IMAGES OF MATHEMATICS STAKEHOLDERS IN TEACHING AND LEARNING MATHEMATICS AT SECONDARY SCHOOLS IN SOKOTO STATE

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ABSTRACT

The study was conducted for images of mathematics stakeholders in teaching and learning mathematics at secondary schools. For the purpose of the study, the research employs various data collection techniques that includes questionnaire conducted on nineteen (19) mathematics teachers, nineteen (19) parents and two hundred and seventeen (217) students of secondary schools. Teachers, students and parents in the sample schools were administered with questionnaire. Result of the study indicated that mathematics teachers should try to motivate and build up the self confidence of pupils/students and convince them that everybody is bale to be good at mathematics. One of the respondents suggested that we should admit that mathematics is difficult but then prepares students to take it on as a challenge. In addition, several of the respondents stressed the importance of relating mathematics to daily life experiences or activities and teaching it as a practical tool. They also suggested that as an effective strategy, students should be allowed to explore and sole problems themselves. A mathematics teacher should not be somebody who just stands there and lectures, but he should teach from the very beginning, how it can be applied to the real world and to see that it excites the students and teacher as well.

CHAPTER ONE

1.1 Background to the Study

INTRODCTION

The word “Mathematics comes from the Greek word (Matherna) meaning science, knowledge or learning and it also derived from other word (mathematiko’s) meaning found of learning” (Simonson & Gouvea 2007).

Agwagah (2008) noted that mathematics is often defined as the study of topics such as quantity, structure, space and change. These topics provide the major subdivision of mathematics into: Arithmetic, Algebra, Geometry and Analysis. These major disciplines within mathematics arose out of the need to do calculations in commerce among others. The study of mathematics will form in the students the habit of clarity brevity, accuracy, precision and certainty in expression.

According to Osofechinti in Odili (2006),the importance of mathematics to individuals in their daily undertaking is so enormous that the knowledge of mathematics is an indispensible tools for a successful and balanced human existence on earth.

Mathematics helps man to sharpen his understanding and definition of religious concepts. Such concepts are eternity, heaven, spirit, life, power, salvation, wisdom, strength, light, hope, faith, righteousness, glory, blessing, truth, grace, peace, neighbor, sun and death can each be defined with mathematical rigors and precisions (Osah-Ogulu & Odili, 2000).

One of the greatest problems faced by mathematics teachers, school principals, administrators and even parents over the years is the teaching and learning of mathematics at the secondary schools. However, for some years back, mathematicians had shown a lot of interest in trying to diagnoses the causes of the continues poor images of mathematics stakeholders and not only that suggest and administer. “Treatment” in order to air the illness.

In view of this fact, it is widely claimed in the liberator that, negative images and myths of mathematics are widespread among the public. The majority of the people today are scared of mathematics and feel powerless in the presence of mathematics ideas. Many people's image towards mathematics represent mathematics negatively, such that mathematics is perceived to be "difficult, abstract, and in many cultures, largely masculine".

Others describe mathematics as a "set, constant, bounded, enclosed and uncreative or a timed-test".

There are propositions and speculations about the causes leading to the claimed negative and unpopular image of mathematics.

Swell (1981) propose that "teachers attitudes, the family of much mathematics teaching, the seeming lack of relevance of mathematics top every days contexts, fear of the subject literacy problems gaps in schooling and parental expectations".

Inspectorates are the few possible causes, this research attempts to find out the images of mathematics stakeholders in teaching and learning mathematics in Sokoto state.

The Nigerian economy requires mathematics that can effectively put science and technology in the for-front of nation building . Mathematics is the precursor and the queen, of science and technology, and the indispensible single element in the modern societal development "mathematics education is therefore indispensible in nation building". Since the introduction of formal education in Nigeria, mathematics education has gone through several developments. From the era of formal arithmetic, algebra, geometric and the likes through the period of traditional mathematics controversy to the present everyday general mathematics. These changes have always been necessitated by realization of the role mathematics should play in the nation's scientific and technological development as well as responses to societal needs and demands (Aguele, 2004).

The world today applies regarded as a global village characterized by computer and information technology. This age has brought with it lots of sophistication in mathematics and be able to sustained these developments.

Today, it is a reality that it is the creation, mastery and utilization of modern science and technology that basically distinguishes the so-called developing from the developed nation of the world. That is to say that the standard of living of a nation is dependent on the level of science and technology of that nation.

While science is the bedrock that provides the spring-board for the growth of technology, mathematics is the fate and key to the sciences. In other words, it is the level of mathematics that determines the level of the science and technological component of nations is mathematics. Therefore, mathematics plays a vital role in nation building, mathematics as observed by Abiodun (1997) is the major tool available for formulating theories in the sciences as in other fields. It is used in explaining observation and experiments in other fields of inquiry. Adeyebge (1987) observed earlier that there is concept to explain its own concepts, theories or models. Mathematics is a science of the methods by which quantities sought are deducible from others known or supposed.

Thus, anyone who neglects mathematics may not be able to go far in sciences and infact other things of the world. Practical work and observations of nature are the main source of scientific discoveries. Mathematical methods play a very important role in this. Mathematical methods lie in the foundation of physics, mechanics, engineering, economics, chemistry and soon.

According to Bermant in Harbor-Peters (2000), an important features of the application of mathematics to the science is that, it enables its to make scientific prediction that are to draw on the basis of logic and with the aid of mathematical methods, correct conclusions whose agreements with reality is then confirmed by experience, experiment

and practice, thus, mathematics is bed rock of sciences and technology, which is the springboard of national development.

Mathematics today is having an enormous impact on science and society. The influence may be silent and appear hidden but has shaped our world in many ways. Mathematical ideas have helped make possible the revolution in electronics which has transformed the way we think and live today. The information technology (IT) of today has transformed the world into a global village.

The important of mathematics in everyday life activities is not doubted, at home for instance, we have to check the water rate bills, measure quality of food that will satisfy the number in the family to avoid wastage. Also in division of labour among members of the family that is going of lands to sweep. In hospital, ages of patient's body weight and temperature are often measure in used by doctors to prescribe quality of medicine to be taken. In the market are used the knowledge of mathematics to calculation to calculate how much is to be paid for goods purchased and how much change if any one collects. Even in digging a grave the corpse has to be measured to determine the size of the grave. A builder knowledge of shapes and solids of measurement to design and build the house.

Once we start working for other people, meeting other people, or traveling, we have to be able to tell the time. If we are traveling by car we might like to estimate our time of arrival, so we must know what speed means. There are almost limitless applications of mathematics in daily life activities.

Mathematics is an abstract subject, a different language is used to convey elders and we use symbols to explain concepts often the students are not sufficiently conversant with the language and concept we are trying to explain many topics in mathematics rely on the understanding of previous topics (It is a logical subject) a gap in the knowledge of a

particular student can make it impossible for him to learn future topics and this leads to failure and frustration and often hatred for the subject.

How can student be convinced that the mathematics they are learning is useful as many people dismiss the problem of mathematics teachers by using what they don't have today very much just teach the students how to add, subtract, multiply and divided.

This however, is far from the truth, if a student does not reach a satisfactory understanding of the basic mathematical concepts there is little chance area of the subj. Mathematics can be function Therefore, must be taught in a logical order so that student can achieve understanding and enjoy mathematics.

Against this background, this research aims to make a systematic enquiry into the images of mathematics stakeholders in teaching and learning and the possible causal factor of affluence on the formation of those images.

The term image is define as some kind of mental representation (not necessarily visual) of something originated from part experiences as well as associated beliefs attitudes and conception. Since an image original from part experience, it comprise both cognitive and affective dimensions. Cognitively it relates to a person's knowledge, belief and other cognitive representation.

Affectively, it is associated with a persons attitudes, feeling, and emotions,. Thus the term image of mathematics is conceptualized as a mental representation or view of mathematics presumably constructed as a result of social experiences, medaled through school, parents, peer or mass media. This terms is also understood broadly to include al visual, verbal representation, metaphorical image and associations beliefs attitudes and feeling related to mathematics and mathematic learning experience. Therefore, the main aim

of this study is to study is to explore and identify the range of images beliefs and attitudes toward mathematics as it is perceived by the public (mainly adults).

1.2 Statement of the Problem

The study aims to make a systematic enquiry into the images of mathematic stakeholder and the possible causal influence on the formation of these images among stakeholders in secondary schools in Sokoto state.

Mathematics as a compulsory subject in Nigeria with vigorous problems ranging from teaching learning application on the area of mathematics teaching teachers undergo difficulty especially on the area students fail the relevance and of both teachers and teaching material this tender the effective teaching of mathematics on the problems of teaching of mathematics in secondary schools if it is confirmed that stakeholders experience difficulties in the area of concepts, understanding availability of relevant materials and applicability to Nigeria situation.

1.3 Objectives of the Study

In considering the needs to promote a better understanding of the image of mathematics the objective of the study are;

1- To explore and identify the range of images, beliefs and attitude toward mathematics among stakeholders of secondary schools in Sokoto state.
2- To explore stakeholder's view about the possible cause and sources of images of mathematics and their attitudes toward mathematics in secondary school in Sokoto state.

3- To find out whether the instructional materials for the subject of mathematics are available in the secondary school or not.

4- To find out areas of coverage in mathematics.

1.4 Research Questions

The main research question for this study are:

1- What is the range of images, attitudes and beliefs towards mathematics held by sample of stakeholders in some secondary schools in Sokoto state?

2- What are the possible reasons of liking and disliking mathematics?

3- Are there enough essential instructional materials of mathematics teaching in secondary schools?

4- What is the level of coverage of mathematic syllables in secondary schools?

1.5 Research Hypotheses

The research will be base on the following hypothesis:-

1. There are no differences of images, beliefs and attitudes toward mathematics among stakeholders of secondary schools in Sokoto state.
2. There are no possible view about the cause and sources of image of mathematics.
3. There are no enough essential instructional materials in mathematic in secondary school.
4. There is no proper syllables coverage in mathematics.

1.6 Significance of the Study

There are widespread claims about the negative images of mathematics stakeholders in teaching and learning. Therefore, the result of this study will provide systematic and

empirical data on image and myths of mathematics among stakeholders in teaching and learning.

Secondly, by examining the different image, attitudes, beliefs and myths of mathematics among stakes\holders, there is a potential for such images attitudes beliefs to be challenged, promoted or discouraged. The information obtained will enhance better strategies and measure for promoting stakeholders understanding of mathematics.

