considered. The issues (academic as well as research methods) are the requirements that need to be imposed in order to be able to undertake scientifically credible research. Quantitative methods are formalized principles that form the basis for a stringent research process that proceeds from formulation of research questions, research design and the selection and analysis of data to interpretations and conclusions (Zyphur & Pierides, 2017). In order to ensure that the study is credible and meets the internationally accepted principles, the following considerations bothering on ethics were observed;

### **3.7.1 Academic Values**

The researcher was guided by the fact that research is a search for knowledge and therefore the truth must prevail. As an academic pursuit the researcher made sure that the results of the research were not influenced by any previous knowledge experience or expectation. The social status, religious or political affiliation had no influence on the data collection and analysis.

### **3.7.2 Honesty**

As a matter of requirement, the researcher tried to remain fair and credible so that the outcome can be regarded as trustworthy. Some of the issues taken into consideration to ensure that the issue of honesty is achieved are;

- No copying or duplication of other people's work
- No fabrication or forgery of data
- Citing all the source used in the study

Right mechanism for data analysis to ensure that those results are not misleading

Made sure the relevant and acceptable research methods within the competence of the researcher are used.

### **3.7.3 Protection of Integrity**

In order to prevent unworthy conditions in the form of scientific misconduct, academic dishonesty among others, the following ethical norms were put in place; requirements for honesty, requirements for informed consent, anonymity and storage of data, the right of access to data for participants and duty of confidentiality for all those who undertake research.

### **3.7.4 Control and Ethical Competence**

In order to ensure the ethical competency, the searcher did not work alone. For instance, in respect of the preparation of the questionnaire experts were involved in addition to using credible published sources. The supervisor was also up to task in providing right assistance and supervision. To ensure the research conform to the standards the University of Education Winneba.

### **3.8 Data Source**

Primary data was collected using questionnaires which is a most commonly used method (Abbott & McKinney, 2013). A questionnaire is a technique of data collection in which each person is asked to respond to the same set of questions in a predetermined order (Burns et al., 2014; Chu & Ke, 2017). Questionnaires were used as they have an advantage of collecting data from large groups within a short time and less costs. Besides, questionnaires can provide time for respondents to think about responses and are easy to administer and score (Kothari, 2011). They also help to reduce the biases which might result from personal encounters and attitudes (Eduafio, 2014). Closed ended questions were used to elicit information based on the study variables. The questionnaires were self-designed in collaboration of the views of the study.

### **3.9 Data Collection Method**

According to (Chowdhury, 2015), data is anything given or admitted as a fact on which a research inference is based. Data collection instruments as the tools and procedures used in the measurement of variables in research. Data collection can be derived from a number of methods, which include interviews, focus groups, surveys,

telephone interviews, field notes, taped social interaction or questionnaires (Abbott & McKinney, 2013; Bloomfield & Fisher, 2019).

Data was collected using instruments appropriate for each category of data source. The data was collected by administering questionnaire to students i.e boys and girls. In administering the questionnaire, the respondents were assured that the information they provide was to be treated with utmost confidentiality and was to be used for the research purpose only. The researcher gave the questionnaire to the respondents in person. Clarifications were made where necessary. Sufficient time was allowed for them to respond to the items accurately. Data for the study was collected for a period of one month. Before the data collection for this study began, a formal letter was written to the headmaster of the school as an introduction letter by the Head of the Department of Mathematics Education from University of Education Winneba (UEW) this was requesting for a research permit. This permit request was availed formally to the Head of the school that had been selected for research. This also enabled the head of the school to give the researcher permission into their school and to have access to the students. The researcher spends about two hours in a school.

### **3.10 Data Reliability and Validity**

#### **3.10.1 Data Reliability**

Reliability is the extent to which the variables or set of variables is consistent in what is intended to measure. If multiple measurements are taken, the reliable measure will be consistent in their values. It differs from validity in that, it relates to not what should be measured, but instead, it relates to how it is measured (Brown, 2002). Further, (Gani et al., 2020) stated that, reliability refers to consistency; therefore it is associated with the strength of measuring instrument and, in specific, its ability to

produce consistent findings at different times and under different conditions. There is the need to conduct research which is very reliable. Hence reliability is the extent to which the method of gathering data will record consistent result and findings, while the same observation and conclusion drawn by different researchers or the extent to which logical conclusions and sense was derived from the raw data. Meanwhile, the internal consistency was measured by use of the Cronbach's alpha. This confirmed how items are related closely in terms of grouping. Research of this nature in social sciences with a coefficient of .70 or higher usually are considered to be acceptable. This study therefore will analyze and display its data reliability values and Cronbach's alpha values in chapter four after data collection.

### **3.10.2 Validity**

Content validity as per (Kothari, 2017) is the degree to which the measurement device, in this case, the measuring questions in the questionnaire, provides sufficient coverage of the research investigative questions. There are many approaches to achieve content validity. Construct validity is another test for questionnaire validity. According to (Saunders & Wong, 2020), construct validity refers to the extent to which the measuring questions actually measure the presence of those constructs that intended to be measured. Further, (Lin et al., 2013) stated that, construct validity is the representation of a confirmation of the hypothesized present of relationships between the measurement scale and conceptually distinct constructs, or representing the hypothesized missing of a relationship. There were several steps considered to ensure that the data together with the study is valid. First of all, the empirical literature which comprised of studies conducted by other researchers was used to develop the research instrument. Secondly, there was pilot testing of the research instrument which allows the researcher to make the necessary correction for the



adoption of the final questions. The corrected questionnaire generated were use in gathering data from the targeted population such as the (Junior High Schools within the Asokore Circuit in the Sekyere East District in Ashanti Religion of Ghana). Last but not the least, the researcher used 3 weeks in collecting the data and within the 3 weeks there no major changes with the topic.

