Young Scientist - Tomorrow's Science Begins Today
Vol 1, Issue 1 - 2017

PERCEPTION OF TEACHERS AND PUPILS ON FACTORS INFLUENCING ACADEMIC PERFORMANCE IN MATHEMATICS AMONG A GROUP OF FIFTH AND SIXTH GRADERS IN JAMAICA

JENNIFER HARRIS[*], PAUL ANDREW BOURNE[**]

ABSTRACT

The study examined the perception of students and teachers and the causes of poor performance Mathematics at a Primary and Junior High students in St. Catherine, Jamaica. Subjects for the study were Twenty (20) students and two (2) teachers randomly drawn from the school. Questionnaires were used to collect relevant data for the study. Percentages and chi-square were used to analyze the research answers. Responses of teachers show that teachers' qualification and students' environment do not influence students' poor performance but the teachers' methods of teaching influence poor academic performance. Students' response on the other hand showed that while teachers' qualification and students' environment influence students' poor performance. The lecture method and not much interactive teaching of students in finding ways to solve problems in Mathematics and also not much use of technology in classroom. Teachers' method of teaching and learning material werenot. The implications of these findings for this Primary and Junior High school guidance counselors interested in counseling adolescents for good academic performance were discussed.

KEYWORDS: Academic Performance, Mathematics, Grade Six Students, Secondary School, Jamaica.

INTRODUCTION

The differences in educational achievement of students in Grade Six Achievement Test have been and are still a source of concern and research interest to educators, government, teachers and parents. This is so because of the great importance that education has on the national development of the country such as Jamaica, Trinidad and Tobago. All over the country, there is an agreement of opinion about the fallen standard of education. Parents and government are in total agreement that their huge investment on education is not yielding the desired dividend. Teachers also complain of students' low performance at both internal and external examinations. The result of Grade Six Test (GSAT)-2002-to-2016-from the Ministry of Education justified the problematic nature and overview of poor primary school students' performance in Mathematics (see Table 1).

[*]The Mico University College, Jamaica, WI.
[**]Northern Caribbean University, Mandeville, Jamaica, WI.
Correspondence E-mail Id: editor@eurekajournals.com

Table 1.Performance of Jamaican Students on Grade Six Achievement Test (GSAT), 2009-2016

Year	%
2002	51.0
2003	48.0
2004	44.2
2005	57.8
2006	53.0
2007	46.0
2008	55.0
2009	53.0
2010	57.0
2011	62.0
2012	63.0
2013	61.0
2014	60.0
2015	56.0
2016	57.0

Source: Ministry of Education, Youth and Information, various years

Statistical Institute (STATIN) report stated that during the academic year 2010 to 2011 there has been a significant decrease in the performance in Mathematics in the Grade Six Achievement Test even though all have not failed. Both teachers and parents are dissatisfied with the poor result of the examination. The national average for the Grade Six Achievement Test in 2008-2009 was 53 percent, down from 55 percent in 2008 (The Statistical Institute, Jamaica. 2009-see Table 1). To date nothing has changed. Then in 2015 to 2016 there was only 57% pass in Mathematics, and 43% of the candidates were failing the subject at the Sixth Grade level in primary and/or preparatory schools.

Taking the GSAT Mathematics test was never an easy venture because math can be a difficult and complex subject. Most students do poorly on the GSAT math tests not so much because the material is too difficult to understand as much as the student's study habits maybe poor. That is to say, poor test preparation may be the reason for under performance. Some students might have waited until the night before the test to study which is often a way for disaster as it leaves far too little time to study properly. Then when extra time is needed in order to properly prepare, it would be too late. Since Math is not a course like history, practice must be done and students may not have worked on weaknesses. Where there is a particular area of weakness in Mathematics, it should become important to put more time to work in such area. Students need to be aware of the importance of mastering numeracy. Educators might not have ensured that the curriculum supports new approach to Mathematics teaching, and develop conceptual under-standing, computational fluency and problem-solving skills.

According to a former Minister of Education who stated that the scarcity of teaching and learning materials in Jamaica and this crisis has affected Mathematics. Significant changes must take place in teaching Mathematics." Therefore teacher's greater effort is needed, by helping to engineer change to assist students to understand mathematical concepts. Teachers have been teaching for exams and this should change, if the old ways have not worked, then new approaches are needed. The methods used in teaching the subject may not be the best ones or may not be the most effective at this present time. Ibid.

In the past, male students used to do better in Mathematics than females students, but these days male students are leading in mathematical problems (The Statistical Institute of Jamaica 2009). Individuals who cannot read would feel ashamed to say so, but not so for Mathematics, people will openly confess that they can't do Mathematics. There has been a fear of the subject as stated by Lester, F. K. Jr. (1983) therefore; teachers and students alike avoid the subject, or show little or no interest in learning Mathematics. A teacher will teach the stronger areas of Mathematics but avoid teaching areas where they are weak in. Therefore, students will

also be weak in these areas of Mathematics. Those areas would not become known to the students. This had been an ongoing trend among teachers and students, which could have been the reason why some parents are unable to do Mathematics as well. Therefore students will not have gotten the assistance needed from these parents at home.

Education at the primary school level is supposed to be the base and the foundation towards higher knowledge in secondary and tertiary institutions. It is an investment as well as an instrument that can be used to achieve a more rapid economic, social, political, technological, scientific and cultural development in the country. The National Policy on Education (2004) stipulated that secondary education is an instrument for national development that fosters the worth and development of the individual for further education and development, general development of the society and equality of educational opportunities to all Jamaican children, irrespective of any real or marginal disabilities.

The role of primary education is to lay the foundation for further education and if a good foundation is laid at this level, there are likely to be no problems at subsequent levels. However,

different people at different times have passed the blame of poor performance in primary school `to students because of their low retention, parental factors, association with wrong peers, low achievement, low achievement motivation and the likes (Aremu & Sokan, 2003; Aremu & Oluwole 2001; Aremu, 2000). Morakinyo (2003) believes that the falling level of academic achievement is attributable to teacher's non-use of verbal reinforcement strategy. Others found out that the attitude of some teachers to their job is reflected in their poor attendance to lessons, lateness to school, unsavory comments about student's performance that could damage their ego, poor method of teaching which would affect pupils' academic performance. Ibid.

The question therefore is what is the cause of this fallen standard and poor academic performance of students? Is the fault entirely for teachers or students or both ? Is it that students of today are non-achievers because they have low intelligent quotient and a good neutral mechanism to be able to act purposefully, think rationally and deal effectively with academic tasks? Or is it because teachers are no longer putting in much commitment as before? Or is it in teachers' method of teaching and interaction with students? Or is the poor performance of students caused by parents' neglect, separation and poverty? Despte the seemingly general under performance of many Jamaican students at the primary-to-secondary level (Powell, Bourne and Waller, 2007), there are instances of academic excellence. The question that is felt unanswered is 'What are the factors influncing under performance among poor achievers? Hence, the present study therefore sought to find out students and teachers' awareness of the causes of poor academic performance of the primary and junior high school students in St. Catherine. This will help teachers to use the findings to enable students to perform better in Mathematics. To change the Statistical annual report, and that teacher, stake holders and educators will be satisfied with examination results. The purposes of this study are out whether there is significant difference between methods of teaching and academic performance, qualification of teachers and academic performance and students' environment and academic performance. This research will attempt to answer the following questions: 1) What is the perception of teachers on students' poor academic performance and the teachers' qualifications?; 2) What is students' perception to teachers' qualification and their students' poor academic performance? 3) What is the

perception of teachers on students' poor academic performance and teachers' method of teaching? and 4) What is the perception to student's poor academic performance and the teachings' methods?

DEFINITION OF TERMS

FACTORS

One that actively contributes to an accomplishment, result, or process: "Surprise is the greatest **factor** in war" (Tom Clancy).

GSAT

Grade Six Achievement Test

MATHEMATICS

The study of measurement, properties and relationships of quantities and sets, using numbers and symbols. Mathematics taught in primary and secondary schools that constructs mathematical relationships from set theory.

PERFORMANCE

Is the act of performing or the state of being performed., or the act or style of performing in a work or role before an audience. The way in which someone or something functions: (She did well on her examination).

