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# Students' Perceptions of Learning Mathematics: The Impact on Achievement in The Ga East Municipality

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***Abstract:*** **This study was conducted to evaluate students' perceptions toward the learning of Mathematics and its impact on academic achievement in the Ga East Municipality. Data was acquired through the use of a quantitative descriptive survey method. The study included a selection of 35 boys and 35 girls drawn using a purposeful sampling technique from three Junior High Schools in the Ga East Municipality in the Greater Accra Region of Ghana. The questionnaire served as the primary data gathering tool. Descriptive and inferential statistics were used in the data analysis. Findings show that the students have a positive perception of learning mathematics. The data also showed that the students' Achievement (performance) was not significantly impacted by their perception of mathematics. The study recommends that teachers should use instructional strategies that take into account learners' differences or learning hurdles, reduce anxiety, foster active interest in, and appreciation of, what is being taught and learned.**

***Keywords:*** **Students' Perceptions, Mathematics Learning, Impact, Achievement, Learning Hurdles, Anxiety.**

## 1. INTRODUCTION

Mathematics is acknowledged worldwide as the most significant subject in most fields of human activities. Mathematics is generally, considered a vital and useful subject in general education. Although it is an imperative subject it is not widely held by students since it is not the same as other subjects. All facets of human existence make extensive use of the mathematical ability one develops through education. Mathematics has a significant impact on how people navigate the various facets of private, social, and civic life (Anthony & Walshaw, 2009). Nearly on par with the significance of education as a whole is the value of mathematics in science, technical pursuits, trade, economics, education, and even the humanities (Tella, 2017; White, 2019). This explains why all students who complete basic and secondary school in the majority of nations are required to study the topic. Mathematics is therefore a core subject at these levels of education in Ghana (Mensah, Okyere & Kuranchie, 2013). Notwithstanding the significance attached to Mathematics by Africans, there has been low attainment in the subject in Ghana (WAEC, 2012; WAEC 2013, in Mensah, Okyere & Kuranchie, 2013).

Many students still obtain poor marks in mathematics, notwithstanding the importance of the subject. Many students avoid mathematics out of fear that they will fail since they believe it to be a boring and uninteresting subject (Colgan, 2014). Students frequently express their attitudes on mathematics by saying things such, "I enjoy/dislike mathematics," or "Mathematics is dull, tough, etc." According to Sam (1999), a lot of pupils are scared of mathematics and feel helpless around mathematical concepts. They view math as being challenging, icy, abstract, and, in many societies, predominately

masculine (Ernest, 1995). Fondness for mathematics, mode of studying mathematics, classroom activities engagements, and many more will be affected if students' mental state and perception of mathematics are negative.

According to Sarwat, Safia, and Manzoor (2013) perception influences performance, then performance, in turn, influences attitudes. The perception of students toward mathematics is important to get success in the subject of mathematics by increasing their rate of participation in learning mathematics (Farooq & Shah, 2008). According to Ma and Kishor (1997) perception toward mathematics is reflected through "an aggregated measure of a liking or disliking of mathematics, a tendency to engage in or avoid mathematical activities, a belief that one is good or bad at mathematics, and a belief that mathematics is useful or useless".

Math success and enjoyment are influenced by students' perspectives and characteristics (Mazana, Montero, & Casmir, 2019). Previous research revealed a substantial relationship between mathematics achievement and perception of the topic (Moenikia & Zahed-Babelan, 2010; Mathai, 2014; Singh & Imam, 2013; Spencer, 2012). The causes of pupils' poor views and performance in mathematics have been the focus of educational scholars' attention and effort (Mensah, Okyere & Kuranchie, 2013). We need to identify if this issue is brought on by unpleasant classroom experiences or by other sources in order to solve math fear (Aydin & Aytekin, 2019).

**Statement of the Problem**

According to Onderi et al (2015), Mathematics is part of our daily life and as such the provision of quality education and high performance is inexorable. Notwithstanding the significant role that mathematics plays in society, students continue to perform poorly in mathematics in national examinations (Mensah, Okyere, and Kuranchie 2013; Enu, Agyman, & Nkum, 2015). According to WAEC (2013) report, achievements in mathematics have been generally poor in many parts of the Country. Mensah, Okyere, and Kuranchie (2013) also decry the poor performance in mathematics although it is one of the core subjects in the country. The same trend of poor performance in mathematics has been noted in the Ga East Municipality over the years. There exists a host of studies examining the teaching of mathematics and mathematics performance (Mensah, Okyere and Kuranchie, 2013; Atteh, Andam, Obeng-Denteh, Okpoti & Amoako, 2014; Asante, 2012; Ankomah, 2002; Etsey, 2005; Fletcher, 2003; Enu, Agyman, & Nkum, 2015). Most of these researches focus on senior high school and University students. Nevertheless, from a general viewpoint, the majority of these studies have little or no regard for students' perceptions of the study of mathematics. Not enough has been done regarding student perception and performance in mathematics in Ga East Municipality. This study is dedicated to filling these gaps in knowledge by assessing how students' perceptions and attitudes influence performance in mathematics among learners in junior high schools in Ga East Municipality.

**Research Questions**

The study was guided by the following research questions:

1. What are the various perceptions of students on Mathematics in Junior High school?
2. What is the relationship between students' perceptions and Mathematics Achievement?

