



**DETERMINING THE RELATIONSHIP BETWEEN STUDENTS' ACADEMIC SELF-EFFICACY AND PERFORMANCE IN MATHEMATICS AMONG BOYS AND GIRLS IN SECONDARY SCHOOLS IN YOLA SOUTH LOCAL GOVERNMENT AREA OF ADAMAWA STATE, NIGERIA**

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**Abstract**

The purpose of this study was to determine the relationship between students 'academic self-efficacy and performance in mathematics among boys and girls in mathematics in secondary schools. The study had the objective of determining the relationship between academic self-efficacy and performance in mathematics among boys and girls in secondary schools in Yola South local government area of Adamawa State, Nigeria. The target population comprised all 21 public secondary school students in Yola South. The sample was consisting of 380 form three students. Stratified, purposive and random sampling techniques were used to select the sample. A pilot study was carried in one school in order to ascertain the reliability of the research instruments. The questionnaire was found to have a Cronbach's Alpha Coefficient of 0.81 thus it was used without amendments. The literature on self-efficacy was used to check the content validity of the questionnaire items while form three Mathematics syllabus was used to check the content validity of the exam. Data was collected using self-administered questionnaires and a standard modified West African Senior School Examination Certificate (WASSCE) of Secondary Education Mathematics exam that was administered to measure performance in Mathematics. The Study collected quantitative data which was analyzed using descriptive statistics such as percentages and presented in form charts and tables. To test the hypothesis the independent sample test and Pearson product Moment Correlation Coefficient were used. There was a strong positive relation between self-efficacy and performance in Mathematics among boys and girls. The study recommends that efforts should be made to improve the academic self-efficacy in Mathematics for both boys and girls.

**Keywords:-** *students', attitude, self-efficacy, self-confidence, persistence, performance, boys, girls, mathematics*

## **1. Introduction**

Various studies have demonstrated that students who have high levels of academic self-efficacy beliefs have good feelings, behaviors, and positive thinking; can motivate themselves for actions and act accordingly; strive for achievement; persist longer when they encounter difficulties and until they get the solution; believe that failure is a temporal problem which they can manage; and attempt and use all possible ways to handle troubles and maintain their course of actions; are not frightened and challenged by difficult assignments and tasks rather they consider them as an opportunity for learning and mastery (Pajares, 2002).

Many researchers have attempted to relate self-efficacy to different educational, social, and psychological factors such as the strategies of learning (Bembenutty, 2007), motivational constructs such as persistence and goals/goal setting (Chemers, Hu, & Garcia, 2001), affective constructs such as stress and anxiety (Chemers, Hu, & Garcia, 2001; Finney & Schraw, 2003; Zajacova et al., 2005), academic achievement (Adeyemo, 2007; Bembenutty, 2007; Campbell, 2007; Chandler, 2006; Chemers, Hu, & Garcia, 2001; Gore, 2006; Zajacova et al., 2005). These researchers have reported that students with higher levels of self-efficacy tend to be more self-regulated and persistent in their learning, more motivated to learn and to be successful in their learning, experience less stress and anxiety, and as a consequence have higher academic achievement than their counterparts who are low in academic self-efficacy.

Vuong, Brown-Welty, and Tracz's (2010) study, for example, examined the effects of self-efficacy on academic success with a sample of 1,291 college sophomores recruited from 5 of the 23 California State University campuses. These investigators found that self-efficacy beliefs had a significant and positive effect on the academic achievement of students, as measured by Grade-Point-Average (GPA) and persistence rates.

Another recent study with a sample of 264 (172 females and 92 males) undergraduate students at a major university in Southwestern United States also demonstrated that self-efficacy positively and significantly predicted academic performance (Turner, Chandler, & Heffer, 2009). Elias and MacDonald (2007) assessed the ability of prior academic performance and academic self-efficacy in predicting college academic performance with a sample of 202 (115 females and 87 males) undergraduate students at a large university in the Rocky Mountain region of the United States. These authors found beliefs and college academic performance and academic self-efficacy beliefs accounted for a significant amount of unique variance beyond prior performance in predicting college academic performance.