Thirdly, the result of this study might inform us what is the extent of the influence of stakeholders in shaping the images of mathematics. This information can be used to promote positive influence while attempting to avoid the negative influence of those sources, it will help to understand better the roles of stakeholders in the shaping of children's images of mathematics.

Fourthly, the findings will reflect possible implication for mathematics education and mathematics teacher education. Knowing how student perceive mathematics learning experience in school and how this could have influenced their images of mathematics will help us to understand better how mathematics should be presented in the classroom. This knowledge may help to enhance better curriculum planning and teacher development programmes.

Lastly, the impact of gender and age difference on images of mathematics resealed in the compression might serve to support or challenge the notion that mathematics is universal value-free, gender-free or age –free. The findings might help to illuminate our understanding on whether the difference in gender, age and value system could have lead to the difference in images of mathematics and consequently the difference in mathematics achievement.

Having described the current scenario of the secondary school stakeholders understanding of mathematics and the importance and significance of the stakeholder images of mathematics I argued that there is an urgent need to carryout this study.

1.7 Scope and Delimitation of the Study

This study is to investigate images of mathematics stakeholder in Sokoto state.

It is also concerned with identifying the possible causal factors of influence on the formation of these images of mathematics stakeholders in sokoto state.

However, for authenticity of this work, the extent is based on the order school in the area. These school are;

1. G.G.D.A.S.S YAR'AKIJA
2. A.A RAJI
3. G.D.S.S K/MARKE
4. S.A.A.S.S
5. G.D.S.S ARKILLA

1.8 Operational Definition of Terms

Mathematical image:- according to Rogers (1992) quoting from the oxford English dictionary define images as a mental construct, he argues that;

Throughout history, philosophers and mathematicians have been involved in the ontological question about the status reality and existence of mental image. Whichever philosophical standpoint we take, we have to admit two fundamental aspect of the debate.

First we are aware of the power of the human mind to construct mental images and

Secondly, our abilities to manipulate these images and use them to inspire creative and thoughts and different forms of communication.

Stakeholders

Stakeholder is anybody who can affect or is affected by an organization strategy or project. They can be internal or external and they can beat senior or junior levels. Some definitions suggest that stakeholders are those who have the power to impact an organization or project in some way. For example, people or small group with the power to respond to, negotiate with change the strategic future of the organization (Eden and Ackermann 1988: 117).

Mathematical Stakeholders: is anybody who can affect or is affected by schools, ministries and teachers services board (T.S.B) in teaching and learning mathematics. They can be internal or external and they be at junior or senior levels.

Examples of stakeholder in teaching and learning mathematics are student, Teacher, Inspectors in the ministry of education, parent etc.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

Mathematics is a subject that has been and will continue to be a source of concern to teacher, students, parent and indeed all stakeholders in the education industry in Nigeria. The reasons for this assertion are not farfetched the poor image of mathematics among students have over the years been a stumbling block for many students in their academic pursuit. For this group, the mere mention of mathematics is enough to send an electric shock down their spines! However, for some mathematics is a subject to be enjoyed. In fact, some students and their teacher cannot understand the hullabaloo about it. To the latter, mathematics is just and subject offered in the school curriculum. And to the other, generally speaking, mathematics is a subject that is often disliked by the students; it has been observed that many academically capable students prematurely restrict their educational and career options by discontinuing their mathematics learning early in the high school based on student attitude toward mathematics. The poor results in this subject have continued to be stumbling - block in the realization of the educational and employment desire of many candidates because it is a gatekeeper for any carriers. This implies that every individual needs some knowledge of mathematics in order to live a useful life and be an effective member of the society. Thomaskulty and George (2007), mathematics cannot be considered as a classroom discipline only. Reflecting on this James (2005) stated that not only an academician, scientist, an engineer, but a shopkeeper, a grocer, a house wife, a sportsman, and an employee need mathematics.

In the contemporary Nigeria, greater emphasis is being placed on industrial and Technological development. As a result student are being encouraged to take up sciences

related subjects. One subject that cut across out the science is mathematics. Today, mathematics methods provide literally every field of human endeavour and play a fundamental role in economic development of a country. In math towards scientific and technological advancement, need nothing short of good performance in mathematics as all levels of schooling. Unfortunately performance of students in mathematics at the end of secondary education has not improved in the past decade (Umoinyang, 1999). Mathematical thinking is indispensable for all in this computer age, as a habit of mind for in application in sciences and technology. As a vital tool for the understanding and application of science and technology, mathematics plays vital role for precursor and harbinger, to the much needed technological and national development (Bassey, Joshua and Asim, 2010).

According to Steen (1989), we learn to mare sense of things around us, through mathematics. It is used in business and finance, and also for personal decision making. Also Arnold (2003) explains that problems which need mathematics for their solution also arise throughout industry. Steen expressed further that as technology has mathematicized the work place, and statistics has permeated the arena of public policy debate, the mathematical science have moved from being a requirement only for future scientists to being an essential ingredient in the education of all. There for the teacher methods of teaching mathematics and students attitude. Towards, a discipline that plays vital roles on the society in different forms and in different ways cannot be over emphasized.

2.2 History of Mathematics Teaching in Nigeria School

The development of an indigenous African Curriculum started early 1960's, before this period nearly all textbook used in Africa were imported from Europe and America. So at the end of Colonial rule many African countries necessitate in the curriculum to some things more relevant to the African way of life in 1961 there was a conference of the advancement of new state Isreal Rev. Solomon Cauker of faurelbay college appealed to Gerold Zacharius to come and help in the education development of Africa.

The first largest modern mathematics project in Africa was initiate by Gerold Zacharius with the support of educational services incorporated based in America. Zacharius on his return to U.S.A gathered some American, British and African scholars to discuss the problem of African education in this house. This letter led to the formation of African educational project AEP in 1961. The AEP had its planning meeting in Acara, Ghana where they decided that their work should start with mathematics. This program was named the African mathematics Project (AMP).

Prior to the advert of the missionaries into Nigeria many ethnic groups used elaborate country system, for example, the Hausa's, Yoruba's, Igbo's and so on.

A child is introduced early in life in to country through means of concrete objects, country rhymes, folk\or res plays and games both at home and on the farm. When the missionaries penetrated into Nigeria in 1842 they introduced a western oriented education whose main objectives was to introduce peoples who could read Bible and serve as catechist. The curriculum of that times started with Bible reading and later with arithmetic, as one of its components. The mathematics education components of primary school in the period 1930 – 60 was nothing more arithmetic's processes. Three textbook were mainly used throughout the country, namely, efficiency arithmetic's shuttling Arithmetic's and Laombo Arithmetics.

Even at higher elementary or grade II Teacher colleges, the mathematics education component was Arithmetics. At secondary schools the situation was the same because of production of clerks or literate Accountant consisting of primarily a series of rules to be memorized and dogmatically applied, according to rather definite classification.

This was later was followed by the introduction of algebra and geometry. Hence the study of mathematics was compartmentalized in to arithmetics, algebra and geometry. After the independences three types of syllabus were used and the two (2) main ones were alternative. A consisting of topic in arithmetics, algebra, Euclidean geometry and trigonometry, while alternative, B consisted of essentially the same topic plus extra topic in coordinates geometry. The schools were left to choose which one they wish to register their students the 3 syllabi were additional mathematics meant for those students who showed mathematical talent and consists of topic from pure mathematics. Mechanics and statistics. Recall the formation of A. E. P. and later A. M. P. while were directed towards attaining the following:-

1- Getting in every participating country a cadre of knowledgeble and competent modern mathematics teachers who could lead in the modernization movement in their own countries.
2- Producing Suitable textbook, audiovisuals aids and testing materials. The first writers workshop at Entebbe attracted 54 participants pants from 13 countries including Nigeria subsequent workshop at Entebbe and Mombasa was also attended by Nigeria parties pants, the program insisted on intensive residential workshops. The most successful A. M. P. Project in Nigeria was the Lagos Experiment when started in 1964 with its director Professor Graace Alele Williams. The original Entebbe textbooks for primary schools were used for the experiment with success of this

experiment modern mathematics became operative in all primary schools in Lagos in (1971).

The adoption of the AMP result was in the form of regionalization; Nigeria, Ghana, Liberia and Sierraleone were requested to team up in form the WARM. Nijona broke off from the regionalization stage of the AMP after pioneering the activities for 8 years in 1969 the Federal government established Nigeria Education research Council (NERC) to led in the modernization of school curriculum. In September, 1969 NERC assembled a cross section of Nigerians at a conference to formulate a national philosophy, to provide guideline on what shared be accomplished with respect to:

1. The needs of the youth and adult individuals in Nigerian society.
2. Socio-Economic Needs, volume, aspiration and development of Nigerian Society.
3. The Curriculum Substance and the subject content which is the means to the end/goals.

In (1975) public complained about poor performance of students in mathematics which was attributed to modern mathematics project. A committee was formed by Nigerian Education Research Council (NERC) with the following assignment:

1. To examine the different aspect of the countries on the teaching of modern or traditional mathematics in Nigeria schools.
2. To examine the existing school mathematics curriculum in the light of this controversy and sport light the problems and issues.
3. To make concrete proposals for development of appropriate mathematics curriculum for the different levels including suggestions for their implementation.

Another independent effort dealing with problem of the school mathematics curriculum had been organized by the comparative Education study adaptation centre (CESAC) at university of Lagos. In August 1976, held a series of conference and workshop aimed at developing a new syllabus for secondary school mathematics and organized a carefully planned timetable of text writing, trial and testing of materials and teacher training. The Federal Ministry of Education invite across section of mathematics, mathematics education and other who had much to do with the shaping of mathematics education in Nigeria to meet at Benin in 1977. In the invitation, the Ministry wished to be guided by expert in order to give appropriate advice to Government on the content and methodology of mathematics. Those invite were happy and get prepared for the meeting, title did they known that they were in for a shock as the then federal commissioner for education Dr. A.A Ali read him speech in which he announced that the government has decided to abolish the teaching of modern mathematics. He justified his announcement with some of the common argument against it and asked the group to consider a list of objectives for mathematics instructions in Nigerian schools. Many who listened to the address were surprise stunned and perplexed. Parents and teachers accepted the decision with a sign relief. To well inform us to date mathematics educations, it was a period of agony to come out in the daily news and papers in support of the decisions. But the conference reacted strongly against it and issued a 14 page report challenging the commissioner's suggestion and pointed out what appeared to be his misunderstanding of the nature of contemporary school mathematics.