**Significance of the Study**

By investigating the different perceptions, beliefs, and myths of mathematics that students hold, there is a potential for such perceptions, and beliefs to be challenged, promoted, or discouraged. The outcome of this study will augment better approaches and measures for promoting student understanding and participation in mathematics-related fields. The results of this study might enlighten the extent of the influences of parents and teachers in shaping students' perceptions of mathematics. This data can be used to support positive influence among students while endeavoring to solve the negative influences of these sources. It will make it easier to comprehend how parents and instructors influence how kids view mathematics. The study's findings might have an impact on mathematics education and the preparation of math teachers. We can better understand how mathematics should be taught in the classroom if we are aware of how students view their mathematics learning experiences in school and how this may affect how they view mathematics. This information might also improve teacher development initiatives and curriculum preparation. The opinions of students on mathematics are crucial because they can influence how they study the subject. Such opinions and perceptions may have a greater impact on how people arrange and define work than information.

## 2. LITERATURE REVIEW

**Students' Perception of mathematics**

It might be difficult to define the phrase "mathematical perception." While some experts limit the definition of perception of mathematics to a person's likes or dislikes of the subject, others broaden it to include their views, capacities, and usefulness. According to Kibrislioglu (2015), the word refers to a perception of mathematics as being either good or terrible and beneficial or not, depending on how much one likes or dislikes the topic. This leads to a predisposition to either participate in or refrain from participating in mathematical activities. According to Zan and Martino (2007), an individual's emotional stance toward mathematics might be either positive or negative. According to Tahar, Ismail, Zamani, and Adnan (2010), one's impression of mathematics is determined by how they feel about the topic, whether they feel positively or negatively. Similar to Hart (1989), who examines the perception of mathematics from multiple angles, a person's perception of mathematics is defined as a more complex phenomenon that is characterized by the emotions and beliefs that person associates with mathematics as well as how that person acts toward mathematics.

The tendency to think poorly of and worry about mathematics is a component of perception of mathematics. There are cognitive, emotive, and behavioral elements to how people perceive mathematics (Tahar, Ismail, Zamani, and Adnan, 2010). Because they learn to associate happy experiences or events with mathematics, students might develop favorable perceptions of the subject. Good reinforcement can also help build a positive attitude toward mathematics. It has long been believed that a student's concepts, perceptions, and conclusions about mathematics and mathematics instruction have a crucial role in how successful they are in school (Borasi, 1990; Shoenfeld, 1985). In general, students' attitudes about mathematics affect how they approach the subject.

According to several research, there is a significant and significant link between how one views mathematics and how well one does in it (Schenkel, 2009). Student perception and performance were found to be positively correlated in Schenkel's 2009 research of primary school students. It was discovered that student perceptions and beliefs might either support or obstruct learning. Burstein (1992) revealed that there is a clear correlation between students' attitudes toward mathematics and student achievements in a comparative examination of variables impacting mathematics achievement. Cheung (1998) found a favorable association between attitude and mathematics achievement in his research of 11 to 13-year-olds. The correlation revealed that a student's degree of accomplishment increased in direct proportion to their attitude. However, some research has shown that there was little to no practical importance in the relationship between attitudes toward mathematics and mathematical performance. In a meta-analysis of 113 primary studies including elementary and secondary school students, Ma and Kishor (1997) discovered a positive and consistent correlation between attitude toward mathematics and mathematical achievement, however it was not statistically significant. Research on the validity and reliability of the "Math and Me Survey", a scale instrument that measures two factors: mathematics self-perception and pleasure of mathematics was conducted by Aktas and Tabak. According to Aktas and Tabak (2018), students who score well on the subscale have a strong self-perception of their ability to grasp mathematics and solve mathematical issues.

**Students' Perception of Mathematics and Their Achievement in Mathematics.**

The link between students' perceptions of mathematics and academic success has been the subject of several research (Nicolaidou & Philippou, 2003; Mohamed & Waheed, 2011; Fraser & Kahle, 2007; Ma and Kishor, 1997). Only minor connections between these factors were found in Ma and Kishor's (1997) meta-analysis, and these associations depended on a number of other variables (e.g., grade, sample size, ethnic background). These connections between grade and age became stronger among older students (7th to 12th grade). Recent research, however, suggests a link between students' perceptions of mathematics and academic success. The findings of Nicolaidou and Philippou (2003), which show substantial relationships between perception and performance, are in accord with this. Students who had optimistic attitudes and views performed better. In research involving secondary school pupils, Mato and De La Torre (2010) found that individuals who perform well academically had more favorable perspectives and attitudes about arithmetic than those who perform poorly. These findings were supported by broader research conducted by Sanchez et al., (2004) on secondary school students' perceptions of and attitudes about math studies in nine different nations. In a study conducted with middle school students from the USA and Bielo, Russia, it highlighted the significance of perception and attitudes in predicting academic achievement by demonstrating that mathematics perceptions and attitudes explained the variance of achievement in mathematics by 25% to 32%, with much of the explained variance being independent of math ability (Lipnevich, MacCann, Krumm, Burrus & Roberts, 2011). However, Georgiou et al., (2007) shown that while high accomplishment might help to predict a favorable impression of mathematics, it did not predict even greater achievement.

