

**Relationship Between Students' Self-Efficacy and their Achievement in Senior Secondary School Mathematics, Delta Central Senatorial District, Nigeria.**

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### **Abstract**

*The study examined the relationship between students' self efficacy and their achievement in mathematics. The method used for the study was correlation design. Samples of 500 students were randomly selected from 25 public secondary schools in Delta central Senatorial District. Questionnaires were drawn to gather data on students' self efficacy, while students' results in mathematics were collected from their various schools to gather data on achievement in mathematics. Two research questions and two hypotheses were formulated to guide the study. All hypotheses were tested at the 0 .05 level of significance by using linear regression and ANOVA. The following are the major findings: There was a significant relationship between students' self efficacy and mathematics achievement. There was a significant difference in mathematics achievement between high self efficacy and low self-efficacy.*

*Keywords: Relationship, Students, Self efficacy, Achievement and Mathematics*

### **Introduction**

Self-efficacy has generated research in different areas of studies most especially in education. It has been most prominent in studies of educational construct such as academic achievement, attributions of success and failure, goal getting and problem solving. Most students believe that they do not have the ability to succeed in Mathematics and that has affected their achievement in the subject. Ezenweani (2006) stated that some problems students face in the learning of Mathematics is due to their attitude and beliefs toward studying of the subject. Because of low self-efficacy, they believe that Mathematics is a very difficult subject and that only the gifted students can do well in it. The females believe that the subject is sex- biased and that the males do better in Mathematics. This has greatly affected the students studying of Mathematics and their corresponding academic achievement at the different levels of the Nigeria educational system.

Pajares and Schunk (2001) stated that students engage in things that provide some form of satisfaction and self-worth and tend to shy away from actions that devalue the self. Many students do not want to face challenges in Mathematics because of the view they hold concerning their capabilities in Mathematics. Bandura (1977) stated that individuals create and develop self perception of capability that becomes instrumental to goals they pursue and to the control they are able to exercise over their environments. Students are understood to possess beliefs that enable them to exercise a measure of control over their thoughts, feelings and actions. According to Bandura, how people behave could often be predicted more by the beliefs they hold about their capabilities than by what they are actively capable of accomplishing. He refers to this as self efficacy.

Pajares (2002) stated that many students have difficulties in school not because they are incapable of performing successfully but because they are incapable of believing that they can perform successfully. They have learned to see themselves as incapable of handling academic work or to see the work as irrelevant to their schooling. Pajares(2002) define self efficacy as the confidence that one has in one's capability to do the things that one tries to do. What students know, the knowledge or skills, or the achievements they have previously accomplished are often predictions of subsequent attainments because the beliefs that they hold about the outcomes of their efforts powerfully influence the ways in which they will behave. Ormrod (2006) define self-efficacy as "the beliefs that one is capable of performing in a certain manner to attain certain goals." It is students' belief about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy is the belief that one has the power to produce that effect by completing a given task or activity to their competency. Self efficacy relates to a person's perception of their ability to reach a goal; it is concerned with beliefs of personal capability. It is the judgment of one's capabilities to perform given actions.

Sharon and Vialle (1998) in their findings revealed that students with high levels of self efficacy show a boost in academic performance compared to those who reported low self efficacy. The researchers also found out that those confident students typically took control over their own learning experience and were more likely to participate in class and preferred hands on learning. Also students reporting low self efficacy typically shied away from academic interaction and isolated themselves in their studies. According to Pajares and Miller (1994) Self efficacy refers to students' beliefs about their ability to master new skills and tasks often in specific domain such as mathematics. Student's self efficacy is viewed as the more influential variable on achievement.

### **Self-Efficacy and Academic Achievement**

Most courses of action are initially organized in thought. Bandura (1995) stated that students' beliefs about their self efficacy shape the types of anticipatory scenarios they construct and rehearse. According to Bandura students who have a high sense of efficacy visualize success, which provides positive guides and support for performance, while those who doubt their efficacy visualize failure. It is difficult for students to achieve when fighting self-doubts. Webb-William (2006), asserted that self-efficacy have been shown to affects performance through their effects on motivation, achievement and self-regulation. Motivation studies have found that three indicators of motivation (choice of activities, persistence and level of effort) are influenced by self-efficacy beliefs. Collins (1982), cited in Bandura (1997), stated that students with a high sense of self-efficacy solve more problems and also reworks more problems than students of the same ability who have low sense of self-efficacy. Students sometimes perform poorly not that they lack the skills but because they lack the perceived self-efficacy. Beliefs of personal competence help to determine the outcomes one expects. Students who are confident anticipate successful outcomes. The influence of self-efficacy on students academic achievement related behaviours was demonstrated by Schunk and his colleagues in a series of studies. They carried out this study by increasing the students' self-efficacy beliefs and providing them with instructional strategies designed to enhance