### **3.11 Data Analysis**

The usefulness of the collated raw quantitative data appears only after data processing, analyzing, and converting it to information (Siegmund & Siedlecki, 2021). The purpose of analyzing the collected data is to test the hypothesis in order to answer the investigative research questions and objectives. In this research the descriptive statistical approach of the data analysis would be followed, because it is a common method for quantitative business and social research(Kothari, 2017). Data gathered has been put to serious break down as well as investigations which enables in creating suitable endorsements. The replies were implied into the Statistical Package for Social Sciences (SPSS) software for analysis resolution. Frequency distribution as well as tables was utilized to present the data. The first section presented the demographics of the respondents using frequencies and percentages. The second section presented analysis and discussions on factors influencing the attitude of students towards the study of mathematics in Asokore D/A Trinity JHS using means and standard deviation. The third section presented analysis and discussions on perceptions of students about mathematics using mean scores and standard deviations. The fourth section presented analysis and discussions effect of factors influencing the attitude of students towards the study of mathematics on students' performance towards by using regression analysis.

## CHAPTER FOUR

### RESULTS ANALYSIS AND DISCUSSION

#### 4.0 Overview

This chapter provides detailed analysis of the data obtained from the studies. The raw data from the field would not have made any meaning without it being analyzed and interpreted. This chapter therefore seeks to bring out the interpretation of the data analyzed. The analysis which was presented in tables has been outlined in order of the research questions starting with the analysis of the demographic data. The detailed analysis of the questionnaire can be found at Appendices A, B, C and D.

**Table 4.1: Demographic Details of Respondents**

Gender	Total number	Percentage
Male	57	55.9%
Female	45	44.1%
<b>Total</b>	<b>102</b>	<b>100%</b>

It was observed from table 4.1 above that out of the 102 respondents 57 were males representing 55.9% and 45 were females representing 44.1%. There was therefore a fair representation of females in the study.

**Table 4.2: Education Level of Responders**

Educational Level	Total number	Percentage
Junior High Form One	47	46.1
Junior High Form Two	30	29.4
Junior High Form Three	25	24.5
<b>Total</b>	<b>102</b>	<b>100%</b>

Table 4.2 above provides the distribution of the respondents' level of education. All the 102 respondents were students at the Junior High School; of which 47 were in JHS 1 representing 46.1%, 30 were in JHS 2 representing 29.4% and 25 were in JHS 3 representing 24.5%.

#### 4.3 Research question one: What are the factors influencing the attitude of students' attitude towards the study of mathematics in Asokore D/A Trinity JHS in Sekyere East District?

In order to identify the factors that influence student's performance in mathematics, part B of the question presents series questions to elicit responses from the students.

The summary of the responses are presented in Table 4.2 below

**Table 4.3: Factors Influencing the Learning of Mathematics**

Factors	Strongly Disagree N(%)	Disagree N(%)	Neutral N(%)	Agree N(%)	Strongly Agree N(%)	Total N(100)
There is enough TLMS teachers make use of various TLMS	17(16.6)	10(9.8)	10(9.8)	46(45.1)	19(18.6)	102(100)
teachers apply ICT in the teaching of mathematics	1(1)	5(4.9)	7(6.9)	46(45.1)	43(42.2)	102(100)
the use of the TLMS make learning a fun	4(3.9)	6(5.9)	22(21.6)	40(31.2)	30(29.4)	102(100)
Mathematics textbooks available	5(4.9)	10(9.8)	11(10.8)	49(48)	27(25.5)	102(100)
I have positive attitude towards the study of math	3(2.9)	5(4.9)	17(16.7)	41(40.2)	36(35.3)	102(100)
I engage in self-regulated learning strategies of the subject	25(24.5)	32(31.4)	14(13.7)	24(23.5)	7(6.9)	102(100)
teacher gives me extra attention when I don't understand certain concepts	3(2.9)	5(4.9)	26(25.5)	47(46.1)	21(20.6)	102(100)
Lack of aptitude and poor interest in the subject equally influence attitude in studying mathematics	4(3.9)	15(14.7)	16(15.7)	42(41.2)	25(24.5)	102(100)
teachers' teaching strategies help me to understand the subject	8(7.8)	12(11.8)	7(6.9)	51(50)	24(23.5)	102(100)
I developed interest in mathematics	4(3.9)	5(4.9)	15(14.7)	40(39.2)	38(37.3)	102(100)
	1(1)	6(5.9)	7(6.9)	40(39.2)	48(47.1)	102(100)

because of my teacher's teaching skills						
conditions at home influence the learning of mathematics	1(1)	9(8.8)	10(9.8)	50(49)	32(31.4)	102(100)
parents give me enough time to learn at home	18(17.6)	25(24.5)	10(9.8)	29(28.4)	20(19.6)	102(100)
parents encourage me to learn	28(27.5)	18(17.6)	13(12.7)	25(24.5)	18(17.6)	102(100)
parent provide me with the things I need	26 (25.5)	34(33.3)	21(20.6)	16(15.7)	5(4.9)	102(100)

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***There are enough teaching and learning resources:*** This question sought to find out if teaching and learning resources are available in the school. It is obvious from the responses that there is enough teaching and learning resources since 70% of the respondents agree to the statement. Only 27 of the 102 respondents disagree and 10 could not decide.

***Teachers' use of Teaching and Learning materials when teaching mathematics:*** This statement was also to find out if the Teachers use Teaching and Learning materials when teaching mathematics. Most of the respondents, thus, over 80% that is 89 out of the 102 respondents agree that the teachers use Teaching and Learning materials when teaching mathematics. Interestingly, only 6 respondents disagree and 7 could not decide.

***Information communication technologies (ICT) based materials largely influence the study of subjects in school:*** It is clear from the responses that teachers make use of ICT in their teaching and this to some extent influence the learning of the subject. This is because almost 60% of the respondents agree with only 10% of the respondents disagreeing but the rest remain neutral.

***The use of the teaching and learning materials makes mathematics learning enjoyable:*** On the issue of whether the use of the teaching and learning materials makes mathematics learning enjoyable, the response indicate about 70% of the respondents agree. Only 15 out of the 102 respondents do not enjoy mathematics when the teaching and learning materials are used.

***Textbook on mathematics are available and accessible:*** About 77% of the respondents agree that textbooks on mathematics are available and assessable in the school. Only 3 of the 102 respondents disagree while 17 of the respondents remain neutral. Since the majority agreed, it is considered to be available and assessable.

***I have positive attitudes towards the study of mathematics:*** On the issue of respondents' attitudes towards the study of mathematics, majority of the respondents Agreed or Strongly Agreed, 52.9% and 24.5% respectively to having a positive attitude towards the study of mathematics. However, 14.7% remained neutral and a total of 7.9% Disagreed to having a positive attitude towards the study of mathematics. This represents 8 out of the 102 respondents.