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## 3. METHODOLOGY

**Research design**

In order to analyze students' perceptions of mathematics and its effect on their academic progress, the study employed the quantitative technique and a descriptive survey design to systematically collect data from participants. With no need to manipulate any variables, survey research allows the researcher to examine certain traits, perceptions, feelings, views, ideas, behavior, and sentiments of a population, whether it be vast or little (Aborisade, 1997). Similar to this, these designs are inventive ways to gather expressive data on the characteristics of people, current practices, and circumstances or requirements (Kothari, 2004). Based on the aforementioned characteristics, a descriptive survey methodology was utilized in this study to collect factual, quantitative data from chosen samples and take a wide perspective of the consequences to the communities from whom the sample was drawn. A population of one hundred and fifty (150) from Junior High School form two students were selected from three schools namely Bethesda Methodist School, Royal Avenue International School, and St. Joseph's Anglican School in the Ga East District. The table below provides an illustration of the population's characteristics.

**Table 3.1: Population summary of the study**

| Name of School | Number of Students | Student | |
|---|---|---|---|
| | | Boys | Girls |
| Bethesda Methodist | 50 | 28 | 22 |
| Royal Avenue International | 50 | 21 | 29 |
| St. Joseph's Anglican | 50 | 26 | 24 |

**Source**: Field Survey, 2022

Three schools—Bethesda Methodist School, Royal Avenue International School, and St. Joseph's Anglican School—were chosen for the study using a purposeful sampling technique so that each school represented a different type of junior high school within the population, such as a public school, a private school, or a missionary school. In a purposive sampling, the researcher selects participants who exhibit the required characteristics and who seem to be a representative sample of the intended learners. (Teddlie & Yu, 2007; Koerber & McMichael, 2008). The Bethesda Methodist School, Royal Avenue International School, and St. Joseph's Anglican School were used as the sources for the sample size. The sample size for each class and the total sample size for each school were determined using the proportional stratified sampling approach. A total of 70 pupils from JHS 2 were included in the sample size calculations, and 35 of them were boys and 35 were girls. The table below provides an overview of the sample size.

**Table 3.1: Sample size summary of the study**

| Name of School | Number of Students | Student | |
|---|---|---|---|
| | | Boys | Girls |
| Bethesda Methodist | 25 | 14 | 11 |
| Royal Avenue International | 25 | 10 | 15 |
| St. Joseph's Anglican | 20 | 11 | 9 |

**Source**: Field Survey, 2022

In this study, a questionnaire was utilized as a tool to examine the various perspectives that students have about mathematics. Peers and the study supervisor were given the questions that would be on the questionnaire to evaluate so they could determine their validity as well. Peer evaluations are crucial in order to increase the instrument's accuracy, it is stressed (Morse, Barrett, Mayan, Olsen, & Spiers, 2002). The questionnaire was created using simplified English to increase readability of the questions and ensure that respondents provided correct answers. An introduction letter was sent to the school administrators and head teachers requesting an application. To ensure thorough coverage, prevent injustice, and assure a high return rate, the instrument was personally administered to 70 children in the three schools with the help of the

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instructors. An overall sample size of 70 responders, including 35 boys and 35 girls, received the test. With the assistance of the teachers, the students' completed questionnaires were gathered. The mathematics teachers from the several schools who sponsored the study indicated the performance of the study participants on a scale of good, average, and bad in their class mathematics performance in order to ensure the validity and reliability of the test results. As instructors merely provided the initials G, A, or P on their questionnaires to indicate if they were excellent, average, or poor, privacy was not compromised.

Statistical Package for Social Science was used to sort, categorize, and code the completed surveys for analysis (SPSS version 20). Both descriptive and inferential statistics were used to analyze the data. The research topics were analyzed using descriptive statistics (such as frequency distribution, percentages, averages, and standard deviations) and inferential statistics (Pearson moment correlations).

## 4. RESULTS AND DISCUSSIONS

**Results**

**Research Question 1:** ***What are Junior High School Students' perceptions on Mathematics?***

**Table 4.6A: Perceived Student's Positive Perception of Learning Mathematics**

| Statement | SDA N (%) | DA N (%) | N N (%) | A N (%) | SA N (%) | WM | SD |
|---|---|---|---|---|---|---|---|
| 1. Math is very useful subject | 0 (0.0) | 1 (1.4) | 7 (10.0) | 50 (71.4) | 12 (17.2) | 4.04 | 0.58 |
| 2. I want to develop my math skills | 0 (0.0) | 0 (0.0) | 12 (17.2) | 47 (67.1) | 11 (15.7) | 3.99 | 0.58 |
| 3. Math gives great deal of Satisfaction | 0 (0.0) | 4 (5.7) | 8 (11.4) | 38 (54.3) | 20 (28.6) | 4.06 | 0.80 |
| 4. Math develops the mind | 0 (0.0) | 10 (14.3) | 24 (34.3) | 26 (37.1) | 10 (14.3) | 3.51 | 0.91 |
| 5. Math is easy to understand | 0 (0.0) | 7 (10.0) | 10 (14.3) | 47 (67.1) | 6 (8.6) | 3.74 | 0.76 |
| 6. Math does not scare me at all. | 1 (1.4) | 9 (12.9) | 14 (20.0) | 18 (25.7) | 28 (40.0) | 3.90 | 1.12 |
| 7. Advanced math is very useful | 1 (1.4) | 8 (11.4) | 18 (25.7) | 35 (50.1) | 8 (11.4) | 3.59 | 0.89 |
| 8. I have a lot of self-confidence when it comes to math. | 0 (0.0) | 4 (5.7) | 8 (11.4) | 38 (54.3) | 20 (28.6) | 4.06 | 0.80 |
| 9. I would prefer to write a math assignment than write an essay | 0 (0.0) | 9 (12.9) | 14 (20.0) | 18 (25.7) | 29 (41.4) | 3.96 | 0.76 |
| 10. A strong math background will help me in my professional life | 0 (0.0) | 4 (5.7) | 8 (11.4) | 39 (55.7) | 9 (12.9) | 4.04 | 0.76 |