LITERATURE REVIEW

ACADEMIC PERFORMANCE

Poor academic performance, according to Aremu (2000), is a performance that is adjudged by the examinee/testee and some other significant personel as falling below an expected standard. The interpretation of this expected or desired standard is better appreciated from the perpetual cognitive ability of the evaluator of the performance. The evaluators or assessors can therefore give different interpretations depending on some factors. Some of the factors affecting academic performance include student-staff ration, qualification of teachers, years of experience of teachers, school environment (Akinloye, Adu, & Adu, (2015), and some factors are destractions as playing games, and the entertainment industry. Bakare (1994) described poor academic performance as any performance that falls below a desired standard. The criteria of excellence can be from 40% depending on the subjective yard stick of the evaluator or assessor. For example, a 70% performance of Senior Secondary 3; students in Junior Secondary English Language examination is by all standard a very good performance.

However, a look at the performance and the individual examined and the standard of the examination he or she took could reveal that the performance is a very poor one. On the other hand, a JSS2 student's performance of 37% in SS3 Mathematics can be said to be a poor performance when in actual fact the performance is by all standards a very good one. This shows that the concept of poor academic performance is very relative and this depends on so many intervening variables which are standard related. Generally, it is agreed upon that poor performance in Jamaica is when an individual has not successefully past an internal or external examination or receiving a score of less than 50% on an internal test.

Aremu and Sokan (2003) submit that the search for the causations of poor academic achievement is unending and some of the factors they put forward are: motivational orientation, self-esteem/ self-efficacy, emotional problems, study habits, teachers and behaviour, teacher consultation and poor interpersonal relationships. Bakare (1994) also made efforts to categorize factors influencing academic performance into four principal areas which are: i. Causation resident in the child such as basic cognitive skills, physical and health factors; psycho-emotional factors, lack of interest in school programme; ii. Causation resident in the

family such as: cognitive stimulation/basic nutrition during the first; two years; type of discipline at home; lack of role model and Finance; Causation resident in the school such as school location and physical building; interpersonal; relationship among the school personnel; Causation resident in the society such as instability of educational policy; under-funding of educational sector, leadership, and job losses.

TYPES OF FAMILY AND STUDENTS' ACADEMIC PERFORMANCE

Three major types of family are nuclear or monogamous, compound or polygamous and traditional or extended families. Studies performed by people proved that each type has its influence on the academic achievement of a child. (Bakare, 1994).

Many research studies have indicated that children from nuclear families perform better in school than children from the compound or polygamous families (Ajala & Iyiola, 1988).

The following reasons may be responsible for this:

1. The children have more time for their studies in most cases because there are less people to send them on errands and the father is present. The reverse is the case in a polygamous family.
2. Children from polygamous and broken homes have tendency to be social deviants due to lack of adequate supervision and care, because of little or no family structure.
3. Since there are more people in a polygamous family, they create a lot of pressure or influence on the child. If it happens that a lot of such influences are bad then this will adversely affect the child. If the influence on the child is good then influence would be good also.

FAMILY SIZE AND POSITION IN THE FAMILY

Family size refers to the number of children in the reference family (Islam Uddin, Bhuyan, & Sanjida Islam, 2011; OECD, 2016). The larger the family the less the attention and devotion of each child by the parents and the more the difficulties encountered by the parents in meeting the needs of the children both physically and emotionally particularly in this austerity period when the prices of food and commodities are skyrocketed (Adane, 2013; Ella, Akpabio,& Sampson-Akpan, 2015; Ella, Odok, & Ella, 2015; Rono, Onderi, Owino, & Odinga,2014; Suleman, Hussain, Akhtar, & Khan. 2012. No wonder the federal government of Nigeria is making a move to limit the number of children by a female to four (Akanwa, Anyanwu, & Ossai-Onah, 2013; United Nations, 2002). It is a good move in the right direction although the populace themselves are regulating child bearing due to the present economic conditions. The fewer the family the better the 'rule.' In Jamaica the government has family planning seminars and programme at the clinics and among students in schools in guidance classes which is called Health and Family Life Education [HFLE (Henry, Black & Lewis, 2006). The position a child occupies in a family equally plays a significant role in his development and academic achievement. Generally, the first child enjoys most particularly among the middle class and the 'rich'. The parents are excited and determined to give him all he or she needs. They are generally overprotected and have tendency to become spoilt due to the type of family they come from. Due to some of the facts stated above, some of them that are undetermined achieve low academic excellence.

In few cases, particularly among the 'poor', they labour seriously to achieve academic excellence and hence pave way for those behind them. The last born are generally 'rotten' in that they are adequately provided for not only by their parents

but equally by their brothers and sisters. The mere fact that their brother is a lawyer and their sister is a doctor; blindfold them to the extent that they themselves will not work hard. In other words, they are relaxed by their elders' achievements. However, there are exceptional cases to this (Asikhia, 2010).

TEACHERS' METHOD OF TEACHING

The means or strategies employed by teachers in an attempt to impact knowledge to the learner is referred to as methodology. Osokoye (1996) sees teaching method as the strategy or plan that outlines the approach that teachers intend to take in order to achieve the desirable objectives. It involves the way teachers organize and use techniques of subject matter, teaching tools and teaching materials to meet teaching objectives. Sometimes when a teacher teaches and at the end of the lesson, evaluation is carried out and it is discovered that students are unable to carry out the behavioural or instructional objectives what the teacher needs to do is to examine his teaching methods rather than looking at students as the causes. Most untrained teachers, which is also the case for some trained teachers, point accusing fingers on students rather than on themselves when the students are unable to carry out the expected behaviour at the end of the lesson or in examinations. Therefore, teachers planning should include: I. Choice of appropriate teaching material; Choice of appropriate teaching method (Asikhia, 2010).

CLASSROOM MANAGEMENT

The classroom is that space bounded by the wall and roof, which a teacher houses his pupils/students for the purpose of giving instruction to such pupils/students. In other words, it is a shelter for both teachers and learners so as to engage in educative activities. Management on the other hand, can be seen as the process of designing and maintaining any setting in which people work in groups for the purpose of accomplishing pre-determined goals (Hannah, 2013). The idea of 'any setting' equally indicates that management is applicable to all establishments which do not exonerate educational setting. Adequate well prepared instructional materials determine the amount of learning that can be placed in a learning setting (Grubaugh & Houston, 1990). Good quality materials can motivate interest, maintain concentration and make learning more meaningful. The need for the use of instructional materials by the subject teacher in the modern age cannot be overemphasized; the traditional method of talk and chalk approach can no longer improve the performance of students in secondary schools academically (Asikhia, 2010).

MATHEMATICAL PROBLEM IN JAMAICA

Mathematics is one of the most important subjects taught in all Primary Schools. In Jamaica, students learn Mathematics every day, for half an hour of the five school days. It is one of the five compulsory subjects apart from Language Arts, Science, Social Studies and Communication Task examined in the Primary for Grade Six Achievement Test (GSAT). It is widely accepted by educators, teachers and students in primary schools that Mathematics is difficult to teach and learn, (Sainah, 1998). She added that despite the use of modern teaching methods, the availability of modern teaching materials and the provision of specialized training for all teachers, most teachers still find difficulties in teaching Mathematics because their students have many problems in learning it. For example, some students can perform arithmetical computation quite well but often have difficulty solving word problems that require the application of those same computational skills.

ATTITUDE TOWARDS MATHEMATICS

Attitude is a central part of human identity. Everyday people love, hate, like, dislike, favour, oppose, agree or disagree, which is an expression

of their attitude towards or on things (Mohamed & Waheed, 2011). Literature refers to attitude as a learned predisposition or tendency of an individual to respond positively or negatively to some object, situation or concept (Nicolaidou & Philippou, n.d.). There have been several attempts at defining and redefining attitude in the context of Mathematics education (Allport, 1935; Neale, 1969; Aiken, 1970; Haladyna, Shaughnessy, & Shaughnessy, 1983; Hart, 1989; McLeod, 1992; Martino & Zan, 2009 and Hannula, 2012) as cited in Larsen (2013). Similarly, Chamberlin (2010) confirmed that there is no consistent view on what constitutes attitudes, which highlight the challenge of influencing attitudes.

Some scholar opined that it is difficult to define a single variable called attitude (Liu & Johnsons, 1998) hence; studies have focused on investigating students' attitude towards Mathematics in relation to one or more variables such as motivation, confidence and usefulness of Mathematics content. Students' attitude towards Mathematics, therefore, plays a fundamental role in the teaching-learning process. Larsen (2013) declared that "learning Mathematics is not only a cognitive challenge, but an affective one" (p.1); with McLeod (1992) postulating that "[attitude] plays a significant role in Mathematics learning and instruction," (p. 575). Likewise, Mubeen, Saeed and Arif (2013) opined that "attitudes are highly composite and they can affect learning comprehensively" (p 38).