In a similar vein, Robbins et al. (2004), in their meta-analysis of 109 early studies, reported that academic self-efficacy beliefs had a significant and positive effect on the academic achievement of college students. These investigators concluded that academic self-efficacy beliefs account for variance in both retention and college academic achievement beyond that explained by more traditional (i.e., cognitive) academic predictors such as high school performance and standardized test scores. Interestingly, an empirical study in Africa has also documented similar findings. That is, Adeyemo's (2007) study with a sample of 300 undergraduate first and second year students at the University of Ibadan, Nigeria, demonstrated that academic self-efficacy had a significant and positive effect on academic achievement.

Consistent findings on effect of academic self-efficacy have been reported by studies undertaken in elementary and high schools. For example, a study by Amare (2001) with a sample of 271 (143 females and 128 males) high school students demonstrated that academic competence (i.e., equivalent to academic self-efficacy) had a significant and positive direct effect on the academic performance of students. Kifle's (2004) study with a sample of 234 (108 females and 126 males) 9th and 10th grade students also found that students with higher self-efficacy had significantly higher academic performance as compared to their counterparts with lower self-efficacy. Similar findings have also been reported in studies which assessed the effect of subject or domain-specific academic self-efficacy on the academic achievement of domain-specific subjects with a sample of high school students (Mustofa, 2006; Yalew, 2005).

The reviewed literature shows that academic self-efficacy though determined by many variables can have both direct and indirect impacts on the academic achievement of secondary students. It envisaged that in this study, academic self-efficacy in Mathematics influences study habits, and students' efforts in tackling mathematical tasks thus influencing the performance of Mathematics among secondary school students in the West African Senior School Certificate Examination.

## **2. Why the study**

The reviewed literature has shown that self-efficacy is effective in determining task performance in all cycles of life. Academic self-efficacy has also been shown to determine the academic achievement at primary, secondary and tertiary levels. In addition high levels of academic self-efficacy have been linked with good performance owing to increased motivation and persistence in tackling perceived difficult assignments thus an increase in the level of academic self-efficacy may lead to an increase in performance in Mathematics. Investigations into sex differences in academic self-efficacy have been found to inconclusive with some researchers showing that males have higher levels of academic self-efficacy in Mathematics while others indicate that

there is no significant difference in the levels of academic self-efficacy between males and females. Similarly, sex differences in performance in Mathematics have been reported in number of studies while others report that females have the ability to perform equally better as males. Studies on gender differences in academic self-efficacy are inconclusive. However, literature on the effects of gender differences in self-efficacy on gender differences in performance is lacking. This study therefore sought to determine whether there are gender differences in academic self-efficacy in Mathematics and assess its effects on performance in Mathematics among boys and girls with a view to explain the gender differences in Mathematics performance.

### **3. Purpose of the Study**

This study sought to determine the relationship between students' academic self-efficacy and the performance in Mathematics among boys and girls in secondary schools in Yola South Local Government Area of Adamawa State, Nigeria.

The specific objective of the study is to: - Determine the relationship between students' academic self-efficacy and the performance in Mathematics among boys and girls in secondary schools in Yola South Local Government Area of Adamawa State, Nigeria.

### **4. Research Question**

What is the relationship between academic self-efficacy in Mathematics for boys and girls and their performance in Mathematics among boys and girls in secondary schools in Yola South local government area of Adamawa State, Nigeria?

### **5. Hypothesis of the Study**

There is no statistically significant relationship between students' academic self-efficacy in mathematics and their performance in mathematics. The hypotheses is derived from the assumption that student self-efficacy have positive effects on students' performance in mathematics particularly at secondary school levels as related by many researchers (Ayotola and Adedeji, 2009; Shkullaku, 2014; Ogunmakin and Akomolafe, 2013; Igbo, Onu, and Obiyo, 2015).