**Note:** 5=Strongly Agree (SA); 4=Agree (A); 3= Neutral (N); 2= Disagree (DA); 1= Strongly Disagree (SDA). WM = Weighted Mean; SD = Standard Deviation

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**Source**: Field Survey, 2022

A staggering 71.4% of students agreed with the statement "Math is a highly valuable subject" as seen in Table 4.6A, which presents the responses to the perceived positive views (WM=4.04; SD=0.58). 17.2% of respondents indicated that they strongly agreed with the statement, while 71.4% indicated that they only agreed. Only a few students, or around 1.4% of respondents, disagreed with the assertion. 10.0% more people are still neutral.

The students were once more asked to rate how much they agreed with the statement "I want to improve my math skills," and once more, as can be seen in the response shown above, a resounding 67.1% of them agreed; 15.7% strongly agreed, and 17.2% were indifferent. (WM=3.99; SD=0.58) None of the students objected or strongly disagreed with the statement.

In the same table that shows responses to perceived positive perceptions, 54.3% of students and 28.6% of students, respectively, agreed and strongly agreed with the statement "Math gives great deal of satisfaction," while just 5.7% of students disagreed and 11.5% chose to stay neutral. (WM=4.06; SD=0.80) No student strongly disagreed.

As seen in the responses gathered regarding the statement presented above, the students were also asked to indicate their level of agreement with the statement "Math develops the mind". 37.1% agreed, 14.3% strongly agreed, while only a few students (14.3%) disagreed, and 34.3% remained neutral (WM=3.59; SD=0.91).

Out of 70 students as respondents, 8.6% strongly disagreed, 67.1% agreed, 10.0% disagreed and 14.3% remained neutral that Math is easy to understand. Meanwhile, out of 70 students as respondents, 40.0% strongly agreed, 25.7% agreed, 12.9% disagreed and 1.4% strongly agreed that Math does not scare me at all. However, 20.0% remained neutral. 50.1% and 11.4% out of 70 students agreed and strongly disagreed respectively, 11.4% disagreed, 1.4% strongly disagreed and 25.7% of students remained neutral that advanced math is very useful.

In relation to self-confidence in math, 28.6% out of 70 students strongly agreed, 54.3% agreed, 5.7% disagreed, and 11.4% remained neutral that they have a lot of self-confidence when it comes to math. 41.4% strongly agreed, 25.7% agreed, 20.0% stayed neutral while 12.9% disagreed that they would prefer to write a math assignment than write an essay. Finally, out of 70 students, 12.9% strongly agreed, 55.7% agreed, 11.4% were neutral, 5.7% disagreed and no student strongly disagreed that strong math background will help them in their professional life.

**Table 4.7B: Perceived Student's Negative Perception of Learning Mathematics**

| Statement | SDA | DA | N | A | SA | WM | SD |
|---|---|---|---|---|---|---|---|
| | N (%) | N (%) | N (%) | N (%) | N (%) | | |
| 1. Math is a feared subject | 1 (1.4) | 8 (11.4) | 13 (18.6) | 20 (28.6) | 28 (40.0) | 3.94 | 1.09 |
| 2. Math makes me feel nervous | 12 (17.1) | 29 (41.4) | 13 (18.6) | 14 (20.0) | 2 (2.9) | 2.50 | 1.09 |
| 3. I dislike mathematics | 18 (25.7) | 20 (28.6) | 8 (11.4) | 24 (34.3) | 0 (0.0) | 2.54 | 1.21 |
| 4. Math is for boys not girls | 10 (14.3) | 24 (34.3) | 9 (12.9) | 26 (37.1) | 1 (1.4) | 2.77 | 1.14 |
| 5. Math is dull and boring | 12 (17.1) | 25 (35.7) | 18 (25.8) | 15 (21.4) | 0 (0.0) | 2.51 | 1.02 |
| 6. Math scares me | 6 (8.6) | 19 (27.1) | 17 (24.3) | 19 (27.1) | 9 (12.9) | 3.09 | 1.19 |
| 7. I would like to avoid math courses in future | 13 (18.6) | 7 (10.0) | 7 (10.0) | 31 (44.3) | 12 (17.1) | 3.31 | 1.38 |
| 8. Math is for intelligent people | 0 (0.0) | 4 (5.7) | 8 (11.4) | 39 (55.8) | 19 (27.1) | 4.04 | 0.79 |
| 9. I am always confused in a math class | 0 (0.0) | 14 (20.0) | 14 (20.0) | 13 (18.6) | 29 (41.4) | 3.81 | 1.18 |
| 10. Math skills is innate | 3 (4.3) | 8 (11.4) | 8 (11.4) | 38 (54.3) | 13 (18.6) | 3.71 | 1.04 |