2.3 Research findings on images of mathematics among students and teacher

Review of published research literature in mathematics education showed that many researchers use the term image rather loosely, and interchanges with many different terms such as views, conceptions and preference. Very few researchers attempted to define these terms explicitly. Many researchers (for example Burton, 1989, Kelly and Olham, 1992; Mura,

1992; Wilson, 1992; Branco and Oliveira, 1996) tended to use the term 'image of mathematics', to include attitudes towards mathematics, and beliefs about the natures of mathematics or learning of mathematics.

For example, Kelly and Olham (1992) used the term image of mathematics among teachers to refer to their urews, of mathematics and mathematics education including beliefs about and attitudes to mathematics that are being communicated by these teachers to their pupils.

Similarly, Wilson (1992) studies prospective secondary teachers' image of mathematics by investigating their knowledge of function, their general views of mathematics and mathematics teaching. Liowise, Branco and Oliveira (1996) focused on "the experience with mathematics that was recorded and crystallized in the memory of students and high school teachers and is presented as image" on the other hand, Burton (1989), did not define the term 'Image of mathematics explicitly at all in her study of some top junior pupils image of mathematics. Never less, implicitly she refer theirs image of mathematics to their feelings attitudes to mathematics and beliefs about mathematics learning (for example, "image of mathematics as difficult". One exception is found in Brown's (1995) study, in an attempt to investigate the influence of teachers on children image of mathematics, Brown (1995) defined image of mathematics as "the personal theory which an individual hold about mathematics at the present time which will include feelings, expectations, experience and confidence".

In view of the heterogeneity of the meaning of the term 'image of mathematics' and there was relatively limited number of research studies on it, the researcher choose to adopt a loose and broader perspective, by reviewing all studies that are closely linked to it. In other words,

the researcher considered the following terms to be theoretical interpretation of the term image of mathematics:

(a) Attitudes towards mathematics

(b) Beliefs about mathematics

(c) Mathematics myths

(d) Conception or views of mathematics

(e) Emotions and feelings towards mathematics

In the following subsections, reviewed and discussed empirical studies pertaining to the above constructs. As it is impossible to make a comprehensive review of all research studies, have focused their review to recent research studies that fulfill at least one of the following criteria.

Firstly, that aimed explicitly to investigate image of mathematics and secondly, whose findings reflected images of mathematics, even though they might use different theoretical construct of the image of mathematics.

2.3.1 Research findings on attitude towards mathematics

Most people have head the age old saying "attitude is the bye to successes" Various quotes can be retrieved that subscribe to this philosophy. In education, research suggests that student attitudes towards a subject lead to academic success (Popham 2005, Royster, Harris, and Schoeps, 1999). According to Yara (2009), attitude of the teacher and his method of teaching influence students' attitude. The conceptions, attitude, and expectations of the students on mathematics and its teaching have been considered to be very significant factors. Underlying their school experience and achievement Boresi, 1990 in Ponte, 2010. This is because attitude is keys to success as people used to say. Fanseca (2010) opined that one of

the factors affecting students' learning performance is the way they face the knowledge, namely their attitudes to the subject. Such attitude as profound feelings, relatively stable are derived from positive or negative experience across time, on learning the subject (Estrad 2002 In fonseca, 2010). This experience include teacher method of teaching.

Attitude is a construct that play an important role in mathematical education (Zan and Martino, 2007). Grody knownz (2009) cited Pophama (2005), opined that in education research suggests that students attitude toward a subject lead to academic success. Attitude is a central part of human identity. Every day people love, hate, like, dislike, favour, oppose, agree, disagree, argue, persuade etc. all these are evaluate responses to an object of thought (Bohner and Wanke, 2002). They are inclinations and predispositions that guide an individuals behavior (Rubinstein, 1986) and persuade to an action that can be evaluated as either positive or negative (Fishbein and Ajzen, 1975). Attitudes develop and change with time (Ruvinstein, 1986), according to multi-component model of attitudes (Eagly and Chaiken, 1993), attitudes are influenced by three components. they are cognitive (beliefs, thoughts, attributes), affective (feelings, emotions)and behavioural information (past events, experiences) (G.R. Maio and Haddock, 2010). When reviewing literature on students attitude towards mathematics, it reveals that several factors play a vital role in influencing student's attitude. These factors can be categories into three distinctive groups.

Firstly, factors associated with the students themselves. Some of these factors include student's mathematical achievement scare (Kogce et'al 2009), anxiety towards mathematics, student's self efficacy and self concept, extrinsic motivation (Teacher et al, 2010) and experience at high school (Klein, 2004, Bous and Cusworth, 1994).

Secondly, the factors those are associated with the school teacher and teaching. Some of these factors that influencing attitudes are teaching materials used by teacher, teachers'

classroom management, teachers' content knowledge and personality, teaching topic with real life enriched example, other student's opinions about mathematics courses (Yilmaz, Altum and Olkum, 2010), teaching methods, reinforcement (Papanastasiow, 2000), receiving private tuition (Kogce et al, 2009), teachers beliefs towards mathematics (cater and Norwood, 1997) and Teachers' attitude towards mathematics (Ford, 1994, Karp, 1991).

Thirdly, factors from the home environment and society also affect students attitude towards mathematics factors such as educational background of parents, occupation of parents (Kogce et al, 2009) and parental expectations (Tobias, 1993) play a crucial role in influencing students attitude towards mathematics. Due to these several factors students have different attitude towards mathematics. More often the public image of mathematics is labeling it as a difficult, cold, abstract, theoretical and ultra rational subject (Ernest, 2004) However, some studies show that students have a relatively position attitude towards mathematics (Tezer and karasel, 2010; Yilmaz et'al, 2010 fan, Ouek, Yan, Mei, Lionel, and 2005). Sometimes, mathematics is also considered as very important and largely masculine subject (Ernest, 2004). Several studies give evidence that compared to boys, girls lock confidence in doing mathematical sums and viewed mathematics as a male domain (Meelissen and luyten, 2008; Odell and Schumacher 1998; Hyde Fennema, Ryan, Frost, and Hopp, 1990. However, there are many studies that suggest that there is no significant difference between attitudes towards mathematics among male and female students (Mohd et'al 2011, Kogce et'al 2009, Nicolaidou and Philippou, 2003).

And there are some other studies which suggest that the attitude of the participants of their study towards mathematics was more positive in the third year than the first year (Grootenber and Lowrie, 2002) and there is a difference between attitude in the grades 6.7 and 8 (Kogee et'al, 2009). Hence it can be said that students attitude towards mathematics are very subjective and varies among the students, had been conducted to find out the

relationship between attitude towards mathematics and academic achievement of the students. Most of these studies showed that there is a positive correlation between students attitude mathematics and academic achievement of students. (Mohd et'al, 2011, Bramlett and Herron, 2009, papanastasition, 2000, Ma and Kishor, 1997) and also achievement in problem solving (Nicoloi dou and Philippou, 2003), the studies has also shown that students attitude towards problem solving in terms of patience, confidence and wiliness has a positive relation with students mathematics achievement (Mohd et'al 2011).

2.3.2 Research finding on beliefs about mathematics

In the literature, beliefs have been described as a massy construct with different meanings and accentuations (Pajare 1992). The term beliefs has not yet been dearly defined (Furinghetti and Pehboner, 2002). However, there is some consensus that mathematical beliefs are considered as personal philosophy or conception about the nature of mathematics and its teaching and learning (Thompson, 1992) following schoenfeld (1998), beliefs can be interpreted as "mental constructs that represent the codification of people's experience and understanding". Beliefs cannot be regarded in isolation; they must always be seen as part of a beliefs system (Green, 1971). The beliefs system can be characterized by three dimensions as there are quasi-logicalness psychological generality, and cluster structure. A quasi-logical order of beliefs refer to person uses as reasons for other areas and derivative beliefs. Psychological centrality considered the strength by which beliefs are held, whether they are central resp. core beliefs and cluster structure point to the fact that beliefs are held in cluster around specific situations and contexts, more or less isolated from each other. Op't Eynde, De and Verschattel (2002) as well consider explicitly the structure of beliefs about mathematics but with a different focus. They provide a framework of students mathematics, related beliefs that is based on a view of research on this construct. Constitutive dimensions are object

(mathematics education), self and content (class), which for further lend to several sub-categories, for example mathematics as a subject, self-efficacy or society norm.

This framework brings together results from beliefs research focusing separately on each of the dimensions. Although the framework was mainly confirmed by analysis of teacher students data, researcher also found one emotional scale concerning libing of mathematics (Harmual et al, 2006).

More recently, there is an increasing number of studies relating teacher's beliefs and their mathematics teaching class (se review of Pajeres, 1992, Raymound, 1993). In general studies on beliefs of mathematics tend to focus on students and teacher and they can be grouped under the following four stands:-

1. Belief about the nature of mathematics.
2. Belief about learning of mathematics
3. Belief about teaching mathematics
4. Belief about self, including self-efficacy and own mathematical ability people believe mathematics is a divine discipline. For instance, Galilev, in Obodo (2004).

Stated that mathematics is the language with which God wrote the universe. Some people love mathematics while some fear it, some are attracted to and study mathematics while some worship it. For instance ancient Indian mathematics. Libe Arya Batta and Bhaskara worshipped mathematics, and lived for it. Also the legend Srinivasa Ramanujsan of Ludia adored mathematics these could be material and non-materials reasons why people adore, worship and are attracted to mathematics. For some like Aryabatta and Bhaskara, it was not for any materials benefits but out of their devotion or Doration (Thomasboulyu and George, 2007).

2.3.3 Research finding on mathematics myths

Closely related to studies on beliefs of mathematics are studies on mathematical myths. There is an increasing number of studies (see example, Mtetwar and Garofalo, 1989. Frame 1990) that investigated mathematical myths that are held by students and presser vice teachers in particular. As defined by Frame (1990) mathematics myths refers to "a belief about mathematics that is (potentially) harmful to the person holding that belief because belief in mathematics myth can result in false impression about how mathematics done 'Even though mathematics myths are not necessary false belief, if manifested in everyday life they represent images of mathematics that are held by these people Kogelman and Walarren (1978) identified to those mathematics anxious and mathematics avoidance students. They are:

1. Some people have a mathematics mind and some don't.
2. Mathematics requires logic not intuition.
3. You must always know how you got the answer.
4. There is a best way to do a mathematics problem.
5. Mathematics require a good memory.
6. Mathematics is done by working intensely until the problem is solved.
7. Men are better in mathematics than women.
8. It's always important to get the answer erectly right.
9. Mathematicians do problems quickly in their heads.
10. Mathematics is not creative
11. It is bad to count on your fingers
12. There is a magic key to doing mathematics.