### **Theoretical framework =Ashton's Theory of Efficacy**

Ashton et al. (1983) developed a —conceptual framework for understanding the nature, antecedents, and consequences of efficacy attitudes in teachers|. This framework consists of two dimensions: learning efficacy, and personal efficacy. Learning efficacy entails student's beliefs between the general relationship of teaching and learning. This sense of efficacy is the belief of the degree the power of learning has to counteract the negative influences in the students' environment or background. Students who have a low sense of learning efficacy perceive

learning is dependent upon a student's ability and far less affected by the teaching and learning process.

Personal efficacy is Ashton's second dimension. Personal efficacy is students' perception of their overall effectiveness in their role as learners and in their perception of their ability to have a positive impact on academic achievement (Ashton et al., 1983). Students with a high degree of personal efficacy believe they have the skills, abilities, and knowledge to lead to success. Personal efficacy is a more general sense of effectiveness, not specific to a particular situation and is willing to try new instructional techniques and adapt instruction to improve his/her performance (Gibson & Dembo, 1984). Ashton's Students Efficacy Study analyzed students' efficacy in two phases. The first phase focused on middle school learners and the second focused on high school basic skills learners. The study results indicated the following:

1. Students efficacy has a significant relationship to academic achievement in high school basic skills classes.
2. Students efficacy is related to maintenance of a warm, accepting classroom climate.
3. Students efficacy is negatively related to teachers' use of harsh control tactics.
4. Students efficacy is related to school organizational structures. Students in middle school that had team organization, student's participation in school decision-making, and multi-age grouping of students had a higher sense of efficacy than students in a junior high with a departmental organization, traditional age grouping, and less student's participation in decision-making.
5. Students with high-efficacy attitudes were more likely to maintain high academic standards, concentrate on academic instruction, monitor learning on-task behavior and work to build friendly, non-threatening relationships with their low-achieving colleagues than were students with low-efficacy attitudes.

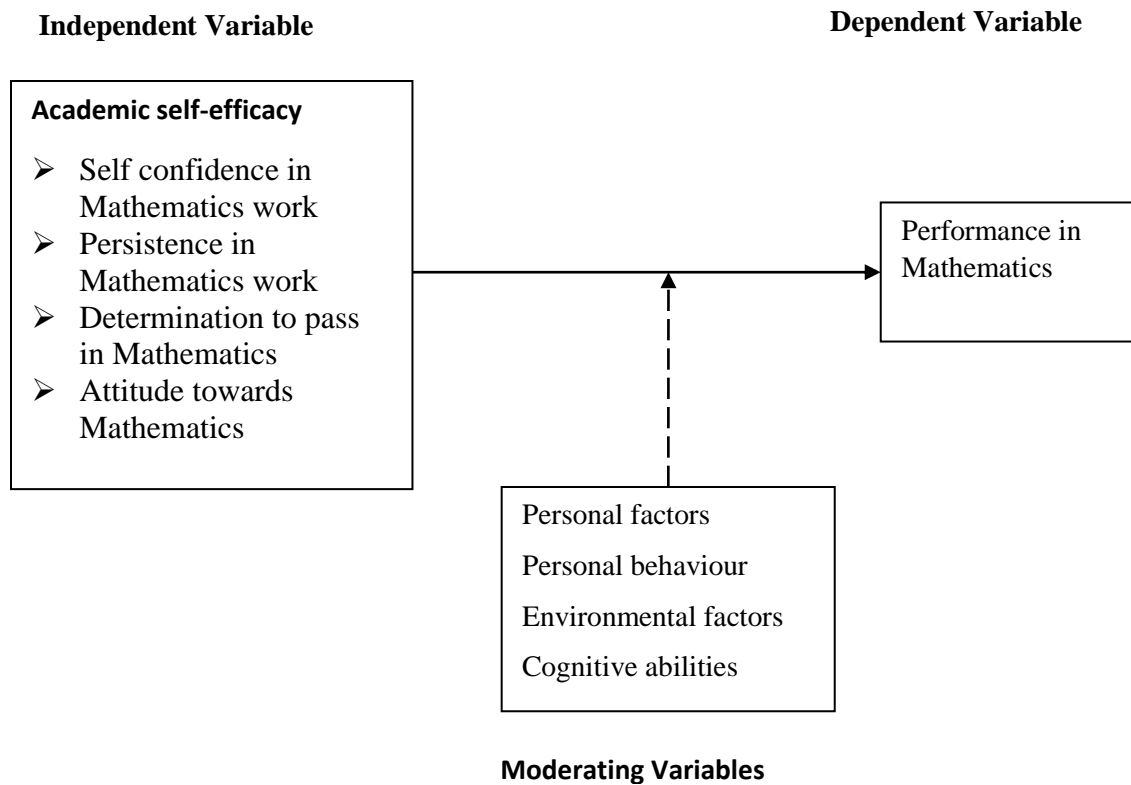
Research indicates students' efficacy can be developed and changes at different times (Ghaith & Yaghi, 1997). Studies have shown (Brousseau, Book, & Byers, 1988; Housego, 1990; Hoy & Spero (2005) students efficacy increases during the period of Problem solving teaching, but declines with more use of rote learning experiences without much variation between boys and girls (Ghaith & Yaghi, 1997).

