



# **Effect Of Peer Tutoring On Secondary School Student's Academic Performance In Mathematics In Tai Local Government Area Of Rivers State**

**Nbame, Letam**

**Department of Educational Foundations,  
Faculty of Education  
Rivers State University, Port Harcourt, Nigeria  
Phone No: 08134246822/Email: [letamkue@gmail.com](mailto:letamkue@gmail.com)**

## **ABSTRACT**

This study investigated effect of peer tutoring on secondary school student's performance in mathematics in Tai Local Government Area of Rivers State. A quasi- experimental design was utilized. Two groups were used for the experiment, peer tutoring group and control group. Two research questions and two hypotheses were formulated to guide the study. The population of the study was (2,950) senior secondary school students. The sample size was (260) SS1 students, taken from three schools in their intact classes. "Mathematics Performance Test (MPT)" was used to collect data from the two groups. There was treatment in the experimental group, while the control group was not treated. Pre-test was given to the groups before commencement of teaching and post-test at the end of teaching. The data obtained was analyzed using mean and standard deviation for the research questions while ANCOVA was used for test of null hypotheses at 0.05 level of significant. The findings of the research revealed that: Peer tutoring enhances academic performance of mathematics students; hence students feel more comfortable and open as they interact with their peers. Peer tutoring offers opportunity for each participant to become aware of their strength and weakness. Base on the findings the following recommendations were made: Peer tutoring should be incorporated in the teaching of secondary school subjects. Teachers should from time to time give students topics to go and make inquiry before teaching the topic, and encourage them to explain in their own terms what they have discovered about the concepts .A teacher who uses peer tutoring should also provide a form of reward system to reinforce and motivate students on task behaviour and participation.

**Keywords:** Mathematics; Peer tutoring, Academic performance.

## **INTRODUCTION**

The importance of mathematics in everyday life cannot be over-emphasized. It is the language and tool that is used in almost all fields of science. It helps in recognizing patterns and understanding the world. Many students in elementary, high school and even at the university level find mathematics to be difficult and challenging because it is an abstract discipline. Mathematics instructors therefore, try to create a mathematical environment which is friendly to the students in order to mitigate this challenge. One way to accomplish this is by giving the students an opportunity to learn and study cooperatively.

Vygotsky in Ra'ed and Reem (2016) suggested that in order for learning to take place, people should talk and interact with each other. People learn naturally from each other and cooperatively work in their

everyday lives. The conventional teaching method usually involves the teacher starting the lesson by introducing the topic, explaining it and then gives some worked examples and finally give homework to the students. In this kind of learning environment, students find it difficult to construct their own concept since they are not completely taking part in the process of teaching and learning. They are also not able to think innovatively, creatively, and critically since they perceivably received what have been taught to them.

Teaching itself involves sharing of knowledge between a teacher and a learner (Abdul-Raheen *et al.*, 2017). Therefore, teachers are required to coordinate the teaching and learning process for quality basic education implementation in classroom, United Nations Educational Scientific and Cultural Organisation (UNESCO, 2015). This implies that for proper coordination of the learning process, a teacher must have a right skill and mastery of the content for the correct level of learners with various needs in inclusive setting (Ali *et al.*, 2015). Some students find it difficult to keep up with the tempo of teaching. Hence, in order to promote active participation of students, teachers need to adjust their teaching approaches to a more learner-centred. One possible approach of teaching is the peer-tutoring method. Peer-tutoring are systematic, peer-mediated teaching strategies (Asaf & Zahoor 2017).

Ezengwu in Okoye (2013) contributed that majority of teachers in the field still employs the conventional teaching method in the classroom, these methods though having some merits found to be didactic, stereotype, ineffective and non-result oriented. The National Mathematics Advisory Panel in Ansem (2010) posited that for there to be continuous progress in mathematics performance, we must improve the quality of mathematics instruction received by all secondary students. Topping (2010) asserted that peer tutoring serves as an efficient way to transform self-ego, in students. Peer tutoring aids interaction among peers not only socially but also academically useful.

Peer tutoring teaching has to do with the pairing of students to learn an academic task. The pair of students can be of differing or the same ability and/or age range. Peer tutoring encapsulates a variety of instructional methods which includes Cross-Age Peer Tutoring (CAPT), Peer-Assisted Learning Strategies (PALS), and Reciprocal Peer Tutoring (RPT). The research base also suggests that, socialization experiences that take place during peer tutoring can benefit both the tutee and tutor by motivating students to learn and increase their social stand among peers (Shahzada, 2016).

Peer-tutoring has to do with student's partnership, bridging the gap between high achieving students with low achieving students. Peer tutoring refers to a situation where one student provides instructional assistance and guidance to another student (Annis, 2013).

Furthermore, Ezenwosu and Loretta (2013) noted that peer tutoring gives opportunity to teachers to accommodate a classroom with diverse learners to enhance academic performance across content areas and ability levels. Razia (2012) opined that peers play a vital role in children's development. Although children's relationship with their parents is more intense and enduring than relationship with peers, interactions among age-mates are more free and egalitarian. Most schools across the country are adopting and using student-centred instruction rather than the conventional method of instruction. This method of teaching has increased students' performance and achievement in all subjects of the elementary classroom, as well as the use of mathematics in everyday life (Topping *et al.*, 2010).