McLeod (1992) in his advocated three kinds of affect which will have an impact on the learning of Mathematics; namely beliefs, attitudes, and emotions, which expand the challenges of teaching-learning process in Mathematics. Likewise, Pries & Biggs (2001) described a cycle of Mathematics avoidance: In phase one, the person experiences negative reactions to Mathematics situations. These may result from past negative experiences with Mathematics, which lead to a second phase in which a person avoids mathematical situations. This avoidance leads to phase three, that is poor Mathematics preparation, which brings them to phase four, poor Mathematics performance. This generates more negative experiences with Mathematics and brings students back to phase one. This cycle can be repeated so often that the Mathematics anxious students become convinced that they cannot do the subject and so the cycle is rarely broken.

The dismally low performance of students in Mathematics in Jamaica is typically the same across the globe. The cycle outlined by Pries & Biggs (2001) offers some explanations for the performance deficiency in the subject area. Hence, the "negative attitudes towards Mathematics can be considered a serious problem in Mathematics education" (Yaratan & Kasapoglu, 2012, p. 164). Ignacio, Nieto, Barona**,** (2006) also disclosed that "many pupils generate negative attitudes towards Mathematics in the course of their academic life; and for most pupils the subject is not a source of satisfaction, but rather one of frustration, discouragement, and anxiety and so many of them, even some of the most able, find Mathematics to be just a tiresome chore" (p. 17). Therefore, some students find Mathematics challenging and so they despise it.

Ignacio, et al., (2006) also asserted that "indeed, many students, thinking that "they are not cut out for Mathematics" end up by rejecting the subject, which they consider a sort of "millstone" that they have to get rid of as soon as they can, by choosing other options offered to them (p.17). Thus, students who normally perceived Mathematics to be a difficult subject will choose subject areas or options that require little or no mathematical skills; when they are able to do their selections in higher grades. Concomitantly, attitudes exert a decisive influence on learning and on how pupils perceive and value Mathematics, as well as on their own view of themselves as learners. Moreover, "attitude towards Mathematics is also influenced by many

factors such as gender, parents, peers, teachers, teaching methods, ethnicity, the home and the school environment" (Khaliq & Rodrigues, 2012, p. 12).

SELF-EFFICACY ABOUT MATHEMATICS

During the past two decades, self-efficacy has emerged as a highly effective predictor of students' motivation and learning (Zimmerman, 2000). According to Bandura, (1997) self-efficacy is a social cognitive theory which involves persons' "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Therefore, students' mathematical self-efficacy is their beliefs about their capabilities to control the outcome regarding their mathematical performance (Locklear, 2012). Schoenfeld (1992) explained that beliefs could "be interpreted as an individual's understandings and feelings that shape the ways that the individual conceptualizes and engages in mathematical behaviour" (p.358). Bandura (1986) also contended that self-efficacy does have an impact on academic achievement.

It was also found that self-efficacy is a major determinant of the choices that individuals make, the effort they expend, the perseverance they exert in the face of difficulties, and the thought patterns and emotional reactions they experience (Bandura, 1986). Bandura (1986) even advocated that "the types of outcomes people anticipate depend on their judgments of how well they will be able to perform in given situations" (p. 392). This may affect students' attitude towards a subject such as Mathematics and how they will perform in it. Consequently, research has shown in school Mathematics that "perceived self-efficacy contributes to academic performance irrespective of the level of intellectual ability, and correlates strongly with academic outcomes, such as performance in problem solving, attitudes towards Mathematics and math anxiety" (Michaelides, 2008, p. 222) as cited in (Locklear, (2012).

Additionally, various studies have maintained the theoretical framework that confidence in one's ability to undertake certain tasks is the best predictor of behaviour, in accomplishing the task (Bandura, 1986, 1997; Pajares, 1996). Self-efficacy beliefs therefore influence a student's choice of task, resilience, effort, persistence and subsequently achievement (Bandura, 1997; Schunk, 1995). These beliefs may therefore influence students into how much effort they direct to given endeavours, how long they will keep trying when they are faced with given obstacles and failures; their resilience to adversity and whether their thought patterns are self hindering or self-aiding (Bandura, 1997). Hence, the students who possess higher self-efficacy will feel more positive about their abilities, and therefore put more exertion in given tasks, as they will keep trying through whichever challenges they encounter in Mathematics. In contrast, most students will feel frustrated and helpless because they lack the confidence to do a mathematical problem correctly (Russell, 2008).

Zimmerman (2000) in his study also gave a fair indication of the role of self-efficacy "as a potent mediator of students' learning and motivation which confirms the historic wisdom of educators that students' self-beliefs about academic capabilities do play an essential role in their motivation to achieve" (p.89). Likewise, the findings of a study done by Frazier-Kouassi (1999) suggested that students who feel more positive about their abilities, and are not easily discouraged by difficult Mathematics problems are higher achievers in Mathematics. It is long held across different populations that students as well as teachers believe that Mathematics is 1) computations or calculations; 2) problems must be able to be solved in few minutes or there is an error in the approach; 3) the primary goal is a get a correct answer, and 4) the students are passive learners and the teacher is the active participant. (Frank, 1988; Spangler, 1992, 19). These suppositions and preconceived notions can

demotivate students, which may result in students' poor attitudes towards Mathematics especially for the fact that, many of them have established negative connotations.

Nolting (2002) as cited in Bogardus (2007) also believed that most students do not know how to study Mathematics because they have never been taught how to master Mathematics study skills. Bogardus (2007) cited that Shearn and Wilding (2000) concurred with Nolting's (2002) findings that speculated that the lack of success and confidence many students experienced could be attributed to poor Mathematics study skills. Consequently, many studies have shown that there is a correlation between students' achievement and their level of motivation (Halawah, 2006) as cited in Bogardus (2007). Moreover, Nicolaidou and Philippou (2003) revealed in their studies that attitudes and self efficacy were correlated.

THE EXTENT TO WHICH MATHEMATICS IS PERCEIVED AS MALE DOMAIN

The difference between genders as it relates to achievement in Mathematics has been an immense controversial area in the educational sphere and research documents confirmed many discrepancies among the performance of girls and boys in Mathematics (Sprigler & Alsup, 2003). According to Brandell, Nyström, and Sundqvist (n.d.), the extent to which Mathematics is perceived as a male domain explains whether Mathematics is considered more suitable, important and interesting for boys than for girls. This may also give an explanation as to why some students would want or would not want to pursue careers in Mathematics or job related fields where Mathematics is a pre-requisite or a critical component.

Some persons have maintained that gender differences in Mathematics achievement are in favour of males. Accordingly, Mahanta and Islam, (n.d.) claimed that "in our society there exists a general belief that Mathematics is a subject for boys" (p. 713). Hence, there are persons who believe that males will undeniably do better in Mathematics than females. Furthermore, Fennema (2002) contended that males strongly believed that Mathematics is more fitting for boys than girls. Other researchers purported that males tend to be more confident than girls and females in academic areas related to Mathematics (Pajares & Miller, 1994; Wigfield, Eccles, & Pintrich, 1996). Moreover, Frempong and Ayia (2006) as cited in Amatobi and Amatobi (2013) found that "female students are less successful in learning Mathematics, due to their low interest and confidence in learning Mathematics and their low academic expectation"(p.2). Hence, these studies found the subject to be more male dominated.

The point is also supported by the findings of Fennema and Sherman (1977) who investigated gender differences at the junior high and high school levels; using the Fennema-Sherman Mathematics Attitude Scales (MAS) which revealed that more boys than girls considered Mathematics to be a male domain. Farooq and Shah (2008) agreed as they asserted that "males are more inclined towards Mathematics than females on being the male dominated domain" (p. 76). Furthermore, a meta-analysis containing numerous studies that used the Fennema-Sherman Mathematics Attitude Scales (MAS) in which they reviewed 70 articles confirmed that boys to a larger extent stereotyped Mathematics as a male domain than did girls (Hyde, Fennema, Ryan, Frost, & Hopp, 1990).