## **6. Conceptual Framework**

This sought to determine the relationship between academic self-efficacy and the performance of Mathematics in secondary schools and explain the gender differences in Mathematics performance. Gender is perceived to affect the level of academic self-efficacy which in turn affects the performance in Mathematics directly or indirectly. Academic self-efficacy was the

independent variable while Mathematics performance was the dependent variables. The moderating variables were the different factors that affect the levels of self-efficacy in a person: personal factors (thoughts, beliefs and aspirations); personal behavior; and environmental conditions. The relationship between these variables is illustrated in Figure 1.

**Figure 1 Conceptual Framework**



As illustrated in Figure 1, gender was perceived to affect academic self-efficacy levels. The differences between boys and girls in personal factors, behavior and environment will moderate the relationship between gender and academic self-efficacy. Self-efficacy is perceived to have four sources: mastery experience, vicarious experience, verbal persuasion and physiological conditions. All these contribute to the level of academic self-efficacy of the learners. The level of academic self-efficacy determines the performance of Mathematics.

## 7. Research Methodology

This research used cross sectional survey design and used mixed research methods (Triangulation) collecting both qualitative and quantitative data. Quantitative data was collected students using Likert scale items to establish their level of academic self-efficacy in Mathematics. Quantitative data on mathematics performance was obtained from students by administering a standard mathematics test. Qualitative data was obtained from mathematics

teachers through open ended questionnaires that were used to provide in depth information on the perceived levels of academic self-efficacy in mathematics among boys and girls. For this study the target population was all the 17,569 public secondary school students in Adamawa State from which a sample 380 respondents consisting of 202 (53.3%) boys and 178 (46.8 %) girls, 34 (77.3%) male teachers and 10 (22.7%) female teachers. Purposive sampling was then be used to select all the mathematics teachers and simple random sampling was used to select the students. Pearson Product Moment Correlation Coefficients was used for analysis.

## 8. Data Analysis and Results

### 8.2 Relationship between Self Efficacy in Mathematics and Performance in Mathematics

The study investigated the relationship between self-efficacy in Mathematics and performance in Mathematics. This was done using the students' scores in Mathematics and their corresponding scores in the levels of self-efficacy in Mathematics. The relationship between on the level of self-efficacy in Mathematics and performance in Mathematics was determined using the Pearson Product Moment Correlation.

Prior to the test the data was tested for the assumptions on of absence of outliers, normality, linearity and homoscedasticity. To test for absence of outliers, box plots were plotted for both the scores on self-efficacy and Mathematics performance and then inspected for data points lying outside the first and the third quartile of the box plots which could signify outliers. Such points were not found thus there were no outliers. To test for linearity scatter plots were plotted and the line of best fit indicated. The data sets gave a line of fit that had all data points not deviating much from the line indicating that the two variables had a linear relationship. The scatter plot also showed that data points were approximately equidistant from the line of best fit from the first data point to the last thus data was homoscedastic. The Shapiro-Wilk test was performed to test of homogeneity of variance as explained in section 4.4. Data was also normally distributed as shown by the Shapiro-Welch test with a significance value ( $p=0.432$ ). The results of the Pearson moment correlations are presented in Table 1.