***Note:*** *5=Strongly Agree (SA); 4=Agree (A); 3= Neutral (N); 2= Disagree (DA); 1= Strongly Disagree (SDA). WM = Weighted Mean; SD = Standard Deviation*

**Source**: Field Survey, 2022

Participants' responses to questions assessing perceived negative perception, as well as the mean and standard deviation for each item, are shown in Table 4.6B. 40.0% (n=28) of participants strongly agreed with the statement that math is a topic to be dreaded, whereas 28.6% (n=20) of participants agreed with the statement. However, although 18.6% remained neutral, 1.4% and 11.4% disagreed and 1.4% strongly disagreed, respectively. While 20.0% and 2.9% of participants replied agreeing and strongly agreeing, respectively, a far greater number of participants (41.4%, n=29) disagreed and 17.1% strongly disagreed that math made them feel anxious. 18.6% had no opinion.

No student strongly disagreed that they detested math. Although 28.6% disagreed and 25.7% strongly disagreed, 34.3% said they detest arithmetic. 11.4% expressed no opinion on this matter. The most frequent response to the statement "Math is for boys, not girls" was "agreed" (37.1%, n=26), followed by "disagreed" (34.3%, n=24). Just 1.4% of respondents strongly agreed with the statement, compared to 14.3% who strongly opposed and 12.9% who were neutral. Math is not tedious or monotonous, according to the majority of respondents (35.7%, n=25), and 17.1% (n=12) strongly agreed. Also, 25.8% of participants gave a neutral response to the question on whether math is tedious and boring, while 21.4% of individuals agreed.

While 24.3% of respondents were undecided about whether or not math scared them, the same number of respondents agreed (27.1%; n=19) and disagreed (27.1%; n=19) with that statement. 8.6% of people strongly disagreed, compared to 12.9% who strongly agreed. 12 respondents (17.1%) strongly agreed, 7 respondents (10.0%) disagreed, and 44.3% of respondents (31 participants) said they would want to avoid math classes in the future. It's interesting to notice that 7.0% of the 70 respondents disagreed, and 18.6% strongly disagreed. The majority of respondents (55.8%) agreed while 27.1% strongly agreeing that math is for bright people. Only a tiny percentage of responders (5.7%) argued that math is only for smart people. 11.4% of the respondents were neutral, but none strongly disagreed.

In addition, the majority of respondents (41.4%) strongly agreed and 18.6% agreed that they always get confused in arithmetic class. While 20.0% remained indifferent, another 20.0% disagreed that they are consistently perplexed in math class. Nobody disagreed strongly. According to Table 4.6B, out of 70 participants, 54.3% (38 students) agreed that math skills are natural, and 18.6% strongly agreed. 11.4%, had no opinion. Only 11.4% (8 students) of the participants disagreed, with 4.3% strongly disagreeing, with the assertion.

**Table 4.7: Summary of ANOVA Results**

| Source of Variation | df | F | p-value | F critiacal |
|---|---|---|---|---|
| Between Groups | 2 | 0.612 | 0.545** | 3.134 |
| Within Groups | 67 | | | |

**-Not Significant at confidence level of 0.05

Table 4.7's analysis of variance (ANOVA) findings demonstrate that p>0.05 and F is modest (df = 2, df = 64, F= 0.092, p=0.911), respectively. Hence, there is no significant variation.

**Research Question 2:** ***What is the relationship between students' perceptions and Mathematics performance?***

**Table 4.15: Frequency and Percentage Distribution of the Mathematics Test Performance of Students**

| | BM | | RAI | | SJA | |
|---|---|---|---|---|---|---|
| **Test Score** | **F** | **%F** | **F** | **%F** | **F** | **%F** |
| 80 and above (Outstanding) | 14 | 56.00 | 15 | 60.00 | 10 | 50.00 |
| 75-79 (Very Satisfactory) | 5 | 20.00 | 6 | 24.00 | 4 | 20.00 |
| 70-74 (Satisfactory) | 6 | 24.00 | 4 | 16.00 | 6 | 30.00 |
| 65-69 (Fairly Satisfactory) | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 64 and below (Below Expectation) | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |

The results in Table 4.15 revealed pupils' performance on the exams was excellent overall. 56.0%, 60.0%, and 50.0% of the children from Bethesda Methodist School, Royal Avenue International School, and St. Joseph Anglican School, respectively, out of the 75 participants who took the mathematics test, scored extraordinarily well and achieved scores of 80 or above. At Bethesda Methodist School, Royal Avenue International School, and St. Joseph Anglican School, respectively, 20.0%, 24.0%, and 20.0% of pupils had scores of 75 to 79, which is considered to be very good. Students from the three institutions made up 24.0%, 16.0%, and 30% of those with scores between 70 and 74. No responders from any institution had ratings that was below average (65 to 69).

To determine if student perceptions substantially affected academic performance, simple linear regression was performed.