their competence. The increase in the students' self-efficacy resulted in improved performance. Collins (1982) identified high average and low ability students in Mathematics. In his work he gave students problems to solve and told them they could rework the one they missed. Ability was positively related to achievement, but students with high self-efficacy solved more problems correctly and choose to rework more problems they missed regardless of ability level than those with low self-efficacy. Schunk (2008) stated that "self-efficacy can influence choice of activities; students with low self-efficacy for learning may avoid attempting tasks. Those who judge themselves efficacious could participate more eagerly." Students who feel efficacious about learning generally put effort and persist longer than students who doubt their capabilities especially when they encounter difficulties. The result of expending greater effort and persistence is the performance.

It is believed that self-efficacy has wide affect in achievement settings and can influence choices of activities. Success is usually attained after generating and testing alternative forms of behaviour and strategies. Schunk (1984) asserted that self-efficacy judgements are thought to affect achievement by influencing on students' choice of activities, task avoidance, effort expenditure and persistence of goals. Students with low self-efficacy believe that a task is difficult and hence build stress depression and a narrow vision on how to solve Mathematics problems. But students with high self-efficacy would be more relaxed in solving difficult Mathematics problems. Therefore these influences are strong determinants of students' level of achievement in Mathematics. Many researchers have reported that Mathematics self-efficacy is a good predictor of Mathematics interest and achievement. It was reported that high sense of efficacy seems to influence the achievement persistence necessary to maintain high academic achievement in Mathematics. Pintrich and De Groot (1990) reported that academic self-efficacy is correlated with academic performance in Mathematics examination. The belief that students develop about their academic capabilities help determine what they do with the knowledge and skills they possess which eventually determine their academic achievement.

### **Research problems**

Many students hold different views about their capabilities to perform well in their academic work. It appears that these views or beliefs affect their achievements in schools. Most students believe they lack the capability to succeed in school especially in the mathematics. They feel that mathematics is meant for the gifted ones. The females also believe that mathematics is sex biased, and that the males do well in it. These beliefs have caused lots of problems and setbacks to the educational system. Despite the effort of the Federal Government and professional body like the Mathematics Association of Nigeria (MAN) to encourage students to study mathematics in the secondary schools, still the problem remains. Most students tend to select tasks and activities in which they feel competent and confident and avoid those in which they do not. Students are not ready to study mathematics and this is as a result of their belief concerning their capability in the subject.

Many educationist and researchers have made a number of systematic efforts to find out the causes and how these problems can be solved. However, it is sad to note that in spite of the efforts

that are being made by the Federal and State Governments, professional bodies like the Mathematics Association Nigeria (MAN) to improving teaching and learning of mathematics in our schools, students achievement in mathematics still remains very poor and far below expectation. Spurred by these worries and fears that this study is being carried out to find out whether self-efficacy have impact on students academic achievements in mathematics. Indeed to what extent does self-efficacy of students contribute to their achievement in senior secondary schools mathematics?

Based on the above problem of study the following research questions and null hypotheses were formulated to guide the study:

### **Research questions**

- 1 What is the relationship between students' self-efficacy and Mathematics achievement?
- 2 What is the difference in mathematics achievement between students with high self efficacy and those with low self efficacy?

### **Hypotheses**

1. There is no significant relationship between students' self-efficacy and achievement in mathematics
- 2 There is no significant difference in mathematics achievement between students with high self efficacy and those with low self efficacy

### **Methodology**

In this study a correlation design was used to determine the relationship between students' self-efficacy and their Achievement in mathematics in Senior Secondary School, in Delta Central Senatorial District, Delta State, Nigeria. Twenty five public secondary schools were randomly sampled for the study. The major instrument used for this study were the students results which was used to measure the students' achievement in mathematics and the questionnaire which was designed to gather data on students' self-efficacy in senior secondary mathematics. Five hundred (500) questionnaires were administered to the five hundred students in the twenty five sampled public Secondary schools to get their response on their self efficacy. The results of the data collected were analyzed by the use of regression and ANOVA. The analysis utilized the SPSS software.