**Table 1 Correlation Results for Self Efficacy and Mathematics Performance**

		Total self-efficacy	Total performance
Total self-efficacy	Pearson Correlation	1	0.611*
	Sig. (2-tailed)		0.026
	N	380	380
Total performance	Pearson Correlation	0.611*	1

Sig. (2-tailed)	0.026	
N	380	380

\*. Correlation is significant at the 0.05 level (2-tailed).

The results in Table 10 show that teacher self-efficacy has a positive correlation with performance in Mathematics with Pearson correlation ( $r$ ) = 0.611, and significance value ( $p$ ) = 0.026 at 0.05 significance level. This implies that increase in the level of self-efficacy in Mathematics would increase the performance in Mathematics. The strength of the relationship between the two variables was determined by calculating the coefficient of determination. This was obtained by squaring the Pearson product moment correlation and multiplied by 100 to convert to percentage ( $r^2$ ). The coefficient of determination was found to be 0.373 (37.3%). This indicates that 37.3% of the performance in Mathematics could be explained by academic self-efficacy in Mathematics. This could be attributed to a number of issues. Firstly, academic self-efficacy shows the amount of confidence that a student has in doing academic work. This translates to intrinsic motivation which may give the student improved efforts towards his or her set goals in a given subject hence improving his/her performance in that subject. Similar findings were reported by Amare (2001) who showed that among high school students academic self-efficacy improves academic competence which has a significant and positive direct effect on the academic performance of students. Academic self-efficacy gives learners the psychological feeling that it's easy to achieve greater goals in academic work. In this case, students with higher levels of academic self-efficacy in Mathematics believe that they can do better in Mathematics. Such students may attribute failure in Mathematics to inadequate efforts rather accepting that Mathematics is difficult from which they could result to committing more of their time to learning Mathematics during self-study thus improved performance. Similar sentiments were noted by Kifle's (2004) study with a sample of 9th and 10th grade students also found that students with higher self-efficacy had significantly higher academic performance as compared to their counterparts with lower self-efficacy. Mustofa (2006) reported similar findings in a study in which he assessed the effect of subject or domain-specific academic self-efficacy on the academic achievement of domain-specific subjects with a sample of high school students.

### 8.3 Attitude towards Mathematics among Boys and Girls

The attitude of the students towards mathematics as assessed on a five point Likert scale in which learners rated them by ticking their appropriate choice that suits their confidence and believes in their Mathematics abilities. The choices given were: Very Low (VL), Low (L),



Moderately Low (ML), High (H), Very High (VH). The choices were awarded scores as follows: Very Low (1), Low (2), Moderately Low (3), High (4), Very High (5). The scale consisted of positive statements such that higher scores indicated positive attitudes towards Mathematics. The Likert scores are presented in for boys are presented in Table 2.

**Table 2 Likert Scores for attitude towards mathematics among Boys**

Statement	0	%	1	%	2	%	3	%	4	%
I have always liked to do mathematics no matter how difficult the topic	53	14.1	74	36.6	41	20.3	31	15.3	3	1.5
I had always liked mathematics more than other subjects	67	17.8	78	38.6	24	11.9	28	13.9	5	2.5
It is easy for me to stick to my aims in learning Mathematics and accomplish my goals	53	14.1	69	34.2	55	27.2	20	9.9	5	2.5
I am confident that I could deal efficiently with unexpected assignments in Mathematics	58	15.4	85	42.1	45	22.3	10	5.0	4	2.0
I can solve most mathematical problems if I invest the necessary effort	31	8.2	57	28.2	63	31.2	29	14.4	22	10.9
I can remain calm when facing difficulties because I can rely on my coping abilities to find the solution to the problems	87	23.1	56	27.7	42	20.8	17	8.4	0	0.0
When I am confronted with a difficult assignment in Mathematics I can usually find several methods of getting the solution	62	16.5	55	27.2	38	18.8	35	17.3	12	5.9

The results presented in Table 2 show that different items of the Likert scale were scored differently. In order to compare the average score for all the boys, the average score for each item of the scale was first calculated and then overall mean score for the attitude levels determined. This was done by calculating the total score per item, dividing it with the maximum

score of the sale per item and converting to percentage. The Likert scores for attitude towards Mathematics among girls are presented in Table 3.