**Table 4.16: Summary of Regression Results**

| | df | SS | MS | $r^2$ | F | P-value |
|---|---|---|---|---|---|---|
| Regression | 1 | 1.020 | 1.020 | 0.0025 | 0.196 | 0.683 |
| Residual | 68 | 5.738 | 0.130 | | | |

**Table 4.17: Summary of Regression Results**

| | Coefficients | t Statistics | P-value |
|---|---|---|---|
| Intercept | 77.676 | 15.925 | 0.000 |
| Perception | 0.545 | 0.411 | 0.68 |

According to Tables 4.16 and 4.17, the fitted regression model was as follows: Test Score = 69.845 + 2.759* (Perception). $R^2 = 0.031$, F (1, 68) = 2.198, p = 0.143 showed that the entire regression was not statistically significant. It was discovered that perception did not substantially predict performance or test score ($\beta = 2.759$, p = 0.143).

## 5. DISCUSSIONS

***Junior High School Students' Perception on Mathematics***

Ga East junior high school pupils' perceptions of teaching and learning math were typically found to be positive (Table 4.6A & Table 4.6B). This was witnessed by the positive perception of majority of the students as they disregard to the negative statements which says "math makes them feel nervous (WM=2.50; SD=1.09)", "I dislike mathematics (WM=2.54; SD=1.21)", "math is for boys not girls (WM=2.77; SD=1.14)", "I feel sick during mathematics test (WM=2.77; SD=1.14)", "math is dull and boring (WM=2.51; SD=1.02)" and "math scares me (WM=3.09; SD=1.19)". However, a sizeable number of students also acknowledged certain negative claims, as seen in Table 4.6B, which may have a detrimental effect if it persisted. For example, students who think math is just for smart people have limited opportunity to study it in depth.

Another research that was done to see how children felt about learning mathematics supports these findings (Kanafiah, & Jumadi, 2013; Akhter & Akhter, 2018; Daher, 2009). These findings from the study indicate that pupils are enthusiastic about learning mathematics and believe it to be a fascinating topic. Students' agreement that they wish to improve their math abilities and that math is an important and beneficial topic is also demonstrated by the revelation. Similarly, this result is in line with the opinions of Atteh et al., (2014), which jointly state that mathematics is regarded as a fundamental topic for many nations throughout the world owing to its significance in our everyday lives and the growth of our civilizations.

Additionally, the results showed that respondents had a favorable opinion of mathematics since they intended to take as much of it as they could while in school (Table 4.6A). The fact that mathematics is one of the most crucial disciplines for people to learn adds to the good attitude. The fact that students are interested in solving new mathematical problems proves beyond a shadow of a doubt that they have a favorable impression of mathematics. The results of this study corroborate those of Mohammed and Waheed (2011), who found that although students had a favorable opinion of mathematics, the degree of such opinion was only moderate.

Respondents did, however, also express a poor opinion of mathematics (Table 4.6B). By stating that math is a feared subject (WM=3.94; SD=1.09), the data revealed an unfavorable view. Additionally, the results showed that students' perceptions were unfavorable when they said they admitted math skills is innate (WM=3.71; SD=1.04). The results showed that the majority of pupils believe mathematics to be tedious and monotonous. The information gained supports Ifamuyiwa's (2005) assertion that pupils had a poor opinion of mathematics. He came to the conclusion that kids recognized it was their job to study mathematics and accepted it as a subject whose difficulty grows as students move through the grades and was of the opinion that most pupils believed mathematics to be difficult. Additionally, this is consistent with the findings of Fasasi and Yahya (2008) who concluded that students had a poor impression of mathematics based on their somewhat negative association between perception and results.

***Relationship between students' perceptions and Mathematics Achievement***

Finding the connection between students' perceptions of studying mathematics and their mathematical achievement was the second research question. The way that students perceive studying mathematics is crucial for their performance in the subject, claim Farooq and Shah (2008). The data showed that the students' performance was not significantly impacted by perception strength (Table 4.16 & Table 4.17). According to the findings as represented in Table 4.16 and Table 4.17, perception was not a reliable indicator of students' academic achievement in mathematics ($\beta = 0.545$, $p = 0.683$). In conclusion, the findings of the study showed that perception had little effect on performance because it did not substantially predict it (Table 4.16). This shows that children are extremely motivated to succeed academically despite their perceptions of studying mathematics. However, these results are consistent with those of Ng-Gan (1987) and Papanastasiou (2002), who found that there was no statistically significant correlation between students' perceptions and their mathematical ability. Additionally, research has demonstrated that there is no connection between perception and effectiveness (Maat & Zakaria, 2010).

## 6. CONCLUSION

According to the study, junior high school students' perceptions of mathematics instruction in the Ga East Municipality do not affect or have any bearing on their academic achievement. However, the fact that students have expressed a favorable opinion of mathematics suggests that if classroom teachers focus greater attention on students' learning, students will be inspired to exert more effort in their studies. This shows that a teacher with solid pedagogical skills and mastery of the mathematics curriculum will aid in creating positive attitudes of learning mathematics. If teachers want to enhance students' perceptions of learning mathematics and encourage them to pursue it as they climb the academic ladder, they must use a variety of techniques while teaching the subject. In order to grasp mathematics and put forth great effort in learning it at any level, students must be inspired to dispel all misconceptions and preconceptions about it. For this reason, it is vital to remind them that mathematics is for everyone. This study has shown that there are elements that affect how people see studying mathematics.