However, the aforementioned researches do not coincide with the findings of Asante, (2012) who compared both genders, and discovered that "girls lacked confidence, had debilitating causal attribution patterns and perceived Mathematics as a male domain" (p. 2). Hence, Asante's finding showed that more girls than boys believe that Mathematics is a male dominated area. Subsequently, if students consider Mathematics

to be more of a male domain, this may possibly have an impact on female students in that they may not want to study the subject, as they may develop a negative attitude towards it. Hence, according to Brandell, Nyström, and Sundqvist (n.d.), the construct "Mathematics as a male domain" continues to be seen as a critical variable in helping to explain perceived disadvantage experienced by females in Mathematics and related areas" (p. 2).

Halai, (2007) as cited in Khaliq and Rodrigues (2012) further acknowledged that in general "people believe that females cannot perform better in Mathematics as compared to males because they think that females do not possess the natural talent that males have to perform better" (p. 13). Moreover, Leedy et al. (Year) stated that boys usually exude higher confidence levels in their Mathematics abilities because of the fact that they view Mathematics as a male dominated arena. Nevertheless, some studies investigating the male dominance in Mathematics, showed neither males nor females considering Mathematics to be a male domain. For instance, the results of a study using the purposive sampling method done by Asare-Nkoom (2007) that examined students' attitudes towards Mathematics in nine junior secondary schools confirmed that neither of the sexes saw Mathematics as a male domain (Asare-Nkoom, 2007). Therefore, despite studies that gave substantiation of male's dominance in Mathematics, the findings of some research do not sustain any gender difference in attitudes towards Mathematics.

ACADEMIC PERFORMANCE WITH AN EMPHASIS ON MATHEMATICS

Caro , McDonald and Williams (2009) did a four point Longitudinal Study of Children and Youth in Canada. They revealed that a widening gap in Mathematics achievement between students of higher and lower socio economic status families in Canada. They also found that the SES gap remains roughly stable from the age of 7 to 11 years, which is more or less between grades 2 and 6. Thereafter, the gap widens at an increasing rate of change up to the age of 15 years, that is from about the beginning of grade 7 to grade 10. Caro et al (2009) findings means that achievement differences among students of varying socio economic backgrounds remain invariant during elementary school to middle school. Ojimba (2013) did a sex-post facto research. His finding revealed that there is a significant relationship between socio economic stats of parents and students' achievement in Mathematics. He further found out that parents who possess an occupation with greater skill requirement like engineering are likely to influence their children to learn Mathematics. Siren (2005) did a meta-analysis and found out that single subject achievement measures, such as verbal achievement, math achievement and science achievement yielded significantly larger correlations than general achievement measures. In contrast to White (1982) and Coleman et al (1966) his current findings indicated that the relationship between SES and academic achievement increases across various levels of school with the exception of the high school samples.

METHODS AND MATERIALS

RESEARCH DESIGN

The study adopted descriptive survey design. This is because the researcher is only interested in determining the influence of the independent variables on the dependent variable without manipulating any of the variables. The variables that were identified in the study for research questions and data collection instruments were: Students' poor or academic performance and teachers' qualifications; Students' poor academic performance and teachers' method of teaching and Students' environment and poor academic performance (Asikhia, 2010).

POPULATION AND SAMPLE

The target population for this research was students of a particular Primary and Junior High school in St. Catherine, Jamaica. Convenient sample was used to draw the sample for the current research.

Ten students were sampled from grade five and the same from grade six. Many of the students did not want to participate in the study; so the researchers conducted the study with all the willing students.

RESEARCH INSTRUMENT

QUESTIONNAIRES

The main instrument designed for the study is a self-designed questionnaire on perception of students 'poor academic performance. The questionnaire also contained certain demographic items as well as 9-item Likert scale question to measure attitude towards Mathematics. The options ranged from strongly agree to strongly disagree.

Respondents were given the questionnaire. The questionnaires were administered by the researcher team, and upon completion, they were collected for analysis and interpretation by the researcher team.

Observation was done during the time given by the schools' administrator. The researcher sat classroom during any given Mathematics session for grades five or six.

The researcher will be observing teaching method, language used in teaching and how well students understood the lesson taught, also students participation in the lesson.

Observation of, teaching material (text books) and methods of teaching, where the researcher team sat at the back of the class room and observes the teachers as the lesson was taught.

OBSERVATIONAL QUESTIONS

Some questions that were used to guide the observation were:

- Does the teacher uses teaching aids in my lessons?
- The teacher is familiar with the content of the lesson?
- Teacher used a variety of techniques in teaching my lesson
- Students are given the task to solve problems on their own
- The text book is used during lesson
- Teacher takes time in explaining a problem
- Teacher seeks responses from students
- Text books are current and relevant
- Teacher have class management and class control
- Classes are student centered or is it teacher centered?

DATA ANALYSIS

The data was collected, stored and retrieved using the Statistical Packages for the Social Sciences (SPSS) version 24 for Windows. Demographic characteristics of the sampled respondents were analysed using frequencies, percentages and descriptive statistics (i.e. mean±SD).

For the bivariate relationship, Pearson's Product Moment was used to determine statistical correlations. Statistical correlation was determine with a P value less than or equal to 5% (i.e. 0.05). Cronbach alpha was used to established reliablity of Students' self-reported attitude towards Mathematics and performance in Mathematics index (i.e. SSAMI).

The SSAMI consists of 9 items, with a Cronbach alpha of 0.823. The values for the SSAMI range from 0 to 36, with higher values indicating a greater attitude towards Mathematics.

FINDINGS AND DISCUSSIONS

INTRODUCTION

This Section presents answers to the research questions for this study, discussion on the issues and detailed socio-demographic characteristics of the sampled respondents. The majority of the respondents lived with a single parent (n=73, 74.5%), live in the community in which the school is located (n=59, 60.2%), females (n=56, 60.9%) and being 11 years old (n=40, 47.6%) – Table 2. The mean score for the students in Mathematics was 36.6%±19.2%., which indicates that they are poor performers in Mathematics. Continuing, the mean value for the self-reported attitude towards Mathematics was 16.7±5.4, with the maximum value being 33. The average for the SSAMI indicates that attitude towards Mathematics among the sampled respondents was low.

Table 2.Socio-demographic characteristics of sampled respondents, n = 98

Details	n	%
Gender		
Male	36	39.1
Female	56	60.9
Place of residence		
Live in community where school is located	59	60.2
Live outside of the community in which school is located	39	39.8
Household type		
Single partner household	73	74.5
Mother and father household	25	25.5
Age cohort		
10 years old	10	11.9
11 years old	40	47.6
12 years old	34	40.5
Score in Mathematics	35.6%±19.2%, 31.7% – 39.4%	
Students'self-reported attitude towards Mathematics index (SSAMI)	16.7±5.4, 15.6 – 17.8	

Minister of Education stated that," There is a crisis of teaching and learning in Jamaica and this crisis has affected Mathematics. Significant changes must take place in teaching Mathematics", which is empirically established by a study by Powell, Bourne and Waller (2007) as well as by the current work. Major crime has been the leading national problem in Jamaica for some time followed by unemployment and then education (Powell, Bourne and Waller, 2007, 49). In fact, 3 out of every 50 Jamaicans indicated that education is a national problem. The issue that was forwarded by the Ministry of Education is captured in the dismallylow performance of Jamaican candidates at the CSEC examinations, particularly Mathematics, which at the primary level (see Table 1). In Jamaica, more students fail Mathematics at CSEC that those who are successful with the average being low performance. In the current study, performanc in Mathematics is very poor with the average score being 36% and this is relatively close the performance at the CSEC level.

The underperformance of Jamaica candidates in Mathematics runs deeper than the sub-standard performance at the CSEC and the grade four levels. In order to comprehend the national underperformance of pupils, the Ministry of Education has disaggregated the performance of students at the grade three level in Mathematics (Table 4). Table 4 shows that while the various

components in the Mathematics examination at the third grade elementary level has improved significantly since 2005 (Table 4.3), grade three Jamaican students are week in estimation and measurement, statistics and geometry and would examination the low degree of mastery in Mathematics in grade 4 and at the secondary level on the CSEC.