***I engage in self-regulated learning strategies of the subject:*** A total of 66.7% of respondents Agreed to (Agreed and Strongly Agreed) usually engaging in self-regulated learning strategies of Mathematics. Whiles 25.5% remained Neutral, 4.9% and 2.9% of respondents Disagreed and Strongly Disagreed respectively.

***Conditions at home influence the learning of mathematics:*** This questionnaire item presents data on conditions at respondents' home as an influence the learning of mathematics. Responses summarized on the table indicate that 18.6%, Disagree that conditions at home influence the learning of mathematics. Moreover, 15.7% were

Neutral to the question and majority of them, 65.7% Agree to this questionnaire item. This means that conditions at home influence the learning of mathematics.

***Lack of aptitude and poor interest for the subject equally influence attitude in studying mathematics:*** It has been established that 77.4% of respondents have positive attitudes towards the study of mathematics and 75.5% also Agree that some students have negative attitude towards learning mathematics. This questionnaire item; Lack of aptitude and poor interest for the subject equally influence attitude in studying mathematics, reveals that 73.5% Agrees and 19.6% Disagree. This affirms that students who lack aptitude or have poor interest influence their attitude towards the study of Mathematics. However, only 6.9% thus seven of the respondents were Neutral.

***Students' bad habits and poor study skills influence their attitude towards the study of mathematics:*** it can be inferred the analysis that Students' bad habits and poor study skills influence their attitude towards the study of mathematics since majority of respondents (62 out of 102) Agree to this questionnaire item. Although 17 respondents were Neutral and 23 Disagreed, it does not affect the outcome since they fell below average.

Teachers teaching strategies significantly influenced students' academic performance in Mathematics: On the issue of Teachers teaching strategies, whether it significantly influenced students' academic performance in Mathematics, 78 respondents out of the total representing 76.5% were in Agreement to this questionnaire item. This implies that Teachers teaching strategies play a vital role in students' performance in Mathematics. Only 9 respondents disagree though whiles 15 were undecided.

***I like mathematics because of the way my teachers handle the subject:*** The table indicates that 6.9% of respondents Disagree that they like mathematics because of the way their teachers handle the subject and 6.9% also could not Agree or Disagree either. On the other hand, the remaining 86.3% agree strongly that they like mathematics because of the way their teachers handle the subject.

***I enjoy the teaching of mathematics because of our qualified teachers:*** Qualified Mathematics teachers are indeed an asset to students. The data displayed on the table indicates that 82 out of the 102 respondents enjoy the teaching of mathematics because of their qualified teachers. Nonetheless, 10 respondents remained Neutral and only 10 Disagreed to this questionnaire item.

***The way the teacher presents the lesson and involvement of the students in the lesson strongly affects the students:*** It had been ascertained that 80.4% of respondents enjoyed the teaching of mathematics because of qualified teachers. This follow-up questionnaire item; the way the teacher presents the lesson and involvement of the students in the lesson strongly affects the students which in effect determines teachers' competencies also recorded 82 Agrees out of the 102 responses. An 80.4% majority suggests that the way the teacher presents the lesson and involvement of the students in the lesson strongly affects the students. On the contrary, 12.8% Disagree and 6.9% were Neutral.

***Enough time for study at home:*** As a follow-up to fully ascertain if conditions at home influence the learning of mathematics, this questionnaire item; enough time for study at home was posed. Whiles 65.7 respondents agreed in one way or the other that conditions at home influence the learning of mathematics, 52.0% majority reliably responded in Strong Agreement that they have enough time to study at home.



Moreover, 26.5% also agreed with only 15.7% remaining Neutral. However, 5.8% disagreed that they have enough time for study at home.

#### 4.4 Research question two: What are the perceptions of students about mathematics in Asokore D/A Trinity JHS in Sekyere East District?

Table 4.3 below presents the summary of the responses from the students on how they perceive mathematics.

**Table 4.4: Perception of Students About Mathematics**

Perception	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
	N(%)	N(%)	N(%)	N(%)	N(%)	N(100)
My teacher teach according to the syllabus	3(2.9)	8(7.8)	15(14.7)	56(54.9)	20(19.6)	102(100)
Enough time to learning mathematics	2(2)	11(10.8)	7(6.9)	47(46.1)	35(34.3)	102(100)
Math is for those who are good	13(12.7)	14(13.7)	16(15.7)	32(31.2)	17(16.7)	102(100)
Math is only useful in the classroom	6(5.9)	6(5.9)	17(16.7)	28(27.5)	45(44.1)	102(100)
Mathematics is boring	3(2.9)	3(2.9)	16(15.7)	27(26.5)	53(52)	102(100)
Math is needed to study other subjects	1(1)	2(2)	24(23.5)	30(29.4)	45(44.1)	102(100)
Mathematics makes me nervous	0(0)	7(6.9)	17(16.7)	24(23.5)	54(52.9)	102(100)
There is math at the work place	11(10.8)	8(7.8)	11(10.8)	43(42.2)	29(28.4)	102(100)

**Teacher Teaches According to the Syllabus:** The table presents a strong conviction that Teachers teach according to the syllabus as 74.5% of the respondents Agree to this against the 10.7% who disagree. Although 14.7% remained Neutral, majority of the respondents responded to Agree (54.9%) and Strongly Agree (19.6%).



***The time allocated for mathematics is enough:*** This questionnaire item seeks to find out if there is enough time allotted for Mathematics. While 13 respondents responded that there is enough time, 7 of them could not decide. However, majority of the respondents (82 out of 120) Agreed that the time allocated for mathematics is not enough although the teachers teach according to syllabus as indicated by 76 of the respondents.

***Mathematics for those who are good:*** On the issue of whether Mathematics is for those who are good academically, the table presents that 26.4% Disagree. 15.7% are Neutral and majority of the respondents, 57.9%, Agree that Mathematics is for those who are good academically. ***Mathematics is used in our daily activities:*** This item (mathematics is used in our daily activities) finds out if there is a link between what is learnt in school and the activities we partake daily. Whiles 28.5% Agree that mathematics is used in their daily activities, 21.6% could not decide hence remained Neutral. Majority of the respondents (50.0%) rather disagreed to mean that mathematics is not used in their daily activities.