Due to time and financial constraints, the study only included three schools from one municipality. Urban regions served as a handy and intentional sampling location for the schools. As a result, the sample might not accurately reflect all students in the municipality, district and in rural areas. Future research should take into account rural and additional schools.

## 7. RECOMMENDATIONS

The study concludes that teachers should use instructional strategies that take into account learners' differences or learning hurdles, reduce anxiety, foster active interest in, and appreciation of, what is being taught and learned. They should implement remedial actions that will ease stress and offer assistance to their kids as needed. This will promote understanding amongst people in a relaxed teaching and learning setting. It is also advised that instructors and principals maintain and enhance their pupils' favorable impression of mathematics. To guarantee that students want to study mathematics in order to boost their academic performance, interest in the subject should be raised. In order to ensure that students comprehend the concepts and themes covered in the mathematics curriculum, as well as to foster a love of the subject and dispel misconceptions, cooperative learning should be promoted among math students. Students should also manage their time well so that they have ample time to practice and comprehend the mathematical ideas they have learnt in class. Resources for education should be made available by the government. For efficient math learning, they should include an adequate number of trained teachers, books, computers, and other educational resources.

## REFERENCES

[1] Aborisade F. Research methods: A student handbook. Lagos: Multifirm; 1997

[2] Anthony, G. & Walshaw, M. (2009). Characteristics of effective teaching of Mathematics: A view from the West. *Journal of Mathematics Education*, 2(2), 147-164

[3] Atteh E, Andam EA, Obeng-Denteh W, Okpoti CA, Amoako J (2014). The Problem Solving Strategy of Solving Mathematical Problems: The Case Study of Esaase Bontefufuo Senior High Technical School, Amansie West District of Ghana. *International Journal of Applied Science and Mathematics*, 1(2), 40-45.

[4] Aydin, D., & Aytekin, C. (2019). Controlling mathematics anxiety by the views of guidance and psychological counseling candidates. *European Journal of Educational Research*, 8(2), 421 – 431.

[5] Asante, K. O. (2012). Secondary students' attitudes towards mathematics. *IFE PsychologIA*, 20(1), 121-133.

[6] Ankomah, Y.A. (2002). The Success of Private basic Schools in Ghana. The case of three Schools in Cape Coast. *Journal of Educational Management,* 1(4), 14

[7] Aktas, M. C., & Tabak, S. (2018). Turkish adaptation of Math and Me Survey: A validity and reliability study. *European Journal of Educational Research*, 7(3), 707 – 714

[8] Akhter, N., & Akhter, N. (2018). Learning in mathematics: difficulties and perceptions of students. *Journal of Educational Research*, 21(1).147-163.

[9] Burstein, L. (1992). The analysis of multilevel data in educational research and evaluation. *Review of Research in Education*, 8, 158-223.

[10] Cheung, K. C. (1998). Outcomes of Schooling: Mathematics achievement and attitudes towards mathematics learning in Hong Kong. *Educational Studies in Mathematics*, 19(2), 209 - 219.

[11] Colgan, L. (2014). Making math children will love: Building positive mathitudes to improve student achievement in mathematics. What works? Research into Practice Research Monograph. Student Achievement Division, Ontario Ministry of Education.

[12] Enu, J., Agyman, O. K., & Nkum, D. (2015). Factors influencing students' mathematics performance in some selected colleges of education in Ghana. *International Journal of Education Learning and Development*, 3(3), 68-74.

[13] Ernest, P. (1994). Conversation as a metaphor for mathematics and learning. Proceedings of the British Society for Research into Learning Mathematics Day Conference, Manchester Metropolitan University (pp. 58-63). Nottingham: BSRLM.

[14] Farooq, M. S. and Shah, S. Z. U. (2008). Students' attitude toward Mathematics. *Pakistan Economic and Social Review*, 48(1), 75-83

[15] Fletcher, J. (2003). Constructivism and mathematics education in Ghana. *Journal of the mathematics Association of Ghana*, (5), 29-38.

[16] Fasasi, K. & Yahya, S. (2008). Teachers and Students Perception of the Psychological Factors Influencing Students' Achievements in Mathematics in Secondary Schools in Girei LGA, Adamawa state. *International Journal of Research & Method in Education*, 5(1), 23-41.

[17] Georgiou, S. Stavrinides, P. & Kalavana, T. (2007). "Is Victor better than Victoria at maths?" *Educational Psychology in Practice*, 23(4), 329–342.

[18] Hart, L. (1989). Classroom processes, sex of students and confidence in learning Mathematics. *Journal of Research in Mathematics Education*, 20(3), 242-260.

[19] Ifamuyiwa, A.S (2005) Girls Participation and Achievements in Secondary School Further Mathematics in Ijebu – Ode, Ogun State, Nigeria P. 97 Standard for Science Technology and Mathematics Education Research (A Book for Reading).