When analyzed further, the list of myths shows that very of these myths are related to beliefs about the nature of mathematics and learning mathematics. Myths (1) and (7) suggest that there are gender difference in mathematical ability, myths (2), (8), (9) and (10) seems to imply that mathematics is a logical rigid and hierar chical subject. While myth (3), (4), (11) and (12) suggests mere of a dualistic view that there is a fixed way of getting, the right answer, myth (5) and (6) indicates that memory and effort are important in doing mathematics.

Perhaps this is best summarized by Paulos (1992) when he proposed that there are at least five " mathematics moron myths" that need to be exploded by mathematics educations and teacher because they are as important as other education issues such as curriculum reform and the use of technological tools. According to him these five myths are:

1. Mathematics is computation.
2. Mathematics is a rigidly hierarchical subject.
3. Mathematics and narrative are disparate activities.
4. Mathematics is only for the few; and
5. Mathematics is numbering.

These myths are also evidenced in Mtetwa and Garofalo's (1989) study, who investigated beliefs about mathematics held by students with difficulties with mathematics. . They identified two myths that were commonly held these pupils, which include, computation problems must be solved by using a step- by –step algorithm, and mathematics problems have only one correct answer. Perhaps holding these myths might have further discouraged these students from liking mathematics and as result, they face difficulties in mathematics.

2.3.4 Research finding on conceptions or view about mathematics

Recently, there have been increased number of research studies on conceptions and views about mathematics but most these studies seemed to focus on mathematics (Mura, 1992; Grigutsch & Torner, 1998; Burton, 1997), mathematics teachers (Kelly and Oldham, 1992 Wilson, 1992) and adult learners (Burton, 1987). Many of these studies categorized their findings using the psychological or philosophical theories described below:

(i) **Perry scheme of dualistic versus relativist belief system**

Perry scheme was first introduced by William (1970) who traced the epistemological development of his graduate students at Harvard. From intensive interviews, he drew up nine 'position' or stages of epistemological development. Two of these are 'dualism' and 'relativism', which have been widely applied to views of mathematics by mathematics researchers (Copes, 1982, Ernest, 1996).

The Dualistic view of mathematics is characterized by "mathematics is a fixed and absolute set of truths and rules laid down by authority" (Ernest, 1996). According to this view, mathematics is either right or wrong, it is certain and exact and there is always an answer to a question. In contrast, the relativist view of mathematics is that mathematics is "a dynamic, problem-driven and continually expanding field of human creation and invention, in which patterns are generated and then distilled into knowledge" (Ernest, 1996). Therefore, people who hold a relativist view of mathematics view mathematics as a social construction. They believe that a mathematical problem could be solve in more than one way and there is more than one possible answer to problem.

(ii) Absolutist versus fallibility philosophy of mathematics (Ernest, 1991)

Drawing on philosophy of mathematics, Ernest (1991) distinguishes two dominant epistemological perspectives of mathematics, namely the absolutist and fallibility view of mathematical knowledge. The main feature of the absolutist view of mathematics is that is that mathematics consists of a set of absolute and unquestionable truths. Mathematical truth is certain and exact. Mathematical knowledge is objective, value free and culture-free. In contrast, the fallibility view of mathematics is of that "mathematical truth is fallible and corrigible, and can never be regarded as beyond revision and correction" (Ernest, 1991).

Thomson (1992) beliefs, refers to conception as mental structures that encompass beliefs, concept, meaning, propositions, mental images and other. She suggest that the distinction between conceptions and belief is not "a terribly important one" when talking about teacher conceptions of mathematics as discipline and teacher beliefs about mathematics (Thomson, 1992). Studies on teacher conceptions and beliefs have focused on describing teacher beliefs and conception, on conceptions, on examining the relation between teacher conceptions and instructional practices, or on changing teacher conceptions of mathematics (Thompson, 1992). Andrews and Hatch (2000) suggest that the literature on conceptions is not clear because different researchers offer different perspectives on conceptions in terms of having cognitive and or affective dimensions. Oaks (1994) describes conceptions as views that students hold of mathematics and what they believe is required in learning and doing mathematics.

2.3.5 Other image-related research

Mathematics has a public I,age of being a difficult subject, accessible only to the few. Learners who do well in mathematics are typically stereotyped as "nerds". Mathematics is generally disliked. It is seen as a dry and boring subject. Often, it evokes feelings of stress;

anxiety and fear (see Zaslavsky, 1994). Furthermore, it is seen as filter that hinders students from pursuing their career aspirations (Ernest, 1994; National Research Council, 1989).

In 1992, Kelly and Oldham carried out a study on image of mathematics and mathematics education among primary teachers and students teachers. The result of their study show that these teachers' and student teachers' images of mathematics were largely 'absolutist and utilitarian' and their images of mathematics education were 'more process-oriented'. However, both sample group seemed to find it difficult to differentiate their view of mathematics from their views on mathematics education.

Although the main aim of Wilson's (1992) study was to investigate the nature of teachers' specific understanding of functions, he also looked into their general views of mathematics and mathematics teaching three prospective secondary mathematics. He found that they communicated primarily dualistic views of mathematics and mathematics teaching. He also observed that one of the teachers viewed functions as computational activities because she believed that mathematics is a collection of specific procedures used to obtain the right answers. In contrast, another teacher's viewed function is a more flexible and dynamic way while the third one had a rich understanding of functions but a narrow view of mathematics teaching. Knudtzon (1996, 1997) observed a similar dualistic view of mathematics exhibited by 28 of his student teachers. He found that they viewed mathematics as 'a subject with answers which are either right or wrong' while 'mathematics teaching consist of a teacher who explains how to do different task and pupils who follow the given procedures, doing lots of exercises'.

There were a number of studies, which aimed to examine image of mathematics, but their result revealed more of emotion and feelings towards mathematics. However, to highlight their findings that reflected images of mathematics in the forms of emotion and

feelings, have discussed these studies under the following headings. These studies involve mostly women and pupils.

2.3.5.1 Women's view of mathematics

Buerk (1982) studies five "able" women who avoid mathematics and she found that these women experience mathematics in a dualistic mode and "they see it [mathematics] as discipline that is rigid, remove, aloof and without human ties, rather than one that is being discovered and developed".

Likewise, in Sewell's (1981)study on the public adults' use of mathematics in everyday life, she also noticed a common feature to some of her women sample that, the more educated women tend to exhibit the least confidence in their mathematics ability. Regardless of their educational background, they tend to avoid mathematics by rationalizing it as a male dominated subject. They showed reluctance to estimate because they believe that "only a complete correct answer were acceptable, even when a approximate answers has been asked for" in 1998, Colwell investigated the perceptions of 11 women on their use of mathematics in everyday lives. She observed that, "many of the stories reveal an avoidance of calculation or of using formal mathematical skills" and also many participants in her study 'talked a lot about their feelings about themselves and about mathematics, as well as about other people'. The above three studies seem to suggest that women who disliked mathematics tend to avoid using mathematics in their everyday life. Even when they are highly educated and competent in their cares, most of them seem to hold a dualistic view of mathematics such that there is always a right answer or right method of do mathematics. Presumable as a consequence of this belief, they are often not confident about their own mathematical abilities. Even when they obtained the 'right' answer with their own methods, they tended to distrust it and opted for some 'mathematical algorithm'.

2.3.5.2 Pupils' views of mathematics

By asking 14 years old pupils to describe their good and bad experience of leaning in school, Holyles (1982) found that, Nearly one third of all god stories (42 out of the 135 stories) and one-half of all bad stories (72 out of the 146 stories) were, in fact, about mathematics learning. Out of the total of 114 mathematics stories, a significant proportion (over 63%) was bad,

These result that mathematics tend to provoke both strong and adverse reactions in 14-year-old pupils because over 63% of the mathematics stories told were bad. On further analysis on the possible reasons associated with these good or bad experiences, she noticed that there are some marked difference in emphasis between the mathematics stories and stories about other areas. The main difference being the stress on 'self factory in both good and bad stories of mathematics experience. Pupils were very concerned about their own roles in mathematics learning in addition to whether they could cope with the work they were doing. Similarly, there were a significantly larger proportion of the bad stories of mathematics learning expressing negative feeling about self in mathematics than in any other areas. These stories also "showed that anxiety, feelings of inadequacy and feeling of shame were quite common features of bad experience in learning mathematics".

The above study on children's image of mathematics suggests that dating back to an early age; some pupils have perceived mathematics as difficult and complex. Some of them are experience negative feelings such as anxiety and frustration and these are probably associated to their bad learning mathematics experiences in schools.

In summary, review of studies on images of mathematics show that in general, many mathematicians, mathematics teachers and student teachers tended to hold a dualistic or absolutist view of mathematics while children and women tended to associate mathematics

with negative feelings. Mathematical myths are held commonly by young students especially those who have difficulty in mathematics. However, these studies are mostly exploratory and thus their findings are still far from conclusive.

Moreover, many of these studies have focused on participants involved in some forms of education such as mathematicians (Mura, 1992; Burton, 1997), primary teachers and students teaches (Kelly and Oldham, 1992; knudtzon, 1997); pupils (Holyes, 1982), mature women students (Buerk 1982, Colwell, 1998) or adult learner (Allen and Shiu, 1997). Therefore, a more systematic enquiry into the image of mathematics among stakeholders needs to cover a wider sample.

2.4 Research Findings on factors influencing images of mathematics

As reviewed in the last section, there is large research literature on attitudes towards mathematics, and an increasing number of research studies on beliefs of mathematics and conceptions or view about mathematics. However, relatively few studies have been carried out to investigate the causal factors liking these theoretical constructs. Perhaps, there is no simple explanation in view images, beliefs and attitudes are all personal constructs. They are probably not only influenced by a person's own experiences, but also likely to be influenced by his/her environment. There are various sociopsychological theories attempt to explain them, but so far there has yet to be one consistent theory that can explain it all.

Review of related literature shows that in general, these factors can be grouped under two main categories.

Firstly, the learner-related factors such as self interest, self motivation and beliefs about the self that include self confidence and causal attribution.

Secondly, the environment related factors including parental influence, teacher influence, school experience, and societal cultural influence.

2.4.1 Learner related factors

In any process of learning, learner himself/herself is certain play an important role. Whether one is interested in, motivated to, confident enough to learn something very much depends on how one views his/her own ability self-image and self-motivation, besides other external factors. This in turn will inevitably affect how one responds to learning the subject. Therefore, in learning mathematics we would have expected the learner himself/herself to have some influence on his/her own attitude towards mathematics and their image mathematics.