***Mathematics is only useful in the classroom:*** Whiles majority of respondents Disagree that mathematics is not used in our daily activities, responses to mathematics is only useful in the classroom recorded 73 out of 102 Agree responses. Only 12 out of the total respondents Disagreed and 17 could not make a conclusive choice as shown on the table. It can be adjudged that respondents think mathematics is only useful in the classroom and not in their daily activities.

***Mathematics is Boring:*** This questionnaire item that sought to find out if mathematics is for those who are good academically, 57.9%, Agree that Mathematics is for those who are good academically. This means that to these respondents,

Mathematics may just be a boring subject as majority of the respondents had also indicated strongly that mathematics is only useful in the classroom and not in their daily activities. From the table, only six respondents chose to Disagree that Mathematics is boring. Out of 102 respondents, 80 strongly agreed that mathematics is boring to reaffirm that mathematics is only useful in the classroom and not in their daily activities. However, sixteen of the respondents were neutral to this questionnaire item.

***Mathematics is Needed to Study Other Subjects:*** This questionnaire item seeks to find out if there is a link between what is learnt in mathematics and other subjects to aid transfer of learning. However, 3.0% of respondents disagreed that mathematics is not needed to study other subjects and 23.5% were undecided. This is an indication that what is learnt in mathematics can be transferred to the subjects to aid understanding. On the contrary, 73.5% representing the majority thinks that mathematics is not needed to study other subjects.

Mathematics makes me nervous: From the table, it can be observed that 76.4% majority finds mathematics as a nervous subject or it makes them nervous. As established from the preceding questionnaire items, majority of respondents agree that Mathematics is boring, only useful in the classroom and not in their life activities; it is not also needed to study other subject. Since respondents (57.9%) affirmed that mathematics is for those who are good, it makes those who are weak academically nervous. This stems from the fact that only 6.9% of respondents disagree that mathematics makes them nervous while 16.7 could not determine their stance.

***There is mathematics at the work place:*** The data presented on the table stipulates that 72 out of the 102 respondents agree that mathematics at the work place. This deepens their conviction that Mathematics is not only useful in the classroom. Nonetheless, 19 respondents disagree that there is no mathematics at the work place as 51 respondents revealed that mathematics is used in their daily activities by Disagreeing to the questionnaire item; mathematics is not used in our daily activities. Out of the 102 respondents also, 11 of them were neutral to this questionnaire item.

#### 4.5 Research Question Three

***What is the effect of factors influencing students' attitude towards the study of mathematics on student's mathematics performance in Asokore D/A Trinity JHS in Sekyere East District?***

The part D and the final part of the questionnaire sought to find out how the factors that influence students' attitude towards the study of mathematics affect their performance. The summary of the responses has been presented in table 4.4 below.

**Table 4.5: The Effects of Factors Influencing Students' Attitude Towards the Study of Mathematics on Student's Mathematics Performance**

Effects of factors	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
	N(%)	N(%)	N(%)	N(%)	N(%)	N(100)
Mathematics is my favorite subjects	31(30.4)	31(30.4)	5(4.9)	18(17.6)	17(16.7)	102(100)
I perform very well in mathematics	20(18.9)	45(44.1)	6(5.9)	20(19.6)	11(10.8)	102(100)
I think that mathematics is one of the most important subjects to study	32(31.4)	34(33.3)	6(5.9)	11(10.8)	19(18.6)	102(100)
I have a lot of self-confidence when it comes to mathematics learning	29(28.4)	29(28.4)	6(5.9)	23(22.5)	15(14.7)	102(100)
I like to solve	32(31.4)	33(32.4)	2(2)	24(23.8)	11(10.8)	102(100)

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mathematics problems						
I look forward to mathematics lessons	21(20.6)	25(24.5)	13(12.7)	24(23.5)	19(18.6)	102(100)
I feel a sense of insecurity when attempting math	13(12.7)	11(10.8)	9(8.8)	37(36.3)	32(31.4)	102(100)

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***Mathematics is my favorite subject:*** From the table, there is a strong indication that Mathematics is a least favorite subject of respondents. It is observed that 60.8% majority of the respondents Disagreed that Mathematics is their favorite subject. Whiles only 4.9% remained Neutral, 34.3% agreed that Mathematics is their favorite subject. An earlier response indicates that Mathematics is for those who are good academically hence responses from this questionnaire item further consolidate that assertion.

***I perform very well in mathematics:*** In ascertaining the Mathematical prowess of respondents, the questionnaire item “I perform very well in mathematics” was introduced. However, the table presents that only 30.4% minority Agree they perform very well in Mathematics. The majority of respondents, totaling 63.7% disagree to the “I perform very well in mathematics” item, and 5.9% were neutral.

***I have a lot of self-confidence when it comes to mathematics learning:*** When asked “I have a lot of self-confidence when it comes to mathematics learning”, majority of the respondents (58 out of 102) strongly Disagreed. However 38 of the respondents boldly confessed to having a lot of self-confidence when it comes to mathematics learning. Meanwhile, 6 respondents had a divided opinion so they chose to be neutral.

***I like to solve mathematics problems:*** Inferences drawn from the table indicates that respondents do not like solving mathematical problems. This might be as result of lack of self-confidence, inability to translate mathematical lessons to real life lessons

or the nervousness they derive from mathematics. Majority of the respondents (85.3%) Disagreed to the questionnaire item “I like to solve mathematics problems” to register their strong dissatisfaction in Mathematics. Only 11.8% agreed that they solve mathematics problems.

***I look forward to mathematics lessons:*** The responses from the questionnaire brought to light that 59.8% of respondents are always under a terrible Strain in mathematics class. It implies that such respondents do not look forward to another mathematics lesson. It is evident from the table that majority of the respondents 45.1% Disagree to looking forward to mathematics lessons. However, 12.7% of these respondents were neutral to this item and 42.1% showed a strong conviction that they agree to the questionnaire item.

***My mind goes blank and I am unable to think when working mathematics:*** As a follow-up to “my mind goes blank and I am unable to think clearly while doing a math test” of which 51 of the respondents agreed, this item (My mind goes blank and I am unable to think when working mathematics) also recorded 72 Agrees, 23 Disagree and 7 Neutral. This means that majority of the respondents do not feel easy when working mathematics as 85.3% had disclosed that they don’t like solving mathematical problems.