**Table 3 Likert Scores for attitudes towards mathematics among Girls**

Statement	0	%	1	%	2	%	3	%	4	%
I have always liked to do mathematics no matter how difficult the topic	64	36.0	56	31.5	35	19.7	22	12.4	1	0.6
I had always liked mathematics more than other subjects	65	36.5	72	40.4	31	17.4	10	5.6	0	0.0
If a mathematical question challenges me, I can find the means and ways to solve it	44	24.7	77	43.3	44	24.7	13	7.3	0	0.0
I am confident that I could deal efficiently with unexpected assignments in Mathematics	39	21.9	80	44.9	53	29.8	6	3.4	0	0.0
I can solve most mathematical problems if I invest the necessary effort	68	38.2	59	33.1	51	28.7	0	0.0	0	0.0
I can remain calm when facing difficulties because I can rely on my coping abilities to find the solution to the problems	81	45.5	74	41.6	22	12.4	1	0.6	0	0.0
When I am confronted with a difficult assignment in Mathematics I can usually find several methods of getting the solution	72	40.4	58	32.6	40	22.5	6	3.4	2	1.1

The results presented in Table 3 show those different items of the attitude towards Mathematics scales were scored differently by the girls. This could be attributed to the fact that attitude is an attribute that is influenced by one's character or innate nature of an individual. All the girls and boys are unique in character thus they have different levels of attitude towards Mathematics. Similarly, the environment in which one is exposed to as well as past experience in Mathematics would influence the attitude towards Mathematics. It is therefore, expected that different boys and girls have different past experiences in Mathematics and therefore different attitude towards Mathematics. These sentiments are supported by the sentiments of Bandura (2001) who noted that an individual's perception of his or her abilities in accomplishing certain activities are the outcome of a dynamic interaction of three important factors: person's behavior; Personal factors

(for instance, thoughts, beliefs, attitude and many others); and environmental conditions. In Yola South Mathematics performance has been poor over time which suggests that the schools environment may not be favorable for good performance in Mathematics. Secondly, the experience of continuous low performance of other students in Mathematics has a negative impact on individuals' attitude towards Mathematics.

### 9. Self-confidence and persistence towards mathematics among secondary school students

Academic Achievement in mathematics according to Govindarajan, (2013) is known to depend upon many factors such as attitude, determination, persistence and self-confidence of students. Self-confidence is one of the important factors which influence the individual's academic achievement and also determine individual's level of persistence in pursuit of goals. Therefore, it is one of the important variables to be considered for the individual's academic success or failure. So development of Self-confidence and persistence is essential for academic achievement (Govindarajan, 2013)

He further argued that, the degree of child's Self-confidence and persistence which will be influenced by success or failure in the school situation will also be determined by the extent to which the child feels about his personal worth and about his achievement. For children who do not perform well, their failure reinforced the avoidant behavior and the academic achievement situation becomes student frustration, boredom and conflict with one's teacher and parents.

**Table 4: Independent Sample t-test for self-confidence and persistence towards mathematics among boys and girls**

Levene's Test for Equality of Variances		t-test for Equality of Means						
F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper

Total Self-confidence and persistence score	Equal variances assumed	.321	.008	-11.23	378	.002	-8.62	3.73210	-11.124	-4.373
	Equal variances not assumed			-10.41	35.142	.002	-7.75	2.8638	-12.362	-5.883

The results of the Levene’s test for equality of variance shows that the assumption for homogeneity of variance was violated (significance value=0.008) was less than 0.05. The t-test was thus carried out with equal variances not assumed.