So far, most research on learner-related factors in learning such as self-esteem, self-concept, self-image or self-motivation has been better researched in psychology rather than educational studies. In recent decades, research on metacognition has gained its popularity in mathematics education, especially in problem solving. Yet in the affective aspect of mathematics education, beliefs about the self was the most researched factor.

2.4.1.1 Belief about the self

Past literature show that most studies on beliefs about the self tended to focus on students self-confidence in doing mathematics, in particular the gender-related differences in mathematics. Many of these studies tended to use psycho-cognitive theory to link 'the self' and how one attributes success or failure in learning mathematics. The development of the latter has resulted in a number of attribution theories. Here we discussed three of these theories that have been commonly applied in mathematics education research.

2.4.1.2 Learner-helplessness and mastery-orientation

According to Diener and Dweck (1978), children or learner could be classified broadly into helpless or mastery-oriented. When these children met with failures, the helpless children attributed their failure to lack of ability, in contrast, the mastery-oriented children made surprisingly few attributions but instead engaged in self-monitoring and self instruction. In other words, helpless children focused on the cause of failure while the mastery – oriented children focused on remedies for failure. These difference in attributions resulted in striking differences in strategy change under failure. The helpless student tended to attribute the cause to uncontrollable factors and spent very little time searching for ways to overcome failure. They tended to show low levels of persistence and to avoid challenges whenever possible. On the other hand, the mastery-oriented children tended to make adjustment to their strategies and responded to 'wrong' feedback as informational leading to solution and not as a prediction for future failure. In brief, this theory explains the difference between these two types of learning behaviours of children in the nature of attribution following failure.

Based on causal attribution theory, including the concept of learned helplessness, Kloosterman (1984) has developed a model to explain student motivation and mathematics achievement in school. According to his model, student perceptions of success of failure in mathematics are followed by attributions, which then influence effort and finally achievement.

2.4.1.3 Expectancy x value theory

According to this theory, "for a student to learn something, the students must first feel that he or she has the possible to achieve success (expectancy) and at the same time must appreciate the rewards that come from succeeding (value). The relationship between

expectancy of success and valuing the reward is not an additive but rather a product. If either factor is missing, the motivation of the student will be zero" (Grouws & Lembke, 1996).

2.4.1.4 Attribution theory of achievement motivation and emotion

Weiner (1983) advocates that, "we feel the way we think" Consequently, how one believes about reasons why certain things has or not happened (causal attribution) would influence one's feelings (emotion). According to Weiner (1983), there were four dominant causal attributions (ability, long term effort, other and luck). Depending on an outcome of success or failure, these attribution give rise to some specific emotions. For example, 'the linkages for success are: ability –competence and confidence; long-term effort-relaxation; others-gratitude; and luck surprise. For failure, the attribution affect association are ability incompetence; effort guilt and shame; others –anger; and luck-surprise.

In brief, Weiner's theory suggests that one's emotions or feeling towards something are partly responses to achievement-related outcome (success or failure) and partly attribute to causal factors (such as ability, long-term effort others).

2.4.1.5 Self-attribution theory and gender differences

There is some research evidence supporting the hypothesis that boys show more confidence in mathematics than girls do. Vermeer, Borkaerts and Seegers (1997) studied 158 pupils of age 11-12 years old on their perceived confidence and persistence in solving algorithmic and applied mathematics problems. Their findings showed that the boys perceived higher confidence than the girls in solving applied mathematics. However, the girls showed more persistence than boys in the same task. This finding supported an earlier observation by Burton (1989) that even though the girls performed better at primary level, (such as invented better mathematics) games than the boys, they still showed less confidence

than their counterparts. As one of the girls who according to her teacher was probably the most able child in the class, believed that, 'but everyone knows that boys get cleverer at mathematics as they get older, so it will get harder for us and easier for them'.

The results of these studies imply that there exist gender differences in perceived confidence in mathematics whereby boys seem to have higher perceived confidence in mathematics than the girls do.

Further review by Gutbezahl (1995) shows that some females' underachievement in mathematics might have related to the negative expectancies and attitudes of their parents, teachers, and peers. These negative expectancies could have led to their negative self-expectancies and negative attitudes to mathematics and consequently led to their lower performances. The lower performance then reinforce the parent's and teachers' negative expectancies and a cycle of low expectancies leading to even lower performance is perpetuated. She further noted some possible reasons for this cycle to persist are:

(1) Girls, more than boys, tend to believe that mathematics ability is something individuals either have or do not have;
(2) Girls are more mathematics anxious than boys;
(3) Girls may believe that 'girls just cannot do math"; and
(4) Girls believe that their ability is so low that no amount of work will compensate, may drain their willingness to persist.

These reasons indicate girls tended to exhibit much lower self-confidence but higher mathematics anxiety than their counterparts.

To conclude, these studies suggest that there are gender differences in attribution to success or failure in mathematics achievement, and in general boys exhibit higher confidence

in their own mathematical abilities than girls do. Yet, very few studies attempt to relate one's own interest or self-image to one's image of mathematics. Thus two question remain:

(i) To what extent one's own interest, self-image or beliefs about the self influence one's image of mathematics?

(ii) To what extent one perceived that their liking or disliking of mathematics is due their own interest.

A study on the possible factors of influence on image of mathematics will inevitably have to include these questions and this forms part of the aim of this study to investigate any relationship between image of mathematics and the 'self' factor.

2.4.2.1 Environment-related factors parental influence

There is large research literature on parental influence and these studies mostly focus on the relationship between parents' attitudes towards mathematics (Cain-Caston, 1986; Parsons, Alder, & Kaczala, 1982; Pedersen Elmore, & Bleyer, 1986), parents' beliefs about their children's mathematical abilities (Wigfield, 1983; Yee et al. 1986), parents' expectation (Dickens and Cornell, 1990) and parental support (Yee, 1984, Reilly et al., 1992; Cai, Moyer and Wang, 1997) with their children's attitude towards mathematics and/or their mathematics achievement.

Cain-Caston (1986) investigated the relationship between both parents' and students' attitudes towards mathematics and the students' level of mathematics achievement. Her study implies a direct influence of parental attitudes upon students' achievement. Her findings also indicate that there is a significant correlation between mother's attitudes towards mathematics and students' attitudes towards mathematics. However, a significance negative correlation was found between fathers' attitudes and students' attitudes towards mathematics.

Another two studies on parental attitudes (Persons, Alder, and Kaczala, 1982; Pedersen, Elmore, and Bleyer, 1986), indicate that for both junior high and senior high school students, the parent's attitudes towards mathematics correlate to their child's mathematics achievement in term of 'self-concept' factor and belief about the child as a mathematics leaner.

Instead of parents' attitudes towards mathematics Wigfield (1983) explores the influence of parents' beliefs on their children's belief in mathematics achievement. The children's beliefs in mathematics achievement were assessed in term of the children's self-concept of mathematics ability, perceived difficulty of mathematics, importance and values of mathematics, expectancies and intentions to take more mathematics. His sample consists of 740 children from fifth through twelfth grade and their parents. The results of this study showed that parents' beliefs about their children's mathematics abilities were related to the children's achievement beliefs.

Similarly, Yee and her colleagues (1986) carried three studies, involving parents and students of grades five to eleven, on parents' beliefs with respect to their sons' and daughters' math competencies. Their findings indicated that:

(i) Parents hold sex-differentiated beliefs about their sons' and daughters' mathematics ability even though boys and girls performed similarly on mathematics grades and standardized mathematics test and

(ii) Parents strongly influenced children's mathematics attitudes and mathematics self-concept.

The important role of parental influence is also examined by Dickens and Cornell (1990), on the mathematics self-concept of 165 high-achieving adolescent girls. They found that parent expectation have a significant impact on adolescent girls' beliefs about their own

mathematical ability. However, parent' mathematics self-concept has little direct effect on daughter' mathematics self-concept. Looking at a slight different perspective, Yee (1984) investigates the relationship of family environment, in terms of parent-child relationship and parent motivation strategies, and the children's self consciousness in mathematics classroom. She administrated a modified version of family decision-making scale to 291 students in grades 4 to 8, and to 314 parents. Her findings showed that parents from highly conflicted or highly authoritarian family environments relied more on extrinsic motivation practices, while those from highly child self-regulating family environments relied more on intrinsic motivation practices. In addition, children from highly authorization family also reported greater self-consciousness in the mathematics classroom than their counterparts. These findings thus suggest that the types of family relationship could have impact on the children motivation as well as their confidence in learning mathematics inn schools.

The importance of parental support and home environment in students' success in mathematics was shown by the study of Cai, Moyer and Wang (1997) investigation the relationship between the parental support and the children's mathematics achievement and attitudes towards mathematics. About 60% of the 220 middle school student's parental returned the Parental Involvement Questionnaire. The parental support was assessed in terms of five roles:

(a) Motivator

(b) Resources provider

(c) Monitor

(d) Content adviser and

(e) Learning counselor.

Their findings show that students with the most supportive parents demonstrated higher mathematics achievement and more positive attitude toward mathematics than those with less supportive parents. The review so far thus gives evidence that parents have significant influence on their children's attitudes towards mathematics and consequently their mathematics performance. However, most of these studies use correlation analysis, or standard attitudes scales such as parents' attitude scales with students' attitudes scale and relating these sales to student achievement (usually measured by grades or performance in standard examination).

2.4.2.2 School experience

Ernest (1996) suggests that many of the negative images of mathematics among students are result of their mathematics learning experience in school. He claims that "this is plausible because all members of the general public in modern industrialized societies spend many years as students of school mathematics". Therefore, "experiences in school mathematics form the basic for the image of mathematics constructed by learners, especially negative ones. These in turn are a major source perhaps often the dominant source for the public's image of mathematics".

Frank (1988) supports the claim that school experiences have important impact on peoples' problems solving. He argues that students' beliefs develop slowly through a long period of mathematics experience and encounters. For most students, mathematics classroom is probably the primary source of mathematics experience. Therefore, what happens in the classroom will strongly influence the mathematics beliefs of the students in that classroom. These mathematical beliefs can either promote or hinder them as problem solvers.