Do not know the usefulness of the subject as 64.7% Disagree that Mathematics is one of the most important subjects.

#### 4.6 Discussion

**Research Question One: *What are the factors influencing the attitude of students' attitude towards the study of mathematics in Asokore D/A Trinity JHS in Sekyere East District?***

The results from the analysis show that the school and for that matter the teachers are doing their best. There seem to be no issues with the availability of Textbooks and teaching and learning resources, teachers do their best in containing the students during lessons. However, most of the students do not seem to like mathematics in the school. This may be clear case of other issue rather than the factors observed, as(Cai& Wang, 2010; Joseph, 2013)revealed that students mathematics achievement is not limited to factors pertaining to the school.

**Research Question Two: *What are the perceptions of students about mathematics in Asokore D/A Trinity JHS in Sekyere East District?***

Students' interest in the mathematics is not activated and that has made them develop a bad perception about the subject. As a result of this, most of the students turn to perform poorly in the subject, this in a way confirm the work of (Arthur et al., 2017) which observed that students' performance is a function of interest and perception.

**Research Question Three: *What is the effect of factors influencing students' attitude towards the study of mathematics on student's mathematics performance in Asokore D/A Trinity JHS in Sekyere East District?***

There was a manifestation that, some parents do not support their wards and this as has dire consequences on students' performance as has been justified by researchers (Baba et al., 2018; Boaler et al., 2016; Butakor, 2021; Zaharin et al., 2018)

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.0 Overview

This is the fifth and final chapter of the thesis and it considers the summary, conclusion and the recommendations of the study.

#### 5.1 Summary

The purpose of the study was to investigate the factors influencing the attitude of students towards the study of mathematics in selected Junior High School in the Sekyere East District of the Ashanti Region of Ghana. This was because of the continuous poor performance of the Junior High schools in the district so far as the BECE is concern. The objectives set to guide the study were; to assess the factors influencing the attitude of student towards the study of mathematics, to determine the perceptions of students about the study of mathematics and to assess the effect of factors influencing students' attitude towards the study of mathematics on student's mathematics performance of the Junior High Schools in Sekyere East District.

The study was based on the ABC Attitude Model is also called a Tripartite Model. The ABC Model of Attitude is based on a Hierarchical Model described in Ajzen, who conceptualizes an attitude as an amalgam of three separate measurable components: affect (A), behavior (B) and cognition (C). Affect is the emotional component consisting of feelings and emotions that are associated with an attitude object (in our study mathematics). The theory believes that a particular attitude may consist a positive emotion that is, feeling happy in a mathematics classroom (affect), intend to learn more mathematics (behavior) and belief that mathematics is easy to learn (cognition). Consequently, the study looked at some scholarly works that are

related to so as to obtain enough information and knowledge about the condition at hand.

Since the purpose of every research is to find answers to the research questions, steps were taken to recruit 102 respondents (students) at the *Asokore D/A Trinity JHS in Sekyere East District* for the study. Questionnaire was the tool for data collection and the data obtained was inputted into the SPSS Software which was analyzed using frequencies. The summary of the findings is presented below in order of the research questions.

## **5.2 Findings**

The main motive of a research work is to find answers to the research questions. This study had three research questions which guided the study. The findings in respect of the research questions are as follows;

### **Research Question One: *What are the factors influencing the attitude of students' attitude towards the study of mathematics in Asokore D/A Trinity JHS in Sekyere East District?***

The outcome of the analysis demonstrates clearly that there are some factors that influence students' attitude towards mathematics learning, out of 102 respondents 54 of them which represent 52.9% do not have positive attitude towards the study of the subject. While some of the factors have positive influence on students' attitude, others have negative influence. Among the positive ones are; availability and usage of teaching and learning resources, teachers' instructional strategies, students' self-determination and parents encouragements. Among the other factors that influence students attitude negatively are; parents inability to provide students with basic need, parents not having time to supervisor their wards learning and not allocating time for the student to do their studies home.



**Research Question Two: *What are the perceptions of students about mathematics in Asokore D/A Trinity JHS in Sekyere East District?***

The analysis shows that students have varied perceptions about mathematics. Even though some of the students have good perception about mathematics, out of 102 respondents, 80 of them have no interest in the subject which represents 78.4% and because of that they do not see the need and application of mathematics in real life apart from the classroom.

**Research Question Three: *What is the effect of factors influencing students' attitude towards the study of mathematics on student's mathematics performance in Asokore D/A Trinity JHS in Sekyere East District?***

The analysis of the questionnaires indicates that out of 102 respondent 65 of them do not perform well in mathematics which represents 63.7%. They think mathematics is boring and it has no practical application, neither does it have any relevance at the workplace. These perceptions, coupled with other negative factors mentioned above, have compounded to worsen the students' performance in mathematics.

### **5.3 Conclusion**

A critical look at the analysis of the results reveals that the inability of the students at Asokore D/A Trinity JHS in Sekyere East District to perform well in mathematics is predominantly; as a result of the fact that, most of them do not see mathematics as an essential component of daily life activities and therefore do not approach the learning of the subject with any seriousness. This negative attitude has been fuelled by the fact that some of them see mathematics as boring and non-rewarding.

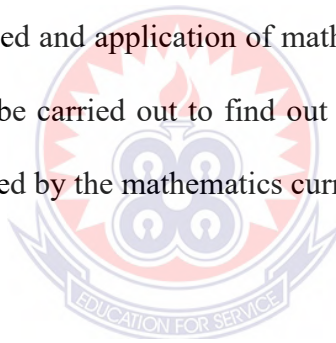
#### **5.4 Recommendations**

Based on the findings, the study recommends the following;

1. Teachers must ensure that their lessons are linked to real life activities
2. Teachers must provide opportunity for all learners to learn by practicing.
3. The Headmaster must ensure that the mathematics teachers are equipped modern pedagogical skills through in-service training.
4. Parents must be sensitized during PTA meetings on the need to encourage their wards to learn at home as well as providing their basic needs.

#### **5.5 Suggestions for Further Studies**

Even though most students agree that the teaching methods are okay, most of the students do not see the need and application of mathematics in real life. As a result of this further studies must be carried out to find out if the teachers are using the right methodology recommended by the mathematics curriculum to teach.