**Table 5 Group Statistics for Effect of Gender on Level self-confidence and persistence towards mathematics**

Group	N	Mean	Std. Deviation	Std. Error Mean
Boys	202	31.90	3.2453	0.0146
Girls	178	24.43	6.5642	0.1244

The self-confidence and persistence levels were higher for boys (M=31.9, SD=3.25) than for girls (M=24.4, SD=6.56). A statistically significant difference was found between boys and the girls levels of academic self-confidence and persistence in Mathematics at 95% confidence interval (N=380, 95% CI, t (378)= -10.41, p = 0.002. This implies that the level of self-confidence and persistence in Mathematics for boys was statistically higher than that for girls in secondary schools in Yola South Local Government Area of Adamawa State, Nigeria.

The independent sample t-test can be used to give the size of any differences in the variable of interest between the groups. This is done by calculating Eta Squared value. The Eta squared value expressed in percentage gives the percentage of the dependent variable which can be explained or which is due to the independent variable. It is calculated from the ‘t’ value and the number of degrees of freedom (N<sub>1</sub>+N<sub>2</sub>-2) here *N<sub>1</sub> and N<sub>2</sub>* are the number of boys and the number of girls respectively using the formula:

$$Eta\ Squared = \frac{t^2}{t^2 + (N_1 + N_2 - 2)} \dots\dots\dots 1$$

This gave a value of 0.223 (22.3%). This means that gender can predict or explain 22.3% of level of academic self-confidence and persistence in Mathematics. This could be attributed to a

number of factors. Self-confidence and persistence is a psychological impact that is nurtured in an individual in four different ways. Firstly, is Past Performance/Mastery experience which is derived from previous success in similar tasks? In Yola South, boys have performed better than girls both in secondary and primary schools and excelled in Mathematics related courses in post-secondary institutions. This has given boys the feeling that they can do it better than girls' thus higher levels of academic self-confidence and persistence in Mathematics. Similar sentiments were made by Bandura (2004), who noted that mastery experience is the best way to improve academic self-confidence and persistence and teachers can provide by giving learners assignments that are well guided that they can gradually improve from simple to more challenging thus boosting their mastery experience.

Secondly, vicarious experience has also been noted by Bandura (2004) as a way of improving academic self-confidence and persistence. This means seeing other peers excel in similar tasks may motivate a learner to perform better by putting more efforts as certain goals seem achievable after being achieved by others. As noted by the teachers, boys seem more motivated to study Mathematics and have goals set along Mathematics related courses as compared to girls in the same class. Boys in Yola South have been performing better than girls in Mathematics implying that younger boys in secondary schools have noted that other boys have succeeded in Mathematics thus creating intrinsic motivation in them. On the other hand girls have been performing poorly as compared to boys a fact that could make them feel that only boys can make it in Mathematics thus reducing their confidence in Mathematics. The findings concur with the findings of Lunenburg (2011) who noted learners who see other learners of their class and status perform well in a Mathematics test may create a drive to perform better as well. This may lead into increased efforts thus high levels of self-confidence and persistence. This explains why better performance of boys in Mathematics as compared has become a tradition.

Verbal persuasion is another factor that nurtures academic self-confidence and persistence. It refers to motivation by seniors such as teachers, leaders and parents into believing one is able to achieve certain goals or accomplishing certain tasks. There has a traditional feeling in the society that boys are better in Mathematics than girls. This was noted by the teachers that generally boys understand Mathematics and science subjects easily than girls and are always set their goals along such courses thus intrinsic motivation to work towards that. This suggests that teachers may have motivated boys more than girls in Mathematics thus higher levels of self-confidence and persistence of the boys. Similar findings were reported in the study by Eden (2003) teachers

feeling and communication to learners that they can makes them feel that they are able thus putting more efforts.

Emotional cues are also associated with a mediating effect on academic self-confidence and persistence. This refers to ones feeling when challenged with a challenging task. A feeling that mathematical tasks are too demanding may make learners develop phobia for Mathematics which results in to traditional failure. The teachers reported that most girls have feelings that Mathematics and science are difficult and too demanding for them as compared to boys. This could be attributed to lack of motivation or the continued poor performance thus low self-confidence and persistence in Mathematics. These results concur with what was noted by Eden (2003) that gender differences in the ability to control fear exists in academic work with girls being more affected than boys.