Thompson's (1984) study suggests that school experience influence students' view of mathematics. She observed that one of her sample, Jeanne held two separate and unrelated

views of mathematics that seemed to be the results of experience of learning mathematics in school. “One was a positive view that seemed to have been influenced by a favourable experience with school mathematics. The other view was related to an unpleasant experience with college mathematics especially with calculus and linear algebra”. Jeanne could not understand what was explained by her mathematics teacher and since then, this experience appeared to have caused her to doubt her own mathematics ability. On the other hand, Kay, another mathematics teacher in Thompson’s sample, was very confident about her knowledge of mathematics and her ability to teach. Apparently her confidence was a result of her successful experience in studying mathematics at school, and partly she attributed it to her inclination toward analytical thinking and logical reasoning. In sum, school experience is thus widely claimed to influence people’s beliefs and image of mathematics. However, more empirical evidence are needed to support this claim.

2.4.2.3 Teacher influence

The significant role of teacher in learning is indisputable. As noted by the NCTM Curriculum and Evaluation Standard (1989) that Teacher implicitly provide information and structure experience that form the basis o students’ beliefs about mathematics. These beliefs exert a powerful influence students’ evaluation of their own ability, on their willingness to engage in mathematics task, and on their ultimate mathematics disposition.

Similarly in the Cockcroft report (Department of Education and Science, 1982), citing from the Royal Society (1976) stated that, mathematics is especially vulnerable to weak teaching. ‘there is no area of knowledge where a teacher has more influence over the attitudes as well as the understanding of his pupils, than he does in mathematics. During his professional life, a teacher of mathematics may influence for good or ill the attitudes to mathematics of several thousand young people, and decisively affect many of their career

choices. It is therefore necessary that mathematics should not only be taught to all pupils, but well taught. All pupil's should have the opportunity of studying in the accompany of enthusiastic and well qualified mathematics teachers'.

Fennema and Peterson (1985) propose that teacher might act as an external influence on both students' internal motivational beliefs and on students' participation in classroom activities. Similarly, Clark and Peterson (1986) made an extensive review on research studies on teachers' thought processes, and they remark that these studies have provided some evidences that a teacher's thinking and other teacher's personal beliefs system. Therefore, I propose that a teacher's instructional decision, which are influenced by his/her beliefs, will influence how a learner do in the classroom and in turn many influence their learning as well as their images of mathematics too. In spite of there are evidences that a teacher's image of mathematics might influence his/her teaching instruction, but to what extent does teachers' image of mathematics influence their students' image of mathematics is relatively unexplored. There is an increased concern about how teachers' images of mathematics might influence their students' (see Brown, 1992) images of mathematics. Several studies have taken into account how the values, beliefs and preference of teachers might influence the values and images of mathematics of their students (see Bishop, 1996; Lin & Chin, 1998; Leu, 1998).

Brown (1992) sets up to examine the influence of teachers on children's image of mathematics. She observed and interviewed four mathematics teachers and six of each of their pupils. She used a qualitative approach of 'story telling' and 'critical incidents' to probe for their images of mathematics. Her findings indicate that"

a. Teacher A through challenging the pupils leaves with them an image of mathematics as initially hard but easy when it's sort out.

b. Teacher B through using the structure of the SMP 11-16 individualized learning booklets leaves with the pupils an image of mathematics as a set of titles from their booklets.
c. Teacher C sees mathematics as a framework of ideas which all link with each other and leaves with the pupils an image of mathematics based on using and applying it.
d. Teacher D and the pupils have a common image of mathematics as enjoyable.

Thus, her results implying that different teacher with different teaching approaches will result in different images of mathematics for their pupils.

Another argument is that teacher's influence is more often implicit in a student's mathematics experience learning in school. Most students when asked to recall their mathematics learning in school often remember their mathematics teachers in relation to their personality or their methods of teaching. There is some research evidence on this. Using a narrative inquiry, McSheffrey (1992) examines the underlying reasons that lead to women's avoidance of mathematics. He studies seven women and 15 either-grade girls, using narrative-based tools such as letters, stories and interviews. His study shows that teacher were the focus of the stories told by most of the participants. These participants recounted their feelings in the mathematics classroom affected by their teachers and they ranked their teachers who can make connections to real life situations to be the best mathematics teachers.

CHAPTER THREE

Research Methodology

3.1 Introduction

The main aim of this study is to explore images of mathematics stakeholders in teachings and learning mathematics at secondary school in Sokoto State. And the chapter present the research design, the population of the study, sampled and sampling techniques, research instrumentation, method of data collection as well as method of data analysis.

3.2 Research Design

The descriptive survey research design was adopted for this study. Descriptive survey is a systematic description of facts, qualities or characteristics of a given population or event which factually and accurately answer a given question posed by the problem under investigation (Nwanbo, 1984:).

3.3 Population of the Study

This research study titled images of mathematics stakeholders in teaching and leaning mathematics at secondary schools is Sokoto state has a target population that researchers intend to cover. The target population for this study is the secondary schools stakeholders. This include but not limited to students, teachers, parents, officials in ministry of education (MOE) and the rest.

Table 3.1 Population of the Study for Teacher, Students and Parents.

S/N	School	Population of Mathematics Teachers	Population of Students	Population of Parents
1.	G.G.D.S.S 'Yar Akija	4	100	4
2.	A.A Raji	5	120	5
3.	G.D.S.S K/Marke	3	85	3
4.	S.A.A.S.S	4	105	4
5.	G.D.S.S Arkilla	4	90	4
	Total	20	500	20

Source: - Principal Office:

3.4 Sample and Sampling Techniques

Due to the constraints of time and resources, the researchers choose to use a combination of stratified and random sampling techniques. The benefits of stratified sampling are that it allow a more or less representative sample to be constructed to represent the-population as well as permitting the stratification of the sample criteria of interest (Bryman & Cramer, 1990)

The sample of five secondary schools in Sokoto State was selected randomly, in such a way that the selection includes two male secondary schools; two female secondary schools and one male and female secondary school.

The following are the selected secondary schools.

1. G.G.D.S.S ‘Yar akija
2. A.A.Raji
3. G.S.S.S K/Marke
4. S.A.A. S.S.
5. G.G.D.S.S Arkilla

Table; 3.2 Samples of Students for the Study

S/N	Schools	Population of Students	Sample Size
1.	G.G.D.S.S ‘Yar akija	100	43
2.	A.A.Raji	120	58
3.	G.S.S.S K/Marke	85	30
4.	S.A.A.S.S.	105	46
5.	G.G.D.S.S Arkilla	90	40
	TOTAL	500	217

Table 3.3 Sample of Teachers for the Study

S/N	Schools	Population of Teachers	Sample Size
1.	G.G.D.S.S 'Yar akija	4	4
2.	A.A.Raji	4	4
3.	G.S.S.S K/Marke	3	3
4.	S.A.A. S.S.	5	4
5.	G.G.D.S.S Arkilla	4	4
	TOTAL	20	19

3.5 Instrumentation

This research study tend to use the questionnaire as the instrument for data collection regarding the research problems.

3.5.1 Validity of the instrument

The validity of the questionnaire instrument was established by giving the questionnaire to some academician base on their known about the subject matter; some items of the draft questionnaires were either eliminated or modify.

3.5.2 Pilot Study

The questionnaire was tested in two secondary school out of five simple school selected. The researchers carefully choose three (3) teachers and 20 student from the two secondary schools. The schools are

1. Nagarta College Secondary School
2. Sultan Atiku Secondary School

3.5.3 Reliability of the Instrument

The reliability of the instrument was established using a test and re-test method. The instrument would be administered and re-administered the selected sampled population, the ideas is to establish the reliability of the instrument.

3.6. Administration of the Instrument

The researchers administered the instruments personally to respondents immediately after introducing the aims of the study. This approach is preferred in the realization that sending the instruments through friends and colleagues to deliver to respondents is unfavorable due to delay and poor returns.

3.7 Procedure for Data Collection

The data in this study were collected using direct delivery method in administration and collection of the completed instrument so as to have significant return rate of the completed instruments.

3.8 Procedure for Data Analysis

In this research, the data collected were analyzed and quantified into sample and tabular presentation based on percentages. In order to analyze the responses in the questionnaire distributed. Analysis was finally done for each question separately and the frequencies of responses made were found through data analysis.

CHAPTERT FOUR

DATA PRESENTATION AND ANALYSIS

4.1 INTRODUCTION

This chapter presents the analysis of data and finding from the analysis on the topic "images of mathematics stakeholders in teaching and learning mathematics at secondary schools in Sokoto State". The purpose of data analysis is to reduce data into an intelligible and interpretable form so that the relations of research problems can be studied, and conclusions drawn (Devos, 1998). Thus, it is classified in such away as to answer the research questions earlier raised in the study.

The data presented and analyzed in this study is the data provided by stakeholders (students, teachers and parents) in Sokoto State through the questionnaire administered.

4.2 Data Presentation and Analysis

A total of 217 questionnaires were administered to the selected secondary school students in Sokoto State, while a total of 19 questionnaires were administered to the selected secondary teachers in Sokoto State and total of 19 questionnaires were administered to the parents in Sokoto State. On the whole two hundred and fifty five questionnaires were distributed and all were successfully returned filled, this will show below.

Table 4.1: Questionnaire administered

Questionnaires	Frequency of student's respondent	Percentage (%)	Frequency of teacher's respondent	Percentage (%)
Number of questionnaires administered returned		217	19	100
Number of missing questionnaire administered	-	-	-	-
Total number of distributed questionnaire	217	217	19	100

Source:- Field survey (2015)

Table 4.2: Qualification of teachers

Responses	**frequency**	**Percentage (%)**
NCE	08	42.11
Diploma	01	5.26
Grade ii	-	-
B.sc	01	5.26
B.sc ed	06	31.57
M.SC	03	15.78
M.SC ed	-	-
Total	**19**	**100%**

Sources: - administered questionnaire (2015)

From table 4.2 above, 42.11% are NCE holders, 5.26% are diploma holders, 5.62% are B.Sc holders, 31.57% are B.sc. Ed holders and 15.78% are M.sc holders. The first question in the student's questionnaire is to know whether the students like mathematics?

TABLE 4. 3: Do you like mathematics?

Responses	Frequency	Percentage%
Yes	182	83.87
No	35	16.13
Total	217	100

Source: Administered Questionnaire (2015)

From table 4.3 above, in item 1 out of the two hundred and seventeen students that responded one hundred eighty two(182) student representing (83.87%) responded that they like mathematics while thirty five students representing (16.13%) they do not like mathematics, s which shows that more than eighty percent of the respondent like mathematics.

The next question in the student questionnaire is mathematics important to you?

Table: 4. 4 Is mathematics important to you?