Table 3.Subjects subsidized by the Government and the Private Sector

	English	**Mathematics**	**Info. Tech.**	**POA**	**POB**
Sitting (2013)	26489	22870	11160	6141	8458
Passing (2013)	16870	9659	8843	4945	7254
% Passing (2013)	63.7	42.2	79.2	80.5	85.8
% Passing (2012)	52.0	37.5	80.5	60.3	87.1
% Passing (2011)	68.5	39.9	75.1	73.2	84.9
% Passing (2010)	70.8	44.7	81.4	67.9	84.3
% Passing (2009)	62.8	40.9	85.4	63.4	83.1

Source: Caribbean Examination Council, 2013, p. 5

Table 4.Grade Three Diagnostic Test Mastery, 2005-2011

Details	**Year**				
	2003	**2005**	**2006**	**2010**	**2011**
	%	%	%	%	%
Numbers	16.4	30.1	35.9	44.0	49.6
Estimation and Measurement	12.8	24.2	25.1	51.0	35.4
Geometry	30.8	34.0	56.1	53.1	36.0
Algebra	28.4	25.5	56.8	44.9	44.7
Statistics	13.9	34.2	57.5	36.6	40.7

Source: Student Assessment Unit, MOE, Kingston, Jamaica, 2013, p. 6

The issue of the under-performance of Jamaican people, particularly in Mathematics has been a cause for concern for the Ministry of Education, other educators and policy makers. It appears that the real solution continues to elude the educators and policy makers in Jamaica as the under-performance in Mathematics continue unabated.

The current study is a testiment to the unceasing problem of the under-performance of Jamaican students; but why even in this research there is sub-standard performance for students at the primary level? The question that may shed light on the problem is attitude towards the subject, which brings the researcher to further examining the underperformance of Jamaican candidates.

RESEARCH QUESTION 1

WHAT IS THE STATE OF CURRENT STUDENTS' ATTITUDE TOWARDS MATHEMATICS ?

There is empirical evidence including the current work that showed there is under-performance of Jamaican candiditates (Tables 3 & 4). Students' poor attitude towards Mathematics at the different levels of schooling must be of importance because of the coverage of the course. Eugene (2012), posits that the most important function of schools is to provide learning activities which contribute to the development of desirable traits and proper attitudes among school children. In Mathematics,

real life problems should be presented in order to keep students interested in the subject. Jagero, Agak & Ayodo (2010) advocate that parents should be encouraged to assign only light duties to school students while at home, since a lot of work makes the students too tired to do their school work.

Studies have shown that students achieve at higher levels when they enjoy and find value in Mathematics, and low levels of achievement have been associated with a deteriorating attitude (Bishop, 2010; Schoenfeld, 1985). The achievement in Mathematics is considerably influenced by personal beliefs about one's own mathematical ability, the value of Mathematics, enjoyment of Mathematics, and motivation to achieve success in Mathematics (Bishop, 2010). Schoenfeld (1985) postulates that the development of mathematical understanding is influenced by student belief in the subject. Hence, Students' success in Mathematics depends upon their attitude towards Mathematics. It also influences the participation rate of learners (Farooq & Shah, 2008). Schenkel (2009) also concurs with other scholars that it is the attitude of the pupil at the beginning of a difficult task which, more than anything else, will affect its successful outcome. He continues that when it comes to attitude in Mathematics, motivation is a critical factor than the home environment. Hence, it should come as no surprise to readers, policy makers and the Ministry of Education that Jamaican candidates continue to do poorly in Mathematics because there is a deficincy in their attitude towards the subject. In the current study, on average the self-reported attitude of students towards Mathematics was low and is equally lack of interest in the subject and the scores are reflect the invested interest of the students.

RESEARCH QUESTION 2

ARE THERE PERCEPTUAL DIFFERENCES OF STUDENTS'SELF-REPORTED ATTITUDE TOWARDS MATHEMATICS INDEX AND GENDER OF RESPONDENTS?

Table 5 shows the descriptive statistics on the difference in students'self-reported attitude towards Mathematics and selected socio-demographic variables. The self-reported attitude towards Mathematics for females in this research was 17.2±6.02 compared to 15.97±4.095, which is statistically the same (t = -1.070, P =0.288). Such a finding indicates that there is low difference between the attitude of females and males in this sample.

Table 5.Descriptive statistics of students' self-reported towards Mathematics index by gender of respondents, n = 98

Details	Descriptive statistics	t-test; P value
Gender		
Male	15.97±4.095	t= -1.070, P = 0.288
Female	17.20±6.022	

Dependent variable: Students' self-reported attitude towards Mathematics index (i.e., SSAMI)

The findings of this research indicated that no significant difference emerged between male and female students as it relates to students' perceptions of their self-efficacy in Mathematics, at this junior high school. This is found to be consistent with the findings of Pajares and Kranzler (1995) but emphatically deny the findings of Louis and Mistele (2012) and Leedy et al. (2003). Additionally, no gender differences in students' perceptions of their teachers' attitude were found in the present research, which is supported by the findings of De Wit et al. (2010), Farooq and Shah (2008) , Malecki and Demaray (2003) and Riconscente (2014), but contradicted

what Reddy et al. (2003) found in their study. Furthermore, no significant gender differences emerged in students' perceptions of the usefulness of Mathematics. Research done by Farooq and Shah (2008), Leedy et al. (2003) and Tartre and Fennema (1995) had similar findings that students' perceptions of Mathematics usefulness do not differ by gender.

Conversely, significant statistical gender difference emerged for students' perception of Mathematics as a male domain, in which more females than males believed that Mathematics is mainly for boys. This seemed surprising, because studies conducted by other researchers revealed opposite findings in which more males than females believed that Mathematics is a male domain. These studies include Fennema et al. (1990), Fennema and Sherman (1977), Forgasz (2001), Leedy et al. (2003) and Tartre and Fennema (1995). Farooq and Shah (2008) however contradicted the studies as they found no significant difference in male and female students about Mathematics as male domain.

RESEARCH QUESTION 3

IS THERE A STATISTICAL CORRELATION BETWEEN STUDENTS'ATTITUDE TOWARDS MATHEMATICS INDEX AND SCORES IN MATHEMATICS?

A correlation between students'self-reported attitude towards Mathematics and performance in Mathematics is presented in Table 6. A p value of < 0.0001 indicate a significant statistical correlation between the two aforementioned variables. Furthermore, the relationship between the variable are direct and relatively strong (i.e., $r_{xy} = 0.683$). Such a correlation denotes that when the students'self-reported attitude Mathematics is lower, their performance in the subject (i.e., Mathematics) is also low and vice versa.

Table 6.Pearson's Product Moment Correlation of Students' self-reported attitude towards Mathematics and performance in Mathematics, n = 93

		SSAMI	Performance in Mathematics
SSAMI	Pearson Correlation	1	0.683**
	Sig. (2-tailed)		<0.0001
	N	93	93
Performance in Mathematics	Pearson Correlation	0.683**	1
	Sig. (2-tailed)	<0.0001	
	N	93	98

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

The results of this study showed that all four subscales of students' attitudes towards Mathematics were positively related to students' achievemen, and that there was a moderate positive correlation between students' perception of their self-efficacy in Mathematics and their Mathematics achievement. This result concurs with findings from works by Ayotola and Adedeji (2009); Liu and Koirala (2009); Louis and Mistele (2011), Malpass et al. (1999), Meyer and Koehler (1990) and Nasiriyan et al. (2011). All of the aforementioned studies found a positively significant correlation between the students' perception of their self-efficacy and their achievement in Mathematics. Accordingly, students' perception of their self-efficacy is significantly related to students' Mathematics achievement. By virtue of its findings, this research has joined the school of thought that relates students' perception of their self-efficacy and Mathematics achievement.

For this study, the researcher found a positive significant relationship between students'

perception of the usefulness Mathematics content and their Mathematics achievement, which is consistent with the findings of Kadijevich (2008) and Pedersen et al. (1985). Simply put, when students perceived that certain content of Mathematics is important or useful to them now and in the future, their academic achievement will increase. It can be deduced from such a finding that low performance of students in sampled population is a function of the disparity between usefulness of the subject and students current or future goals. Clearly, the teachers and the realities in society have not be able to convince students in school to seek an understanding of Mathematics, and the reason is simply its applicability and usefulness are not seen in the personal development of the students. Such a perspective provides an understanding from the dilemma that the educational system in Jamaica has been experiencing for some time. A national probability study conducted by Powell, Bourne and Waller (2007) found that among a list of twenty-one national problems identified by Jamaicans, education was ranked third. The matter becomes ever more complex as Mathematics has the lowest rate of passes at the CSEC level. Based on the current findings, the researcher believes that the teachers have a part to do with the high failure rate of students in Mathematics.