### **10. Discussions of Findings**

The study determined the level of self-efficacy in Mathematics, the performance in Mathematics in secondary schools and the then established the relationship between self-efficacy in Mathematics and performance in Mathematics. The objective of the study was to determine the relationship between academic self-efficacy in Mathematics and performance in Mathematics. The results gave a Pearson correlation coefficient ( $r$ ) of 0.611 and coefficient of determination of 37.3% indicating that there was a strong positive relationship between academic self-efficacy in Mathematics and performance in Mathematics. In a similar study on the relationship between gender, age, mental ability, anxiety, mathematics self-efficacy and achievement in mathematics Ayotola and Adedeji (2009) found that only mathematics self-efficacy, gender, and mathematics anxiety contributed significantly to the observed variance in the criterion variable in that order. This finding is in agreement with Bandura's (1986) in Ayotola and Adedeji (2009) claim that self-efficacy beliefs play an influential role in human agency. It also supports the work of prior investigators reporting a significant relationship between self-efficacy and related academic performance. Similarly, Pintrich and De Groot (1990) in Shkullaku (2013) documented that female students have lower self-efficacy compared to male students, in accordance with the results of this study where boys reported higher levels of self-efficacy than girls.

However, in another study on the relationship between mathematics self-efficacy and achievement in mathematics, Ayotola and Adedeji (2009) found that there is no significant difference between the mean achievement scores of secondary school male and female in mathematics contrary to the findings of this study. There are three possible reasons for this finding. The first is that their sample size was not large enough to detect significance. The near

significance value suggests that the increase in power that would result from a large sample as in the case of this study would detect such significance. This is supported by the strong goodness of fit indices of the scale with the relationship with gender and mathematics self-efficacy. The second possibility is that, although differences in mathematics self-efficacy between male and female secondary school students are consistently found, these differences may be less pronounced in mathematics confidence of males and females at the secondary school level. The third possible possibility is that secondary school females may continue to exhibit weaker mathematics self-belief, than the males, but these differences may be less pronounced when females are asked to provide a judgment of confidence to solve a specific problem

### **11. Conclusion**

There was a strong positive correlation between academic self-efficacy of students in mathematics and the performance of students in mathematics among secondary school students in in Yola South Local Government Area of Adamawa State, Nigeria. The implication that arise is that researchers, school counselors and teachers should be looking to student's beliefs about their mathematics abilities, for they are important components of motivation and academic performance (Loo and Choy, 2013; Ayotola and Adedeji, 2009; Abd-Elmotaleb and Saha, 2013). It could also be suggest that researchers and teachers should continue to identify the contexts in which certain motivation constructs may be better predictors of mathematics related outcomes as well as the unique role that the construct plays in the general development of self-beliefs and performance skills in mathematics. Other major findings are that, there is no significant difference in mean scores on self-confidence and persistence between boys and girls students. There is a significant relationship between self-confidence and persistence and achievement in mathematics of Boys and Girls in Yola South Local Government Area of Adamawa State, Nigeria.

The null hypothesis was thus rejected

### **12. Recommendations**

- i. There is need to create awareness to teachers and parents on ways of improving students' academic self-efficacy so as to improve their performance in Mathematics
- ii. There is need for teachers to devise ways of improving academic self-efficacy of girls in Mathematics so as to improve their performance and reduce gender disparities in Mathematics performance.

- iii. The ministry of education needs to devise ways of training teachers on developing student's self-efficacy so as to improve performance in Mathematics.
- iv. Experimental effect of positive psychology on student's self-Confidence and persistence on achievement in mathematics can be studied.
- v. 4. A study of parenting styles contributing to self-confidence and persistence could be attempted. .
- vi. Self-confidence and persistence, and self-concept present in students of secondary schools can be studied and natured to develop and sustain the positive attitude towards mathematics.

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