Responses	Frequency	Percentage %
Yes	190	87.56
No	27	12.44
Total	217	100

Source: Administered Questionnaire (2015)

From the table above one hundred and ninety (190) of the respondent representing (87.56%) answered “yes” while twenty seven (27) of the respondent representing (12.44%) answered “No”. This indicated that Majority of the respondents believe that mathematics is important to them.

The next question in the student questionnaires is “describe your images of learning mathematics”

Table 4.5 Describe your images of learning mathematics?

Responses	Frequency	Percentage (%)
Enjoyable	34	15.67
Difficult	47	21.66
Confusion	59	27.19
Interesting	77	35.48
Total	217	100

Source: Administered Questionnaire (2015)

From the above table thirty four (34) of the respondents representing (15.67%) answered that mathematics is “enjoyable”, fourty seven (47) of the respondents representing (21.66%) answered that mathematics is “difficult”, fifty nine (59)of the respondents represent (27.19%) answered that mathematic is “confusion” and seventy seven (77) of the respondents representing (35.48%) answered that mathematics is “interesting” this shows that mathematics is interested, to the students.

The next question in the students questionnaire is “describe your general belief or view about mathematics”

Table 4.6: Describe your general belief or view about mathematics?

Respondents	Frequency	Percentage (%)
Mathematics is Calculation of numbers	96	44.24
Mathematics is a complex subject	77	35.48
It is simple	44	20.28
Total	217	100

Sources: - Administered Questionnaire (2015)

From the above table ninety six (96) of the respondents represents (44.24%) answered that mathematics is calculation of numbers" while seventy seven (77) of the respondents represents (35.48%) answered that mathematics is a complex subject "and fourty four (44) respondents represents (20.28%) answered that "mathematics is simple". This indicated that the majority of the respondents beliefs that mathematics is calculation of numbers.

The next question in mathematics teacher's questionnaire is "is mathematics important to you"? Below is the summary of the responses: -

Table 4.7: is mathematics important to you?

Responses	Frequency	Percentage (%)
Yes	19	100
No	-	-
Total	19	100

Source: Administered Questionnaires (2015)

The above table indicates that nineteen (19) of the respondent representing hundred percent (100%) answered "yes" while non of the respondent answered "no" this shows that all mathematics teachers likes mathematics.

The next question in the questionnaire is “in your opinion are student interested in mathematics”?

Table 4.8: In your opinion are student interested in mathematics

Responses	Frequency	Percentage (%)
Yes	9	47.37
No	10	52.63
Total	19	100

Source: Administered Questionnaire(2015)

The above table indicates that nine (9) of the respondents representing Fourty Seven Point three seven percent (47.37%) answer “Yes” while ten (10)of the respondents representing. Fifty two point six three percent (52.63%) answered ‘No’ students are not interest in mathematics.

The next question in the questionnaire is “do you like mathematics?”

Table 4.9: Do you like mathematics?

Responses	Frequency	Percentage (%)
Yes	10	52.63
No	9	47.37
Total	19	100

Source: - Administered Questionnaire (2015)

The above table indicated that ten respondent representing fifty two point six three percent (52.63%) answered “Yes” while nine respondent represent fourty seven point three seven percent (47.37%). Answered “No”.

The next question in the questionnaire is “do you consider mathematics as the bedrock of science and technological development in every society.

Table 4.10: Do you consider mathematics as the bedrock of science and technological development in every society.?

Responses	Frequency	Percentage (%)
Yes	9	47.37
No	10	52.63
Total	19	100

Sources: Administered Questionnaire (2015)

The above table indicated that nine (9) respondent representing forty seven point three seven (47.37%) answered “yes” while ten(10) respondent representing 52.63% answered “No”. No they did not considered mathematics as the bedrock of science and technological development in every society.

The next question in the questionnaire is “Describe your image/perceptions of learning mathematics”.

Table 4.11: Describe your image/percent of learning mathematics

Respondent	Frequency	Percentage (%)
Interesting	1	5.26
Easy	10	52.63
Difficult	4	21.05
Boring	4	21.05
Total	19	100

Sources: Administered Questionnaire (2015)

The above table indicated that one (1) respondent representing five point two six percent (5.26%) is “interested,” ten respondents represent fifty two point six three percent (52.63%) believed mathematics is “Easy”, four respondents representing twenty one point zero five percent (21.05%) perceived it as “Boring”.

The next question in the questionnaire is “Describe your general beliefs or view about mathematics

Table 4.12: Describe your general belief or view about mathematics

Responses	Frequency	Percentage (%)
Mathematics is for intelligence ones	6	31.58
Mathematics is calculation of numbers	4	21.05
Mathematics is a complex subject	4	21.05
It is simple	5	26.31
Total	19	100

Sources: Administered Questionnaire (2015)

The above table indicated that six respondents representing thirty one point five eight percent (31.58%) answered “mathematics is for intelligence ones, four respondents representing twenty one point zero five percent (21.05%). Answered “Mathematics is calculation of numbers”, four respondents representing twenty one point zero five percent (21.05%) answered “Mathematics is complex subject” and lastly five respondents representing twenty six point three one percent (26.31%) answered “Mathematics is simple” therefore “mathematics is for intelligence ones.

The next question in parent questionnaire in “Do you like mathematics?

Below is the summary of the respondent.

Table 4.13: Do you like mathematics?

Respondent	Frequency	Percentage (%)
Yes	17	89.47
No	2	10.53
Total	19	100

Sources: Administered Questionnaire (2015)

From the above table seventeen (17) of the respondents representing eighty nine point four seven (89.47%) answered that "yes" while two (2) of the respondents representing ten point five three (10.53%) answered "No" this indicates that majority of the parents like mathematics.

The next question in the questionnaire is "Describe your general believes or view about mathematic"

Table 4.14: Describe your general believe or view about mathematics?

Responses	Frequency	Percentage (%)
Is for intelligence ones	7	36.84
Mathematics is calculation of numbers	3	15.79
Mathematic is a complex subject	5	26.32
Mathematics is single	4	21.05
Total	19	100

Sources: Administered Questionnaire (2015)

From the above table seven of the respondents representing thirty six point eight four (36.84%) answered that "Mathematics is for intelligent ones, three of the respondents representing fifteen point seven nine (15.79%) answered that "Mathematics is calculation of numbers" while five of the respondents representing twenty six point three two (26.32%) answered that "mathematics is complex subject and four of the respondents representing twenty one point zero five (21.05%) answered that "Mathematics is simple". This shows that the majority of the respondents believed that mathematics is for intelligence ones.

The nest question in the questionnaire is "Do you provide mathematics, text books for your children"?

Table 4.15: Do you provide mathematics text books for your children?

Responses	Frequency	Percentage (%)
Yes	16	84.21
No	3	15.79
Total	19	100

Sources: Administered Questionnaire (2015)

From the above table sixteen of the respondents representing eighty four point two one (84.21%) answered "Yes" while three of the respondents representing fifteen point seven nine (15.79%) answered 'No'. Therefore majority of the parents provide mathematics text books to their children.

The next question in the questionnaire is "Describe how your children images mathematics"?

Table 4.16: Describe how your children images mathematics?

Responses	Frequency	Percentage (%)
Enjoyable	2	10.53
Difficult	8	42.11
Interesting	9	47.36
Total	19	100

Sources: Administered Questionnaire (2015)

From the above table two of the respondents representing ten point five three (10.53%) answered that mathematics in "enjoyable" while eight of the respondents represent fourty two point one-one (42.11%) answered that mathematics is "Difficult" and nine of the respondents nine representing fourty seven point three six (47.36%) answered that mathematics is "interesting". This indicates that (42.11%) of the respondents see mathematics as a difficult subject and also (47.36 %) of the respondents view mathematics as interesting subject. Therefore mathematics is interesting subject.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This is the portion of the study, which ties up the research objectives, significance of the study and the research question together. This provides the summary of the study, the conclusions with respect to the finding and lists of recommendations based on the findings in the study. The conclusion is about the connection between the findings of the present study and published literature. In recommendations, an overview of ideas and suggestion for further research is provided. Also, included in this chapter are suggestions for further research.

5.2 Summary

This study explores the range of images, beliefs and attitude towards mathematics as responded by a sample of stake holders of secondary schools in Sokoto state (students) teachers and parents). It also explores in greater depth the possible causal factors of influence on the formation of these images of mathematics. In this study, the term "image of mathematics' is conceptualized as a mental representation or view of mathematics, presumably constructed as a result of social experience, mediated through interaction at school, or the influence of parents, teachers, peers or society. This is also understood broadly to include all visual and verbal representations, metaphorical images and association, attitudes and feeding related to mathematics and mathematics learning experience.

The design of this study was explorative and modestly interpretative, both quantitative and quantitative method were used in data collection. From a synthesis components of respondent's images of mathematics these are (i) utilitarian, (ii) symbolic, and (iii) difficult view.

There are differences in the images and beliefs about mathematics between those who claimed to like mathematics and those who claimed to dislike mathematics. Notably, the

former group of respondents ptends to view difficulty in mathematics as a challenge and attribute success in mathematics to efforts and perseverance. In contrast, the latte group tends to view difficulty in mathematics as an obstacle, and attributes failure to their own lack of inherited mathematics ability or blamed on other (particular, their mathematics teachers). In addition the interview data suggest that the teaching styles and the motivation given by these respondents mathematics teacher, and their parents (mostly father) were the two most important factors of influence on the formation of their attitude to mathematics and images of mathematics. Although these findings suggest that differences in (i) beliefs about attribution to success in mathematics, (ii) mathematics teachers' teaching styles, and (iii) motivation given by mathematics teachers and parents may lead to differences in images and beliefs of mathematics. These in turn may lead to the differences in attitudes towards mathematics and learning mathematics. However, there is a slight different in the ranking of the most common reasons for disliking mathematics between males and females. The males tended to link to external factors such as blaming their mathematics teacher, whereas the females negative feelings, as well as their own lack of ability in mathematics.

5.3 Conclusion

In the light of these research findings on images of mathematics stake holders in teaching and learning at secondary school in Sokoto state, it is not out of place to emerge from this study. This indicated that the notion of difficulty was a part of their image of mathematics. These respondents viewed mathematics as a subject that is difficult to understand, that needs a lot of hard work and extra effort. Consequently, some believe that one needs to have a special mathematical ability to be good at mathematics that is mathematics is only for the intelligent ones. More than half of the respondents gave these similar reasons. While some of the respondents gave their images of mathematics as related to utilitarian and symbolic views of mathematics. Such as mathematics is the bedrock of science and technological development

in every society, mathematics is useful in every day life and mathematics is both calculations of numbers and interesting. Generally, the images of mathematics of the sample are characterized by expression of feelings and attitudes, followed by the category of the nature of mathematics. The five most common factors of influence were: mathematics teachers; parents; peers; own interests in mathematics teacher was listed as the most common influence.