### **Presentation of Results and Discussion**

The results arising from the data analysis have been quantified and presented in table 1, 2, 3 and 4. These are in response to the two research questions and two hypotheses stated.

**Research question 1:** What is the relationship between students' self-efficacy and Mathematics achievement?

Table 1: correlation analysis of students' self efficacy and achievement in Mathematics

		Mathematics achievement	Self-efficacy
	Mathematics achievement	1.000	0.002
	Self-efficacy	0.002	1.000
Sig.(1-tailed)	Mathematics achievement		0.485
	Self-efficacy	0.485	
N	Mathematics achievement	500	500
	Self-efficacy	500	500

Table 1 Shows that 0.002 is the relationship between students' self efficacy and their mathematics achievement. The coefficient of determination is 0.002 and amount of variance or contribution to the model Mathematics achievement is 0.2%.The result shows a positive relationship between self-efficacy and mathematics achievement which indicates that as the students self-efficacy increases their achievement also increases. The results also showed that self-efficacy contribute to students' achievement in Mathematics.

**Research question 2:** What is the difference in mathematics achievement between students with high self-efficacy and those with low self-efficacy?

Table 2: Difference in mean between students with high self-efficacy and low self-efficacy in mathematics achievement

Groups	Count	Sum	Average	Variance
Mathematics achievement	500	18814	37.628	252..2461
Low self-efficacy	447	2441	5.46085	22.3118
High self-efficacy	496	10508	21.18548	21.41199

Table 2 show the difference in mean between high self-efficacy and low self- efficacy in mathematics achievement. The table revealed that there was a difference between high self-efficacy and low self -efficacy in mathematics achievement. The mean level reported by students with high self efficacy was (21.18548) while that of low self-efficacy was (5.46085).

**Hypothesis 1:** There is no significant relationship between students' self-efficacy and achievement in mathematics

Table 3: The relationship between Students' self-efficacy and their mathematics achievement at 0.05 level of significance.

Model	Sum of squares	Df	Mean square	F	Sig
Regression	.379	1	.379	.001	.969
Residual	125870.429	498	252.752		
Total	125870.808	499			

From the result in table 3, the P- value (.969) was greater than the F- value (.001). Hence the null hypothesis was rejected. This indicated that there was a significant relationship between students 'self- efficacy and mathematics achievement in senior secondary school.

**Hypothesis 2:** There is no significant difference in mathematics achievement between students with high self-efficacy and those with low self-efficacy

Table 4: the difference between students with high self-efficacy and those with low self-efficacy in mathematics achievement

Source of variation	SS	Df	MS	F	P-Value	F-Crit
Between groups	244720	2	122360	1203.37	5.6777E-308	3.001972
Within groups	146420.8	1440	101.6811			
Total	391140.8	1442				

In table 4,  $F=1203.37$  with a critical value of 0.05, the critical F-value =3.001972. Since the F statistic is greater than the critical F-value, the null hypothesis was thereby rejected. This shows that there was a significant difference between students with low self-efficacy and those with high self-efficacy in mathematics achievement. We can conclude that students with high self-efficacy and those with low self-efficacy exhibited different achievement scores favouring those with high self-efficacy.

## Discussion

The findings in hypothesis 1 revealed that there is a significant relationship between students self efficacy and mathematics achievement. In table 1 we discovered that the correlation between self efficacy and mathematics achievement was positive, which means that as self efficacy increases achievement also increases and vice versa which is in line with the findings of Bandura (1995),

which stated that students with high sense of efficacy visualize success which provides guide and support for performance. It also support Mahyddin, Elias, Cheong, Muhamad, Noordin & Abdullah(2006) findings, who found out that students with high self efficacy often display greater performance comparatively to those of low self efficacy.