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## APPENDIX

### SURVEY QUESTIONNAIRE

#### UNIVERSITY OF EDUCATION, WINNEBA

The aim of this questionnaire is to investigating *the Factors Influencing the Attitude of Student towards the study of Mathematics in Asokore D/A Trinity JHS in the Sekyere East District Ashanti Region*. This questionnaire is for academic purposes only and any information gathered will remain confidential. Where alternatives have been provided in this questionnaire, please tick the appropriate response. For any other question write your answer in the space provided. Your participation and cooperation in this study is highly appreciated and valued.

#### SECTION A: DEMOGRAPHICS (*Only tick one option under each question*)

**1. What is your gender?**

- a. Male
- b. Female

**2. What is your level of Education?**

- 2.9 JHS ONE
- 2.10 JHS TWO
- 2.11 JHS THREE

#### SECTION B: *FACTORS INFLUENCING THE ATTITUDE OF STUDENTS TOWARDS THE STUDY OF MATHEMATICS*

With regard to factors influencing the attitude of students towards the study of mathematics **please tick** the appropriate number to indicate the extent to which you agree or disagree with each statement. The item scales are five-point Likert type scales with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

Items	Statements	1	2	3	4	5
	<i>Factors Influencing the Attitude of Students towards the Study of Mathematics</i>					
<b>RRF</b>	<b><i>Resources Related Factors</i></b>					
RRF1	There is enough teaching and learning materials					
RRF2	Teachers make use of various TLMs					
RRF3	Teachers apply ICT in the teaching of mathematics					
RRF4	The use of the TLMs make a learning a fun					
RR5	Mathematics textbooks available					
<b>SRF</b>	<b><i>Students Related Factors</i></b>					
SRF1	I usually engage in self-regulated learning strategies of the					

	subject					
<i>SRF2</i>	Students' ability and background largely influence their interest in the study of mathematics					
<b><i>TRF</i></b>	<b><i>Teacher Related Factors</i></b>					
<i>TRF1</i>	Teaching experience significantly influenced students' academic performance in Mathematics					
<i>TRF2</i>	I enjoy and develop interest in mathematics because of the experience mathematical teachers in our school					
<i>TRF3</i>	I enjoy the teaching of mathematics because of our qualified teachers					
<i>TRF4</i>	The attitude of teachers usually influences the interest of student towards the study of mathematics					
<i>TRF5</i>	High rate of teacher absenteeism and transfers influence students' performance in mathematics					
<b><i>TM</i></b>	<b><i>Teaching Methods</i></b>					
<i>TM1</i>	The method teachers use to teach has affected how students understand Mathematics in class					
<i>TM2</i>	I developed interest in mathematics because of my teachers teaching skills					
<i>TM3</i>	Teachers gives me extra attention when I don't understand certain concept					
<i>TM4</i>	Teachers teaching strategies help me to understand the subject					
<b><i>HE</i></b>	<b><i>Home Environment</i></b>					
<i>HE1</i>	Conditions at home influence the learning of mathematics					
<i>HE2</i>	We have enough time at home to effectively practice the mathematics					
<i>HE3</i>	Parents encourage me to learn					
<i>HE4</i>	Parents give me enough time to learn					

**SECTION C: PERCEPTIONS OF STUDENTS ABOUT STUDY OF  
MATHEMATICS**

With regard to *perceptions* of students about study of mathematics please tick the appropriate number to indicate the extent to which you agree or disagree with each statement. The item scales are five-point Likert type scales with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

Items	Statements	1	2	3	4	5
<b>PSM</b>	<b><i>Perceptions of Students about study of Mathematics</i></b>					
<i>PSM1</i>	My teacher teach according to the syllabus					
<i>PSM2</i>	Enough time to learn mathematics					
<i>PSM3</i>	Mathematics is for those who are good					
<i>PSM4</i>	Mathematics is only useful in the classroom					
<i>PSM5</i>	Mathematics is boring					
<i>PSM6</i>	Mathematics is needed to study other subjects					
<i>PSM7</i>	Mathematics makes me nervous					
<i>PSM8</i>	There is mathematics at the work place					

**SECTION D: STUDENTS' ATTITUDE TOWARDS MATHEMATICS**

With regard to *students' attitude towards mathematics* please tick the appropriate number to indicate the extent to which you agree or disagree with each statement. The item scales are five-point Likert type scales with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

Items	Statements	1	2	3	4	5
<b>SALM</b>	<b><i>Students' Attitude towards Learning Mathematics</i></b>					
<i>SALM1</i>	Mathematics is my favorite subjects					
<i>SALM2</i>	I look forward to mathematics mathematics lessons					
<i>SALM3</i>	I am always under a terrible strain in mathematics class					
<i>SALM4</i>	I like to solve mathematics problems					
<i>SALM5</i>	I think have a lot of self-confidence when it comes to mathematics learning					
<i>SALM6</i>	Mathematics is always difficult for me to understand					
<i>SALM6</i>	I feel a sense of insecurity when attempting mathematics					

***Thank You for Participating***

## APPENDIX A

### BIOGRAPHIC DETAILS OF THE RESPONDENTS

<b>Gender of respondents</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	57	55.9	55.9	55.9
	Female	45	44.1	44.1	100.0
	Total	102	100.0	100.0	

<b>level of Education</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Form One	47	46.1	46.1	46.1
	Form Two	30	29.4	29.4	75.5
	Form Three	25	24.5	24.5	100.0
	Total	102	100.0	100.0	

<b>Respondents position in the school</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	102	100.0	100.0	100.0

## APPENDIX B

### Detailed analysis of the **Factors influencing the learning of mathematics**

<b>teaching and learning resources are available</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	17	16.7	16.7	16.7
	Disagree	10	9.8	9.8	26.5
	Neutral	10	9.8	9.8	36.3
	Agree	46	45.1	45.1	81.4
	Strongly Agree	19	18.6	18.6	100.0
	Total	102	100.0	100.0	

<b>Teachers use Teaching and Learning materials when teaching mathematics</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.0	1.0	1.0
	Disagree	5	4.9	4.9	5.9
	Neutral	7	6.9	6.9	12.7
	Agree	46	45.1	45.1	57.8
	Strongly Agree	43	42.2	42.2	100.0
	Total	102	100.0	100.0	