Umameh (n.d) posits that attitude is fundamental to the dynamics of behaviours and determines how far a student learns. He agrees with Osafehinti (1986) that if a student has a positive attitude towards Mathematics, he will not only enjoy studying it but will also derive satisfaction from the knowledge of mathematical ideas he gains; Obodo (2002) contends that when a student has a positive attitude to Mathematics, he will definitely be interested in its teaching and learning and Salman (2004), most Mathematics teachers do not make the teaching of Mathematics practical and exciting and this leads to negative attitude to Mathematics by students.

It is a common belief that students' attitude towards a subject is related their achievement in that subject (Akinsola & Olowojaiye, 2008), which is concurred with by the current study. Surprisingly, the findings of this study revealed a moderate positive relationship between the two variables. In fact, on 46.6% of the variability in Mathematics scores for the sampled respondents could be accounted for by a 1% change in students' attitude. Thus, as students develop better attitude towards Mathematics then their Mathematics achievement will be improved; but the changes in performance in Mathematics is more a function of other factors that students' attitude. Previous research had revealed similar positive relationships, some of which are found in Amatobi and Amatobi (2013), Cheung (1998), Mahanta and Islam's (2012), Michelli (2013) and Nicolaidou and Philippou (2003). However, they did not concur with the findings of Papanastasious (2000) and Adaramola and Obomanu (2011) who found no relationship between students' attitude and their Mathematics achievement, which is equally refuted by the current findings.

Umameh (n.d) posits that attitude is fundamental to the dynamics of behaviours and determines how far a student learns. He agrees with Osafehinti (1986) that if a student has a positive attitude towards Mathematics, he will not only enjoy studying it but will also derive satisfaction from the knowledge of mathematical ideas he gains; Obodo (2002) that when a student has a positive attitude to Mathematics, he will definitely be interested in its teaching and learning and Salman (2004), most Mathematics teachers do not make the teaching of Mathematics practical and exciting and this leads to negative attitude to Mathematics by students.

It is well established in the literature that attitude, particularly attitude of students towards

Mathematics, is critical to performance in the subject (Ursini & Sanchez, 2008; McLeod, 1992). These studies have been used to assess and compare student achievement and student self confidence toward Mathematics (see also, Wilkins, 2004). Additionally, Ursini and Sanchez (2008) employed longitudinal research which used mixed methods to examine the attitude of students towards Mathematics and their achievement in the subject. They found that the attitude of grade 8 and 9 students towards Mathematics improves with the use of technology, attitude influences self-confidence and that those associations did not differ by being females. In another study, Ma and Kishor's (1997b) meta-analysis on the relationship between attitude toward Mathematics and achievement in the subject found a statistically significant positive relationship between the two variables, which indicates that one's mental state influences behaviour. This goes further to explain the rationale why some students shun Mathematics and careers that demand a high degree of mathematical knowledge, the cycle of avoidance of Mathematics.

It has been empirically established that confidence in one's mathematical ability is a predictor of achievement in Mathematics (Hannula, Maijala, & Pehkonen, 2004; Ercikan, McCreith, & Lapointe, 2005; Flores, 2007), which again speaks to the issue of attitude and its influence on performance. Similarly, in an analysis of Trends in International Mathematics and Science Study (TIMSS) data, Wilkins (2004) found a positive relationship between mathematical self concept and achievement, which is in keeping with the other studies. Furthermore, Wilkins and Ma (2003) indicated that student attitudes toward Mathematics and beliefs about the usefulness of learning Mathematics decline as they progress through middle and high school, and therefore explains their lower achievement in the subject area and wanting to venture into careers that are mathematically oriented.

There is a common perception that people who have negative attitudes towards Mathematics tend to avoid the subject all together and can be easily frustrated when doing the course, particularly females (Vermeer et al, 2000; Ma, & Kishor, 1997; Casey et al, 1997; Sayers, 1994; Hyde et al, 1990). On the contrary, people with positive attitudes towards Mathematics are more likely to be interested doing Mathematics more than those with highly negative attitudes. Several researchers have demonstrated that there is a significant correlation between attitude and achievement (Papanastasiou, 2002; Wong, 1992), which is a part of the rationale for the greater performance among those who are interest in the subject area. Using meta-analysis, Ma (1999) established that anxiety in Mathematics has a negative influence on achievement in Mathematics, indicating the role the psychology of the individual plays in determine learning outcomes.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The present study revealed a low attitude towards Mathematics of the sampled respondents and that this moderately affects performance in the subject. The perceptions of boys is not different from that of girls about their self-efficacy in Mathematics; students' perceptions of their teachers' attitude; and students' perceptions of Mathematics usefulness. These results suggest that there are no gender differences in these attitudinal components. On the contrary, female students have a higher perception of Mathematics being a male domain, than the males, indicating gender differences. Equally, the general attitude of students differs based on gender, with females having a better attitude than males.

RECOMMENDATIONS

Based on the conclusion, the researcher would like to propose the following recommendations:

1. Mathematics teachers at this Junior high school should launch a vivacious Mathematics club, in which all students can participate in applying Mathematics concepts to their everyday lives through the use of games, drama, music, poems and songs to generate a greater interest in the subject, which may allow more students to have better attitudes towards this numeric subject.
2. Mathematics teachers during their teaching should enable students to explore mathematical concepts through integrated, interesting, simulating and creative activities such as field trips to factories, construction sites, medical laboratories and other practical areas. This may allow students to develop a better appreciation for Mathematics in the environment and its application to real life.
3. Teachers should provide students with continuous encouragements and support to students. This may help to boost their interest and patricipation in the subject which may improve their attitudes and subsequently their achievement.
4. Teachers should create educational experiences to increase students' belief in their own abilities based on using their own experiences.
5. Administrators should have planned and ongoing professional development workshops and seminars for all Mathematics teachers at the school, in an effort to assist them in honing their skills in teaching the subject to students who possess negative or positive attitudes.

IMPLICATIONS OF THE FINDINGS

Mathematics is seen as one of the most important core subject in a school's curriculum (Mohamed & Waheed, 2011). The fact that students' attitudes are related to their achievement in Mathematics has implications for teachers, students and administrators at the school. It is fair to also acknowledge that attitude is only one of the many factors of an intricate environment that influence students' achievement in Mathematics, as there may be many interrelated factors that account for students' attitude towards the subject.

The findings of this study however, demonstrated that students' attitude towards Mathematics is an essential variable that cannot be overlooked in the teaching and learning process of Mathematics. The reality is that if all stakeholders in our education system seek to make changes, then students may develop better attitudes and in turn become more competent in Mathematics, thus boosting their achievement in the subject.

RECOMMENDATIONS FOR FUTURE RESEARCH

Future studies-

1. attitude towards mathematics and its influence on reason at the secondary level;
2. use a larger sample size, and a stratified sampling method, for a better generalization of the results.
3. The inclusion of other variables such as 1) family education level, 2) socioeconomic status of the family, 3) student's reading ability and learning styles; 4) teaching materials and resources; 5) teaching styles and strategies, and 6) teachers' qualification.

REFERENCES

[1]. Adane, L.O. (2013). Factors affecting low academic achievement of pupils in Kemp Methodist Junior High School in Aburi, Eastern Region. Master of Philosophy Thesis, The University of Ghana. Retrieved on February 22, 2017 from

http://ugspace.ug.edu.gh/bitstream/123456789/5828/1/Linda%20Ofosua%20Adane_Factors%20Affecting%20Low%20Academic%20Achievement%20of%20Pupils%20in%20Kemp%20Methodist%20Junior%20High%20School%20in%20Aburi,%20Eastern%20Region_2013.pdf.

[2]. Akanwa, P.C., Anyanwu, E.U., & Ossai-Onah, O.V., (2013). Population control in Nigeria: Implicaitons for Librarians. Library Philosophy and practice (e-journal). Paper 1031. Retrieved on February 22, 2017 from http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=2493&context=libphilprac

[3]. Akinloye, G.M., Adu, K.O., & Adu, E.O. (2015). A Comparative Analysis of Students' Performance in Economics in Private and Public Secondary Schools in Lagos State, Nigeria. J Soc Sci, 44(2, 3): 144-151.

[4]. Asikhia O. A. (2010). Students and Teachers' Perception of the Causes of Poor Academic Performance in Ogun State Secondary Schools [Nigeria]: Implications for Couselling for National Development. European Journal of Social Sciences, 13(2): 229-242.