The result in table 4 and table 2 indicated that there is a significant difference between students with high self- efficacy and low self-efficacy in mathematics achievement. This study supports the view of Collins (1982), in his study it was discovered that students with high self efficacy solve more mathematics problems correctly and choose to rework more problems they missed. In table 2 the mean of students with high self efficacy was greater than that of students with low self efficacy. The results indicated that students with high mathematics self-efficacy were associated with high mathematics achievement. Mathematics self-efficacy was a significantly positive predictor of mathematics achievement. The findings suggested that students who have high self -efficacy tended to have better mathematics achievement which was in line with Liu and Koirala (2009). In their findings they discovered that students with high self-efficacy have high mathematics achievement than those with low self-efficacy. This finding suggests that students who were confident of their performance in mathematics tended to have high mathematics achievement. These sets of students could do an excellent job on mathematics tests, understand the most difficult material presented by their mathematics teacher and were more likely to have better mathematics achievement.

Bandura(1995) stated that low self-efficacy students believe that a task is too tough and hence have a narrow vision on how to tackle mathematics problems From the findings we can conclude that high self-efficacy is an important variable for students to achieve well in mathematics

## **Conclusions**

The study reviewed studies of students' self-efficacy and mathematics achievement in different parts of the world, the relationship between students' Self-efficacy and their achievement in senior secondary school mathematics in Delta Central Senatorial District, Delta State Nigeria. The study revealed that high self-efficacy is a predictor of students' achievement in mathematics

It showed that high self-efficacy and low self-efficacy influences students' achievement in mathematics among secondary school students.



**References**

- Bandura, A. (1977). Self-efficacy: Toward a Unifying Theory of Behavioural Change, *Psychology review* 84(2). Pp.191-215
- Bandura, A. (1995). *Self-efficacy in changing societies*. New York. Cambridge University Press.
- Bandura, A. (1997). *Self-efficacy. The Exercise of Control* New York, W.H. Freeman and Co.
- Collins, J.L. (1982). *Self-efficacy and ability achievement behaviour*. Paper presented at the meeting of the American Educational Research Association, New York.
- Ezenweani, U.L. (2006). *Mathematics and Classroom Teaching*, Abraka, University Printing Press.
- Liu, X and Koirala H (2009), The effect of self-efficacy on Mathematics achievement of high school students NERA conference proceedings 2009 paper 30.[http://digitalcommons.uconn.edu/near\\_2009/30](http://digitalcommons.uconn.edu/near_2009/30)
- Mahyddin R,Elias H,Cheong LS,Muhamad M.F,Noordin,Abdullah(2006).The relationship between students' self efficacy and their English language achievement, *Jurnal Pendidik dan Pendidikan*,Jil Pp 61-71
- Onoshakpokaiye, E. O.(2012). Self-efficacy and study habit as correlates of students' achievement in senior secondary school mathematics, Delia Central Senatorial District, Nigeria. *An unpublished M.ED dissertation submitted to the Delta State University , Abraka, Nigeria*
- Ormrod, J.E. (2006), *Educational Psychology: Developing learners*, N.J. Merrill publishing Co.
- Pajares, F. (2002). Overview of Social Cognitive Theory of Self-efficacy. Retrieved April 22, 2010. From <http://www.emoiy.edu/EDUCATION/mfp/effhtml>
- Pajares, F.(2002), Self-efficacy beliefs in Academic contexts: An outline. Retrieved January 25, 2011. from <http://des.emory.edu/mfp/efftalk.html>.
- Pajares, F and Miller,M.D (1994), Role of self-efficacy and self-concept Beliefs in mathematical problem solving: A path analysis .*Journal of Educational Psychology* 86,193-203.
- Pajares, F. and Schunk, D.H. (2001). Self-beliefs and Schools Success: Self-efficacy, Self- Concept and School Achievement. In R. 'Riding & S. Rayner (Eds,), *Self-Perception*. (Pp.239-266). London. Ablex Publishing.

- Pintrich, P.R. and DeGroot, E. (1990), Motivational and Self-regulated learning Components of Classroom Academic Performance. *Journal of Educational Psychology*. 82(1) Pp. 33-50.
- Schunk, D.H. (1984), Self-efficacy Perspective on Achievement Behaviour. *Educational Psychologist*, 19, 48-58.
- Schunk, D.H. (2008). *Learning Theories on Educational Perspective*. New Jersey, Pearson Meril.
- Sharon A and Vialle W (1998), Nursing students; self-efficacy ,self-regulated learning academic performance in science. Retrieved December 13,2011 from <http://www.aare.edu.au/98pap/and98319.html>
- Webb-William, J. (2006). Self-efficacy in the Primary Classroom: An Investigation into the Relationship with Performance. *Paper presented at the British Educational Research Association*. New Researchers / Students Conference. University of Warwick.