<b>Information communication technologies (ICT) based materials largely influence the study of subjects in school</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	3.9	3.9	3.9
	Disagree	6	5.9	5.9	9.8
	Neutral	22	21.6	21.6	31.4
	Agree	40	39.2	39.2	70.6
	Strongly Agree	30	29.4	29.4	100.0
	Total	102	100.0	100.0	

<b>The use of the teaching and learning materials makes mathematics learning enjoyable</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	4.9	4.9	4.9
	Disagree	10	9.8	9.8	14.7
	Neutral	11	10.8	10.8	25.5
	Agree	49	48.0	48.0	73.5
	Strongly Agree	27	26.5	26.5	100.0

	Total	102	100.0	100.0	
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<b>There is availability and accessibility of text books on mathematics</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	2.9	2.9	2.9
	Disagree	5	4.9	4.9	7.8
	Neutral	17	16.7	16.7	24.5
	Agree	41	40.2	40.2	64.7
	Strongly Agree	36	35.3	35.3	100.0
	Total	102	100.0	100.0	

<b>I have positive attitudes towards the study of mathematics</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.0	2.0	2.0
	Disagree	6	5.9	5.9	7.8
	Neutral	15	14.7	14.7	22.5
	Agree	54	52.9	52.9	75.5
	Strongly Agree	25	24.5	24.5	100.0
	Total	102	100.0	100.0	

<b>I usually engage in self-regulated learning strategies of the subject</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	2.9	2.9	2.9
	Disagree	5	4.9	4.9	7.8
	Neutral	26	25.5	25.5	33.3
	Agree	47	46.1	46.1	79.4
	Strongly Agree	21	20.6	20.6	100.0
	Total	102	100.0	100.0	

<b>Some students have negative attitude towards learning mathematics</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7	6.9	6.9	6.9
	Disagree	9	8.8	8.8	15.7
	Neutral	9	8.8	8.8	24.5
	Agree	47	46.1	46.1	70.6
	Strongly Agree	30	29.4	29.4	100.0
	Total	102	100.0	100.0	



<b>Conditions at home influence the learning of mathematics</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	3.9	3.9	3.9
	Disagree	15	14.7	14.7	18.6
	Neutral	16	15.7	15.7	34.3
	Agree	42	41.2	41.2	75.5
	Strongly Agree	25	24.5	24.5	100.0
	Total	102	100.0	100.0	

<b>Lack of aptitude and poor interest for the subject equally influence attitude in studying mathematics</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	7.8	7.8	7.8
	Disagree	12	11.8	11.8	19.6
	Neutral	7	6.9	6.9	26.5
	Agree	51	50.0	50.0	76.5
	Strongly Agree	24	23.5	23.5	100.0
	Total	102	100.0	100.0	

<b>Students' bad habits and poor study skills influence their attitude towards the study of mathematics</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7	6.9	6.9	6.9
	Disagree	16	15.7	15.7	22.5
	Neutral	17	16.7	16.7	39.2
	Agree	38	37.3	37.3	76.5
	Strongly Agree	24	23.5	23.5	100.0
	Total	102	100.0	100.0	

<b>teachers teaching strategies significantly influenced students' academic performance in Mathematics</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	3.9	3.9	3.9
	Disagree	5	4.9	4.9	8.8
	Neutral	15	14.7	14.7	23.5
	Agree	40	39.2	39.2	62.7
	Strongly Agree	38	37.3	37.3	100.0
	Total	102	100.0	100.0	

<b>I like mathematics because of the way my teachers handles the subject</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.0	1.0	1.0
	Disagree	6	5.9	5.9	6.9
	Neutral	7	6.9	6.9	13.7
	Agree	40	39.2	39.2	52.9
	Strongly Agree	48	47.1	47.1	100.0
	Total	102	100.0	100.0	
<b>I enjoy the teaching of mathematics because of our qualified teachers</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.0	1.0	1.0
	Disagree	9	8.8	8.8	9.8
	Neutral	10	9.8	9.8	19.6
	Agree	50	49.0	49.0	68.6
	Strongly Agree	32	31.4	31.4	100.0
	Total	102	100.0	100.0	

<b>The way the teacher presents the lesson and involvement of the students in the lesson strongly affects the students.</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.0	2.0	2.0
	Disagree	11	10.8	10.8	12.7
	Neutral	7	6.9	6.9	19.6
	Agree	47	46.1	46.1	65.7
	Strongly Agree	35	34.3	34.3	100.0
	Total	102	100.0	100.0	

<b>Enough time for study at home</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	2.9	2.9	2.9
	Disagree	3	2.9	2.9	5.9
	Neutral	16	15.7	15.7	21.6
	Agree	27	26.5	26.5	48.0
	Strongly Agree	53	52.0	52.0	100.0
	Total	102	100.0	100.0	

**APPENDIX C****DETAILED ANALYSIS OF THE PERCEPTION OF STUDENTS ABOUT MATHEMATICS**

<b>MY TEACHER TEACHES ACCORDING TO THE SYLLABUS</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	2.9	2.9	2.9
	Disagree	8	7.8	7.8	10.8
	Neutral	15	14.7	14.7	25.5
	Agree	56	54.9	54.9	80.4
	Strongly Agree	20	19.6	19.6	100.0
	Total	102	100.0	100.0	

<b>THE TIME ALLOCATED FOR MATHEMATICS IS NOT ENOUGH</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.0	2.0	2.0
	Disagree	11	10.8	10.8	12.7
	Neutral	7	6.9	6.9	19.6
	Agree	47	46.1	46.1	65.7
	Strongly Agree	35	34.3	34.3	100.0
	Total	102	100.0	100.0	

<b>MATHEMATICS FOR THOSE WHO ARE GOOD</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	13	12.7	12.7	12.7
	Disagree	14	13.7	13.7	26.5
	Neutral	16	15.7	15.7	42.2
	Agree	42	41.2	41.2	83.3
	Strongly Agree	17	16.7	16.7	100.0
	Total	102	100.0	100.0	

<b>MATHEMATICS IS NOT USED IN OUR DAILY ACTIVITIES</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	12	11.8	11.8	11.8
	Disagree	39	38.2	38.2	50.0
	Neutral	22	21.6	21.6	71.6
	Agree	17	16.7	16.7	88.2
	Strongly Agree	12	11.8	11.8	100.0
	Total	102	100.0	100.0	