[5]. Bakare, C.G.M (1994). Mass Failure in Public Examinations: Some Psychological Perspectives: Monograph, Department of Guidance and Counselling, University of Ibadan, Ibadan.

[6]. Baroody, Arthur J. (19930. Problem solving, reasoning, and communication K-8: helping children think mathematically. University of Illinois at Urbana-Champaign. (pp. 2-6).Macmillan Publishing Company, a division of Macmillan, Inc. Merill is an imprint of Macmillan Publishing Company.

[7]. Bell, A.W., Costello, J and Kechemann, D.E. (1983). A Review of Research in Mathematical Education: Research on Training and Teaching. NFER-Nelson Berkshire, England.

[8]. Bishop, S. (2006) The Impact of Parent and Community Involvement Programmes.

[9]. Brunei, J. S. (1968). Towards a theory of instruction. USA: Norton (p. 26).

[10]. Bruner, J. (1961). The act of discovery. Harvard Educational Review, 31 , 21-32.

[11]. Bruner, J. S. (1964). The course of cognitive growth. American psychologist, 19 , 1-15.

[12]. Carpenter, Thomas P., Mary Kay Corbit, Hendry S . Kepner. Jr., Mary Montgomery Lindquist, and Robert E. Reys . Â"Solving Verbal Problems: Results and Implications from National Assessment. Arithmetic Teacher 28 (September 1980):8-12.

[13]. Casey,M.B., Nuttall, R.L., & Pezaris, E. (1997). Mediators of gender differences in Mathematics college entrance test scores: A comparison of spatial skills with internalized beliefs and anxieties. *Developmental Psychology* 33(4), 669-680.

[14]. Clements, M. A. (1999). Language aspects of mathematical modeling in primary schools. In M. A. Clements & Y. P. Leong (Eds.), Cultural and language aspects of science, Mathematics and technical education (pp. 363-372). Gadong: Universiti Brunei Darussalam.

[15]. Cockcroft, W. H. (1982). Mathematics Counts: Report of the Committee of Enquiry into the teaching of Mathematics in Schools.London:HMSO pp. 6.

[16]. Curriculum Development Department. (2004). Primary Mathematics for Brunei Darussalam. Darjah 5. Singapore: Federal Publication.

[17]. Curriculum Development Department. (2006). Primary Mathematics Syllabus for Brunei Darussalam. Darjah 4. Singapore: SNP Panpac Pte.Ltd.

[18]. Dawe, Llyod (1983). Bilingualism and Mathematical Reasoning in English as a Second Language. Educational Studies in Mathematics. Nov 1983 14 (4), 325-350.

[19]. Dickson, L., Brown, M. & Gibson, O. (1984). Children learning Mathematics. London: Cassell.

[20]. Ella, R.E. Akpabio,I.I& Sampson-Akpan, P.E (2015). Influence of Study Habits of Undergraduate Nursing Students' and Academic Performance in University of Calabar, Nigeria. American Resaerch Journal of Nursing 1(3) 1-6.

[21]. Ella, R.E., Odok, A. O., & Ella, G.E. (2015). Influence of Family Size and Family Type on Academic Performance of Students in Government in Calabar Municipality, Cross River State, Nigeria. International Journal of Humanities Social Sciences and Education, 2(11):108-114.

[22]. Ercikan, K.; McCreith, T. & Lapointe, V. (2005). Factors associated with Mathematics achievement and participation in advanced Mathematics courses: an examination of gender differences from an international perspective. School Science and Mathematics, 105(1):5.

[23]. Ernest, P. (1989). Mathematics teaching: The state of the art. Borcombe, England: Falmer.

[24]. Eshun, B. (2004). Sex-differences in attitude of students towards Mathematics in secondary schools, *Mathematics Connection*, 4, 1-13.

[25]. Ekundayo BS 2013. A Comparative Analysis of Student Performance in Economics in Private and Public Secondary Schools in Kogi State, Nigeria. MEd Dissertation. Department of Arts and Social Sciences Education. Nigeria: University of Lagos.

[26]. Eugene D. G. (2012). Determinants of the Mathematics performance of the iv year high students. *Retrieved November 23, 2012 from* http://www.slideshare.net/eugenedbest/determinants-of-the-Mathematics-performance-of-the-iv-year-high-students-by-eugene-d-gabriel?from=share_email#btn.

[27]. Flores, A. (2007, October). Examining disparities in Mathematics education: Achievement Gap or Opportunity Gap? The High School Journal, 91(1): 29-42.

[28]. Fong, H. K. (1997). One mathematical problem but FIVE possible solutions. Singapore: In Science and Mathematics education (pp. 14-16). Gadong: ETC Â-University Brunei Darussalam.

[29]. Frank, M. L. (1988). Problem solving and mathematical beliefs. Arithmetic Teacher, 35 (5), 32-34.

[30]. Funkhouser, C. (1990). Mathematical problem solving: A review of the literature. (ERIC Document Document Reproduction Service No. ED 324 217) or SE 051 596.

[31]. Grubaugh, S. & Houston, R. (1990). Establishing a Classroom Environment That Promotes Interaction and Improved Student Behavior. The Clearing House , 63(8): 375-378.

[32]. Gurung, C. (2003). A comparative study of performance in arithmetic word problems in English Language between Bruneian students and Gurkha students. Unpublished M. Ed dissertation, Universiti Brunei Darussalam.

[33]. Hajah Raimah bte Hj Mawang (2000). An investigation of errors made by Primary 6 pupils in word problems involving fractions. Unpublished M.Ed dissertation, Universiti Brunei Darussalam.

[34]. Hajah Sainah binti Haji Nayan (1998). Problem-solving errors by primary six children in specialist teachers' project schools. Unpublished M.Ed dissertation, Sultan Hassanal Bolkiah Institute of Education, Universiti Brunei Darussalam.

[35]. Haji Saman bin Haji Anit (2000). Investigating understanding by primary six pupils of word problems involving multiplication and division. Unpublished M.Ed dissertation, Sultan Hassanal Bolkiah Institute of Education, University Brunei Darussalam.

[36]. Hannah, R. (2013). The Effect of Classroom Environment on Student Learning. Honors Theses. Paper 2375. Retrieved on February 22, 2017 from http://scholarworks.wmich.edu/cgi/viewcontent.cgi?article=3380&context=honors_theses.

[37]. Hannula, M S., Maijala, H & Pehkonen, E. (2004). Development of understanding and self confidence in Mathematics. Department of Teacher Education, University of Turku, Finland.

[38]. Hannula, M S., Maijala, H & Pehkonen, E. (2004). Development of understanding and self confidence in Mathematics. Department of Teacher Education, University of Turku, Finland.

[39]. Hayati, I., Zaharawati, J. & Kamsiah, J. (2005). Primary 5 and 6 pupils Â' performance on, and understanding of, change, combine and compare arithmetic word problems. In H. S. Dhinds, I.J. Kyeleve, O. Chukwu & J.S.H.Q. Perera (Eds) (2005). Future directions in science, Mathematics and technical education (pp. 161-168). Gadong: ETC. University Brunei Darussalam. http://www2.ed.gov/pubs/SER/Parent Comm/chap4.html.

[40]. Henry, M., Black, J., & Lewis, B. (2006). Evaluation of the pilot health and family life education curriculum schools. Kingston: Ministry of Education. Retrieved on February 22, 2017 from https://www.unicef.org/jamaica/MOEY_HFLE_EVALUATION_FINAL_REPORT.pdf.

[41]. Huat, J, Ng. C. & Huat, L.K. (2001). Teacher Works: Mathematics teachers in primary schools. Singapore Times Media Private Limited.

[42]. Hyde, J.S., Fennema, E., Ryan, M., Frost, L.A., & Hopp, C. (1990). Gender comparisons of Mathematics attitudes and affect: A meta-analysis. *Psychology of Women Quarterly,* 14(3), 299-324.

[43]. Islam Uddin, M.D., Bhuyan, K.C., & Sanjida Islam, S. (2011). Determinants of desired family size and children ever born in Bangladesh. The Journal of Family Welfare, 57(2): 40-47.

[44]. Jagero, N. O., Agak, J. & Ayodo. T. M. (2010). An evaluation of home environmental factors affecting performance of boarding secondary school students in Kenya. *Analytical Report in International Education*. 3(1), 47-6.

[45]. Kantowski, M. G. (1977). Processes involved in mathematical problem solving. Journal for Research in Mathematics Education, 8(3), 163-180.