[20] Kibrislioglu, N. (2015). An Investigation about 6th Grade Students' Attitudes Towards Mathematics. *Procedia - Social and Behavioral Sciences*. 186(1), 64 – 69

[21] Koerber, A., & McMichael, L. (2008). Qualitative Sampling Methods: A Primer for Technical Communicators. *Journal of Business and Technical Communication*, *22*(4), 454–473. https://doi.org/10.1177/1050651908320362

[22] Kothari, C.R. (2004) Research Methodology: Methods and Techniques. 2nd Edition, New Age International Publishers, New Delhi.

[23] Lipnevich, A. A., MacCann, C. Krumm, S., Burrus, J., and Roberts, R. D. (2011). "Mathematics attitudes and mathematics outcomes of US and Belarusian middle school students". *Journal of Educational Psychology*, 103(1), 105–118.

[24] Mensah, J. K., Okyere M., & Kuranchie, A. (2013). Student attitude towards Mathematics and performance: does the teacher attitude matter? *Journal of Education and Practice*, 4(3), 132-139

[25] Mato, M. & De la Torre, E. (2010). "Evaluación de las actitudes hacia las matemáticas y el rendimiento académico." *PNA*, 5(1), 197–208.

[26] Maat, S. M. B. & Zakaria, E. (2010). The learning environment, teacher's factor and student's attitude towards mathematics amnogst engineering technology students. *International Journal of Academic Research*, 2(2), 16- 20

[27] Ma, X. & Kishor, N. (1997). Assessing the relationship between attitude towards mathematics and achievement in mathematics: A meta-analysis. *Journal of Research in Mathematics Education*, 28, 26 – 47.

[28] Mazana, M. Y., Montero, C. S., & Casmir, R. O. (2019). Investigating students' attitude towards learning mathematics. *International Electronic Journal of Mathematics Education*, 14(1), 207-231.

[29] Moenikia, M., & Zahed-Babelan, A. (2010). A study of simple and multiple relations between mathematics attitude, academic motivation and intelligence quotient with mathematics achievement. *Procedia - Social and Behavioral Sciences*, 2, 1537–1542.

[30] Mathai, M. J. (2014). Perceptions and lived experiences of traditional community college developmental mathematics students. University of Phoenix.

[31] Mohamed, L. & Waheed, H. (2011). "Secondary students' attitude towards mathematics in a selected school of Maldives". *International Journal of Humanities and Social Science*, 1(15), 277–281.

[32] Nicolaidou, M. & Philippou, G. (2003). "Attitudes towards mathematics, self-efficacy and achievement in problem solving," in European Research in Mathematics Education III, M. A. Mariotti, Ed., pp. 1–11, University of Pisa, Pisa, Italy.

[33] Onderi, P. O., Okwara, M. O., Raburu, P., Barongo, S., Mokaya, E., Mokogi, H., & Omae, D. (2015). Assessment of school factors related to academic achievement in mathematics among secondary school students of Masaba South Sub- County, Kenya. *Journal of Education and Practice*, 6(12), 70-73.

[34] Papanastasiou, E. (2002). Factors that Differentiate Mathematics Students in Cyprus, Hong Kong, and the USA. *Educational Research and Evaluation*, 8(1), 129-146. 10.1076/edre.8.1.129.6919.

[35] Singh, S. P., & Imam, A. (2013). Effect of personal and institutional variables on mathematics achievement of secondary school students. *IOSR Journal of Humanities and Social Science*, 10(3), 22–33

[36] Sam, L. C. (1999). Public images of mathematics. Unpublished PhD thesis, University of Exeter.

[37] Spencer, A. (2012). Attitudes matter: an examination of the relationship between student attitudes toward mathematics and success in middle school algebra (Unpublished doctoral dissertation). University School of Education of Gardner-Webb University.

[38] Sarwat, M., Safia, S., & Manzoor, H. A. (2013). Attitude towards Mathematics and Academic Achievement in Mathematics among Secondary Level Boys and Girls. *IOSR Journal of Humanities and Social Science (JHSS)*, 6(4), 38-41

[39] Sanchez, K., Zimmerman, L. & Ye, R. (2004) "Secondary students' attitudes toward mathematics". *Academic Exchange Quarterly*, 8(2), 56–60.

[40] Schenkel, B. (2009). The impact of an attitude toward mathematics-on-mathematics performance. Unpublished MA Thesis, Mariette College.

[41] Tahar, N. F., Ismail, Z., Zamani, N. D., & Adnan, N. (2010). Students' attitude toward mathematics: The use of factor analysis in determining the criteria. *Procedia - Social and Behavioral Sciences*, 8, 476–481.

[42] Tella, A. (2017). Teacher variables as predictors of academic achievement of primary school pupil's mathematics. *International Electronic Journal of Elementary Education*, 1(1), 16-33.

[43] White, T. (2019). Artifacts, Agency and Classroom Activity: Materialist Perspectives on Mathematics Education Technology. *Cognition and Instruction*, 37(2), 169-200

[44] . West African Examinations Council. West Africa Senior School Certificate Examination. Chief Examiner's Report. Accra: West Africa Examinations Council; 2013.

[45] White, T. (2019). Artifacts, Agency and Classroom Activity: Materialist Perspectives on Mathematics Education Technology. *Cognition and Instruction*, 37(2), 169-200.

[46] Zan, R. & Martino, P. D. (2007). Attitudes toward Mathematics: Overcoming positive/negative dichotomy. *The Montana Mathematics Enthusiasts Monograph*, 3, 157-168.