<b>MATHEMATICS IS ONLY USEFUL IN THE CLASSROOM</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	5.9	5.9	5.9
	Disagree	6	5.9	5.9	11.8
	Neutral	17	16.7	16.7	28.4
	Agree	28	27.5	27.5	55.9
	Strongly Agree	45	44.1	44.1	100.0
	Total	102	100.0	100.0	

<b>MATHEMATICS IS BORING</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	2.9	2.9	2.9
	Disagree	3	2.9	2.9	5.9
	Neutral	16	15.7	15.7	21.6
	Agree	27	26.5	26.5	48.0
	Strongly Agree	53	52.0	52.0	100.0
	Total	102	100.0	100.0	

<b>MATHEMATICS IS NOT NEEDED TO STUDY OTHER SUBJECTS</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.0	1.0	1.0
	Disagree	2	2.0	2.0	2.9
	Neutral	24	23.5	23.5	26.5
	Agree	30	29.4	29.4	55.9
	Strongly Agree	45	44.1	44.1	100.0
	Total	102	100.0	100.0	

<b>MATHEMATICS MAKES ME NERVOUS</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	7	6.9	6.9	6.9
	Neutral	17	16.7	16.7	23.5
	Agree	24	23.5	23.5	47.1
	Strongly Agree	54	52.9	52.9	100.0
	Total	102	100.0	100.0	

<b>I WISH I DID NOT STUDY MATHEMATICS</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	3.9	3.9	3.9
	Disagree	5	4.9	4.9	8.8
	Neutral	5	4.9	4.9	13.7
	Agree	44	43.1	43.1	56.9
	Strongly Agree	44	43.1	43.1	100.0
	Total	102	100.0	100.0	

<b>THERE IS NO MATHEMATICS AT THE WORK PLACE</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	11	10.8	10.8	10.8
	Disagree	8	7.8	7.8	18.6
	Neutral	11	10.8	10.8	29.4
	Agree	43	42.2	42.2	71.6
	Strongly Agree	29	28.4	28.4	100.0
	Total	102	100.0	100.0	



## APPENDIX D

### THE EFFECT OF FACTORS INFLUENCING STUDENTS' ATTITUDE TOWARDS THE STUDY OF MATHEMATICS ON STUDENT'S MATHEMATICS PERFORMANCE

<b>Mathematics is my favorite subject</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	31	30.4	30.4	30.4
	Disagree	31	30.4	30.4	60.8
	Neutral	5	4.9	4.9	65.7
	Agree	18	17.6	17.6	83.3
	Strongly Agree	17	16.7	16.7	100.0
	Total	102	100.0	100.0	

<b>I perform very well in mathematics</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	20	19.6	19.6	19.6
	Disagree	45	44.1	44.1	63.7
	Neutral	6	5.9	5.9	69.6
	Agree	20	19.6	19.6	89.2
	Strongly Agree	11	10.8	10.8	100.0
	Total	102	100.0	100.0	

<b>I do not perform well in mathematics because it scares me</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.0	2.0	2.0
	Disagree	7	6.9	6.9	8.8
	Neutral	4	3.9	3.9	12.7
	Agree	47	46.1	46.1	58.8
	Strongly Agree	42	41.2	41.2	100.0
	Total	102	100.0	100.0	

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	16	15.7	15.7	15.7
	Disagree	21	20.6	20.6	36.3
	Neutral	14	13.7	13.7	50.0
	Agree	30	29.4	29.4	79.4
	Strongly Agree	21	20.6	20.6	100.0
	Total	102	100.0	100.0	

<b>I think that mathematics is one of the most important subjects to study</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	32	31.4	31.4	31.4
	Disagree	34	33.3	33.3	64.7
	Neutral	6	5.9	5.9	70.6
	Agree	11	10.8	10.8	81.4
	Strongly Agree	19	18.6	18.6	100.0
	Total	102	100.0	100.0	

<b>I have a lot of self-confidence when it comes to mathematics learning</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	29	28.4	28.4	28.4
	Disagree	29	28.4	28.4	56.9
	Neutral	6	5.9	5.9	62.7
	Agree	23	22.5	22.5	85.3
	Strongly Agree	15	14.7	14.7	100.0
	Total	102	100.0	100.0	



<b>I am always under a terrible Strain in mathematics class</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	16	15.7	15.7	15.7
	Disagree	18	17.6	17.6	33.3
	Neutral	7	6.9	6.9	40.2
	Agree	25	24.5	24.5	64.7
	Strongly Agree	36	35.3	35.3	100.0
	Total	102	100.0	100.0	
<b>I like to solve mathematics problems</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	52	51.0	51.0	51.0
	Disagree	35	34.3	34.3	85.3
	Neutral	3	2.9	2.9	88.2
	Agree	5	4.9	4.9	93.1
	Strongly Agree	7	6.9	6.9	100.0
	Total	102	100.0	100.0	

<b>I look forward to mathematics lessons</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	21	20.6	20.6	20.6
	Disagree	25	24.5	24.5	45.1
	Neutral	13	12.7	12.7	57.8
	Agree	24	23.5	23.5	81.4
	Strongly Agree	19	18.6	18.6	100.0
	Total	102	100.0	100.0	

<b>My mind goes blank and I am unable to think when working maths</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	7.8	7.8	7.8
	Disagree	15	14.7	14.7	22.5
	Neutral	7	6.9	6.9	29.4
	Agree	52	51.0	51.0	80.4
	Strongly Agree	20	19.6	19.6	100.0
	Total	102	100.0	100.0	

<b>I never liked mathematics and it is my most dreaded subjects</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	15	14.7	14.7	14.7
	Disagree	10	9.8	9.8	24.5
	Neutral	5	4.9	4.9	29.4
	Agree	27	26.5	26.5	55.9
	Strongly Agree	45	44.1	44.1	100.0
	Total	102	100.0	100.0	

<b>I feel a sense of insecurity when attempting mathematics</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	13	12.7	12.7	12.7
	Disagree	11	10.8	10.8	23.5
	Neutral	9	8.8	8.8	32.4
	Agree	37	36.3	36.3	68.6
	Strongly Agree	32	31.4	31.4	100.0
	Total	102	100.0	100.0	