[46]. Kilpatrick, J. (1985). A retrospective account of the past twenty-five years of research on teaching mathematical problem solving. In E. A. Silver (Ed.), Teaching and learning mathematical problem solving: Multiple research perspectives (pp. 1-15). Hillsdale, NJ: Lawrence Erlbaum Associates.

[47]. Lester, F. K.Jr. (1983). Trends and Issues in Mathematical Problem-Solving Research. In Lesh, R. & Landau, M. (Eds.) Developmental Psychology Series. Acquisition of Mathematics Concepts and Processes. School of Education. Northwestern University Evanston, Illinois (pp. 232).

[48]. Ma, X. & Kishor, N. (1997a). Attitude Toward Self, Social Factors, and Achievement in Mathematics: A Meta-Analytic Review. Educational Psychology Review, 09(2), 89-120.

[49]. Ma, X. (1999). A meta-analysis of the relationship between anxiety toward Mathematics and achievement in Mathematics. *Journal for Research in Mathematics Education,* 28(1), 26- 47.

[50]. Mayer, Richard E. (1985). Implications of cognitive psychology for instruction in mathematical problem solving. In E. A. Silver (Ed.),Teaching and learning mathematical problem solving: Multiple

research perspectives (pp. 123-138). Hillsdale, NJ: Lawrence Erlbaum Associates.

[51]. McLeod, D. B. (1992). Research on affect in Mathematics education: A reconcep tualization. In D. A. Grouws (Ed.), Hand book of Research on Mathematics Teaching and Learning (pp. 575-596). New York: Macmillan.

[52]. Ministry of Education (2013). Caribbean secondary education certificate (CSEC) examination 2013. Analysis of the public schools' performance. CSEC report.

[53]. Ministry of education, youth and culture (2003). Mathematics and numeracy policy. Retrieved from http://expanding-edu cational-horizons.com/Numeracy/Numer acyPolicy.pdf.

[54]. Ministry of Education. (ud). Mathematics: Overall aims of the whole curriculum. Kingston: Ministry of Education. Retrieved on February 22, 2017 from www. moe.gov.jm/sites/default/files/Lower2nd-Mathematics.pdf.

[55]. National Assessment of Educational Progress. Changes in Mathematical Achievement, 1973- 1978. Report no. 09-MA-01. Denver, Colo,; NAEP, August 1979. National Council of Teachers of Mathematics. (1989). Curriculum and Evaluation Standards for School Mathematics. Reston, VA: Author

[56]. National Council of Teachers of Mathematics. (2000). Principles and Standards for School Mathematics. Reston, VA: NCTM.

[57]. OCED. (2016). Family size and household compostion. Retrieved on February 22, 2017 from https://www.oecd.org/ els/family/SF_1_1_Family_size_and_com position.pdf, accessed.

[58]. Papanastasiou, C. (2002). School, teaching and family influence on student attitudes toward science: Based on TIMSS data Cyprus. Studies in Educational Evaluation, 28, 71-86.

[59]. Pavio (1974).A language and knowledge of the world. Educational Research,3 (9), 5-12.

[60]. Piaget, J. (1950). The psychology of intelligence. London: Routledge & Kegan Paul Ltd.

[61]. Polya, George (1985) How to solve it (2nd ed.).Princeton, N.J.;Princeton University Press.

[62]. Powell L.A., Bourne P., & Waller L. (2007). Probing Jamaica's Political culture, volume 1: Main trends in the July-August 2006 Leadership and Governance Survey. Kingston, Jamaica: Centre for Leadership and Governance.

[63]. Rees, R. (1989). Mathematics education in Brunei Darussalam: A preliminary report. University Brunei Darussalam.

[64]. Rono, K., Onderi, H., Owino, J., & Odinga, J.O. (2014). Perceptions of causes of poor academic performance amongst selected secondary schools in Kericho sub-country: Implications for school management. Kenya Journal Of Educational Planning, Economics & Management, 7(2): 1-24.

[65]. Sayers, R. (1994). Gender differences in Mathematics education in Zambia. *Educational Studies in Mathematics,* 26(4), 389-403.

[66]. Schenkel, B. (2009). The impact of an attitude toward Mathematics on Mathematics performance. *Retrieved November 26, 2012 from* http://etd. ohiolink.edu/send-pdf.cgi/Schenkel%20 Benjamin%20D.pdf?marietta1241710279.

[67]. Schoenfeld, A. H. (1985). Mathematical problem solving New York: Academic Press.

[68]. Sfard, A. (1991). On the dual nature of mathematical conceptions: Reflections on processes and objects as different sides of the same coin. Educational Studies in Mathematics 22: 1-36. Dordrecht: Kluwer Academic Publishers.

[69]. Shulman, L. S. (1985). On teaching problem solving and solving the problems of

teaching. In E. A. Silver (Ed.),Teaching and learning mathematical problem solving: Multiple research perspectives (pp. 123-138). Hillsdale, NJ: Lawrence Erlbaum Associates.

[70]. Spangler, D.A. (1992). Assessing students' beliefs about Mathematics. The Mathematics Educator, 3(1): 19-23.

[71]. Suffolk, J. & Gurung, C. (2005). Peformance in solving word problems by Nepalese and Bruneian children. In H. S. Dhindsa , I. J.Kyeleve, O. Chukwu & J. S. H. Q. Perera (Eds.),2005). Future directions in science, Mathematics and technical education (pp. 177-186). Gadong: ETC Â– University Brunei Darussalam.

[72]. Suleman, Q., Hussain, I., Akhtar, Z. & Khan. W. (2012). Effects of Family Structure on the Academic Achievement of Students at Elementary Level in Karak District, Pakistan. Journal of Sociological Research 3(2): 234-247.

[73]. Sullivan, P., & Mousley, J. (2001). Thinking teaching: Seeing Mathematics teachers as active decision makers. In F-L. Lin & T.J. Cooney (Eds), Making sense of Mathematics teacher education (pp. 147-163). Dordrecht, The Netherlands:Kluwer Academic Publishers.

[74]. Tough, J (1997). Talking and Learning. Wardlock London, England

[75]. Ursini, S., & Sanchez, G. (2008). Gender, technology and attitude towards Mathematics: a comparative longitudinal study with Mexican students. ZDM Mathematics Education 40:559–577.

[76]. Veloo, P.K. & Lopez-Real, F. (1994). Drawing diagram and solving word problems: A Study of a sample of Bruneian primary and secondary school children in Mathematics Education: Constraints on constructions, Proceedings of the Seventeenth Annual Conference of the Mathematical Education Research Group of Australasia, Vol.2 (pp. 667-674). Lismore: Mathematics Education Research Group of Australasia.

[77]. Veloo, P.K. et al (1993). Report of the Jawatankuasa Mata Pelajaran Matematik bagi Peperiksaan Brunei-Cambridge GCE Â'OÂ' Level. Brunei Darussalam.

[78]. Veloo, P.K., & Wong, K. W. (1997). Multi-modal instruction. An integrated instructional approach to promote conceptual understanding in school Mathematics. In L. K. Chen & K.A. Toh (Eds.), Educational Research Association 1997 Annual Conference Proceedings: Research across the disciplines (pp. 292-306). Singapore: Educational Research Association.

[79]. Vergnaud, G. (1998). Towards a cognitive theory of practice. I.Sierpinska, A. and Kilpatrick, J. Mathematics Education as a Research Domain: A Search for Identiry, 227-240. Kluwer Academic Publishers.

[80]. Vermeer, H., Boekaerts, M., & Seegers, G. (2000). Motivational and gender differences: Sixthgrade students' mathematical problem-solving behavior. Journal of Educational Psychology, 92(2), 308-315.

[81]. Wilkins, J. (2004). Mathematics and science self-concept: An international investigation. *The Journal of Experimental Education. 72*(4), 331-346.

[82]. Wilkins, J., & Ma, X. (2003). Modelling change in student attitude toward and beliefs about Mathematics. *The Journal of Educational Research*, *97*(1) 52-63.

[83]. Yin, R. (1994). Case study research: Design and methods (2nd ed.). Thousand Oaks, CA: Sage Publishing.

[84]. Zweng, Marilyn, Jonathan Turner, and Jean Geraghty. ChildrenÂ's Strategies of Solving Verbal Problems. Final Report, NIE Grant No. G-78-0094. August 1979. (ERIC no. ED 178 3590.