More than half of the sample responded that they like mathematics and one third of them stated they do not like mathematics. However, they gave their reasons for liking mathematics is, because they are good at it. Moreover, they appreciate the practical value of mathematics as they can use it at work and in daily life. On the subject that is difficult to understand and tended to feel that they lack the ability to learn mathematics and thus they are not good at it. They also tended to compare themselves with others and commonly believe that mathematics is only for the intelligent ones.

In term of gender comparisons, the results indicated that males showed the most positive images of mathematics, while female were shoed the least positive images of mathematics.

5.4 Recommendations

Based on the findings of this study, the following recommendations were made;

- The result from this study suggested that, there is need to develop a positive images of mathematics through the setting up of "Mathematics Club" in every secondary school. Its aim should be as follows,
    a. To develop a love for Mathematics
    b. To help students develop positive attitude towards Mathematics development from ancient time to present
    c. To further stress its importance to students who will go on higher institution of learning for mathematics related courses.
- The respondents were also asked to give suggestions for the improvement of the mathematics learning, the majority of them gave some forms of suggestions for improving mathematics learning. Those who claimed to like mathematics tended to stress the importance of removing the anxiety or the negative image of mathematics as 'difficult' or 'only for the intelligent ones'. They suggested that mathematics teachers should try to motivate and build up the self-confidence of pupils/students and convince them that everybody is able to be good at mathematics. One of them also suggested that we should admit that mathematics is difficult but then prepares students to take it on as a challenge. In addition, several of the respondents stressed the importance of relating mathematics to daily life experiences or activities and teaching it as a practical tool. They also suggested that as an effective strategy, students should be allowed to explore and solve problems themselves. A mathematics teacher should not be somebody who just stands there and lectures, but he should teach from the very beginning, how it can be applied to the real world and to see that it excites the students and teacher as well.

For those who claimed to dislike mathematics, they tended to emphasize making mathematics interesting and fun by using games. This is because of their view that by making it more fun the students will be interested and they want to learn it, instead of feeling that they have to learn it. They also stressed the importance of where and how to get certain formula and problems, and then set them off their activities and exploiting the fact that mathematics is interlinked with many other subjects. Thus, the researchers notice that suggestions from both groups (those who sated that they linked and those who stated they disliked mathematics) were similar. Both tend to emphasize the importance of clear explanation, interesting and enjoyable mathematics lessons, as well as the relevance of mathematics in daily life.

- In order to improve the positive images of mathematics among stakeholders government should consider the following points,

    a. The government should endeavour to provide the necessary infrastructures and facilities that will motivate teaching and learning of mathematics.
    b. The government should come up with packages that will motivate mathematics teacher and reward hardworking teachers and students
    c. The state government should as a matter of urgency send mathematics teachers for training and seminars for effective teaching of mathematics in secondary schools.
    d. The appropriate bodies responsible for monitoring of teachers and students should be made to leave up to expectations.

- Since the present study was limited to senior secondary schools students, similar studies could be carried out to cover both junior ands senior secondary schools students as well as other sectors of education.

5.5. Contribution to Knowledge

This research has contributed in finding out the solutions that can help in teaching and learning mathematics in secondary school through investigation how stakeholders view mathematics. Following are some of the contributions.

- Teachers should try to see that attention is paid to students seriously during their secondary school level, if possible their should be left at the hand of the most experienced teachers during that period.
- Parents should show their interest of mathematics to their children by encouraging their children in learning mathematics
- The government concerned should improve the condition of services for teachers, teachers were over worked because the number of periods per week and the number of students per class was too large for effective teaching. Training of mathematics teachers should therefore be accelerated so that when the manpower shortages is reduced the teachers' work load should accordingly be minimized.

5.6 **Suggestion for Further Studies**

Teachers often face many obstacle in the class room a wide range in ability, lack of supports or resources, large class size, time constraints. But Perhaps one of the difficult obstacle is fear of mathematics. Mathematics phobia can easily translate into students exhibiting anxiety, lack of involvement and even behavioral issues.

Research has confirmed that mathematics anxiety is linked to poor mathematics performance, and make teaching the subject a daily struggle. The following can help the stakeholders to overcome the problems

1. Building students confidence in mathematics
2. Strengthen students basic skills
3. Develop a growth mindset
4. The attitudes of the teachers

APPENDIX

DEPARTMENT OF SCIENCE AND VOCATIONAL EDUCATION, FACULTY OF EDUCATION AND EXTENSION SERVICES, USMANU DANFODIYO UNIVERSITY, SOKOTO.

TEACHERS QUESTIONNAIRE

We are students of the Department of Science and Vocational Education, Usmanu Danfodiyo University Sokoto undertaking a research on the Topic; images of mathematics stakeholders in teaching and learning mathematics at secondary schools in Sokoto state.

We are in need of your respond to the questions below and your **responses** would **be treated confidentially.**

INSTRUCTION; Please tick in the appropriate box provided.

1. School Name:…….

2. Age.....,,.....

3. Sex; Male ( ) or Female ( )

4. Marital Status; Single ( ) or Married ( )

5. Class teaching……..

6. Subject Teaching

7. What is your highest qualification?.....

S. Years of Teaching Experience.....

9. Is mathematics important to you? Yes ( ) or No ( )

10. give reasons for your answer to question (9) above;……..

……

11. In your opinion are interested in mathematics? Yes ( ) or No ( )

12. Give reasons for your answer to question (11) above;.....

13. What is your impression of mathematics during your school Period?

(a) Very Dimple (b) Fairly simple (c) Very difficult

14. Do you like mathematics? Yes ( ) or No ( )

15. Give reasons for your answer to question (14) above;.....

16. Do you consider mathematics as the bedrock of science and technological development in every society? Yes ( ) or No ( )

17. Are instructional materials very important in mathematics teaching and learning Yes ( ) or No ( )

18. How do you motive students?.....

19,How do as a mathematics teacher presents themselves? (a) Dedicated (b) Sincere (c) Hoae.st (d) Neat and other specify.....

20. Are there] ways or methods of teaching you adopt in teaching mathematics that stimulates students interest? Yes ( ) or No ( )

USMANU DAN FODIYO UNIVERSITY, SOKOTO
FACULTY OF EDUCATION AND EXTENSION SERVICES
DEPARTMENT OF SCIENCE AND VOCATIONAL EDUCATION.
Student's Questionnaire

The aim of this questionnaire is to find the problems encountered in teaching and learning mathematics. Please fill in the questionnaire as correctly and as truthfully as you can. Your answer will be kept a secret.

PERSONAL DATA

Name of School_____

Class_____

Sex_____

Age_____ 1. Do you like mathematics

YES ☐ NO ☐

2. Is mathematics important to you?
   YES ☐ NO ☐
3. Describe your images of learning mathematics?
   a. Enjoyable ☐
   b. Difficult ☐
   c. Confusing ☐
   d. Interesting ☐
4. Describe your general belief or view about mathematics
   a. Mathematics is calculation of numbers ☐
   b. Mathematics is a complex subject ☐
   c. It is simple ☐
5. How do you find the textbooks of mathematics helpful?
   a. Good ☐
   b. Fairly ☐
   c. Poor ☐
6. How often do you access mathematics textbooks?
   a. Always ☐
   b. Very often ☐
   c. Not at all ☐
7. How do you find mathematics in your present class?
   (a) Very interesting ☐ (b) fairly interesting ☐ (c) not interesting ☐

1. How do you find mathematics in your previous class?

(a) Very interesting ☐ (b) fairly interesting ☐ (c) not interesting ☐

2. Your class teacher assignment is base on?
   (a) Class work ☐ (b)Home work ☐ (c) Test ☐

3. Did you have enough textbooks in your school?
   (a) Yes ☐ (b) No ☐
4. How often do you fell mathematics sets is helpful in understanding mathematics concept (a) always (b) very often ☐ (c)not at all ☐ ☐
5. How can you assess the teaching of mathematics in your present class
   (a)Good ☐ (b) fairly ☐ (c) Poor ☐

6. In terms of instructional, how can you image mathematics?
   (a) Very interesting ☐ (b) fairly interesting ☐ (c) interesting ☐

7. Do you participate in class when solving problem?
   (a) Yes ☐ (b) No ☐
8. If yes how?
   (a) By interaction ☐ (b) by solving class work ☐

USMANU DAN FODIYO UNIVERSITY, SOKOTO
FACULTY OF EDUCATION AND EXTENSION SERVICES
DEPARTMENT OF SCIENCE AND VOCATIONAL EDUCATION.

We are the final year students from the faculty of education and extension services Usmanu Dan fodiyo university, sokoto. Undertaking research on the topic: Image of Mathematics Stakeholders in Teaching and Learning Mathematics at Secondary Schools in Sokoto State. Kindly help by answering the following questions carefully and honestly; you are expected to tick the correct answer or comment where necessary; your response could be confidential.

PARENT QUESTIONNAIRE

Name:_____

Occupation:_____

Gender:_____

Age:_____

Questions

1. Describe your general believe or view about mathematics?
   a. Is for clever ones. ☐
   b. Mathematics is calculation of numbers ☐
   c. Mathematics is a complex subject ☐
   d. Mathematics is simple ☐

2. Is mathematics important to you?
   YES ☐ NO ☐

3. In your opinion are children interested in mathematics
   YES ☐ NO ☐

4. How would you grade your child's performance in mathematics
   a. Very Good ☐
   b. Good ☐
   c. Poor ☐

5. Do you like mathematics? YES ☐ NO ☐

6. Did you provide mathematics text book for your children
   YES ☐ NO ☐

7. Is Mathematics crucial in our social activities?
   YES ☐ NO ☐

8. Did you assist your child in solving mathematical problems?

YES ☐ NO ☐

9. Do you provide mathematics instrument for your child?

YES ☐ NO ☐

10. Do you provide mathematics extra lesson to your child?

YES ☐ NO ☐

11. Do you consider mathematics as a guidelines to your child's studies?

YES NO ☐ ☐

12. Do you provide your child with mathematics tools/learning materials?

YES ☐ NO ☐

13. As a parent which subject do you want your child to practice always?

(a) Mathematics ☐) English ☐ Biology ☐

14. Describe how your children images mathematics?

(a) Enjoyable ☐ (b) difficult ☐ (c) interesting ☐