An additional benefit of using peer assisted learning to improve student's learning of mathematics in classroom was motivation. Kibuthu (2016) indicated that learners are motivated in achieving their own success in mathematics. Research on peer-assisted learning and its effects on students in mathematics, has proven to be a beneficial way in achieving success (McMaster *et al.*, 2006). Bombardelli, (2016) posited that in a research conducted on cross-age and same-age peer tutoring, gains were made significantly in learners of different backgrounds. Nebo (2012) stated that, the conventional method of teaching has failed to acknowledge the uniqueness of the inquiry based nature of mathematics and the learner's individuality thus failed to encourage creative and critical thinking in the learner, leading to poor achievement of students. Based on this, educators and scholars are challenged to seek for an intervention method that would enhance academic performance of students in mathematics. Some of these methods include;

concept mapping, discovering method, cooperative learning, target task approach, peer tutoring etc. (Okoye, 2013).

Students therefore, need to be able to master skills in problem-solving. One way to achieve this objective is through peer-assisted learning (PAL), also known as peer tutoring. Caihoon & Funchs (2013) sees it as students working together to teach one another.

Bielinski and Davidson (2011) defined academic performance as the display of knowledge attained or skills developed by students in the school subject. It is the level of performance in the subject as exhibited by a student. Academic performance is the exhibition of knowledge attained or skills developed by learners in the school subject usually designed by test scores or by marks assigned by teachers which can be low or high. It means how well one does in school. Poor grades are considered as bad academic performance. Academic performance is a yardstick used to determine how far a student has mastered a course of study within a given period of time. It is an absolute tool that can be used to determine and predict the standard of any educational system in Nigeria in terms of its efficiency and effectiveness. It portrays the quality of education offered in Nigeria

Zakaria *et al.* (2010) opined that to achieve efficient and effective teaching and learning, knowledge acquisition should not only focus on dispensing rules, definitions, and methods for students to master, but should be inclined to engage students actively as primary participants. One approach to achieve that is peer tutoring, which is the focus of this study.

### **Statement of the Problem**

Recent observations in mathematics performance of students in internal examinations among senior secondary schools in Tai Local Government Area of Rivers State indicated that, there is a poor performance by students in the subject. This low level of performance of students in mathematics which is also conspicuous at every level of the educational system has given mathematics educators a high level of concern which is so because of the assumption that is held universally about the growth and development of mankind. A lot of research efforts have been focused on identifying factors that constrain the learning of mathematics. Poor motivation and lecture method have been highlighted as some of the problems affecting the academic performance of students in mathematics.

The approach used by many mathematics teachers is one which does not give room for students to develop their intuition, imagination, critical thinking and creative abilities. As a result of this, educators of mathematics are constantly interested on how and when to optimally adopt varied mathematics instructional techniques in order to attain the stated mathematics educational objectives. Obviously, the traditional mathematics teacher as a textbook guided classroom has failed to bring the required outcome of producing well thinking students of mathematics in order to meet the present challenges globally.

This method of teaching (peer tutoring) has not been used in the area of study, hence, the study sought to make a comparative analysis on peer tutoring type and conventional teaching method in relation to mathematics performance among senior secondary school students in Tai Local Government Area of Rivers State.

### **Research Questions**

- 1 What is the mean difference in the pre-test scores and post-test scores of students in peer tutoring (experimental) and control groups in Tai Local Government Area of Rivers State?
- 2 What is the difference in the mean performance of male and female in the peer tutoring (experimental group) and control group?

### **Hypotheses**

**Ho<sub>1</sub>:** There is no significant difference between the pre-test scores and post-test scores of students in the peer tutoring group (experimental group) and control group in Tai L. G. A of Rivers State.

**Ho<sub>2</sub>:** There is no significant difference in the mean performance of male and female in the peer tutoring (experimental group) and control group in Tai L.G.A of Rivers State

**METHODOLOGY**

In each school, two arms of a class were randomly selected as experimental and control groups; Peer Tutoring Group (PTG) and control group (CG) respectively. The study employed the quasi- experimental design, using students in their intact classes. The sample of this study consists of (260) SS1 students. Three schools were drawn through simple random sampling technique for the study. The instruments for data collection consisted of structured questions tagged. ‘Mathematics Performance Test (MPT)' with 50 multiple choice questions for pre-test and post-test and four options (A, B, C, D) in which the students were requested to tick the correct option. In a period of 10 weeks that the study was concluded, in the PTG, the researcher taught some students to teach other. Pre-test scores were collected in the groups before commencement of teaching and post-test scores after teaching and treatment of experimental group. The instruments for data collection were validated by two experts in the subject area, in measurement and evaluation, department of Educational Psychology, Guidance and Counselling. Reliability of the instrument was estimated using the Cronbach Alpha reliability method for internal consistency. The sample for determination of the Cronbach Alpha was 30 from schools that are not part of the study. The result shows that a reliability co-efficient of 0.85 was obtained which made the instrument reliable for data collection. Mean and standard deviation were used to answer the research questions, while ANCOVA was used to test the null hypotheses at 0.05 level of significant.

**Experimental procedure:** This research used students in their intact class for experimental group and control group in the three schools. A pre-test was administered to the groups before the commencement of peer tutoring (teaching). The scores obtained from the result was referred to as pre-test scores. The researcher with the help of the mathematics subject teachers of arms (A and B) peer tutoring group (experimental group) and control group respectively was assisted in order to make sure the arms are in order to carry out the peer tutoring for the experiment. In the peer tutoring group (Arm A), the researcher instructed a student first, whom in turn taught the students in the experimental group. The peer tutoring serves as a treatment (intervention) to the experimental group.

In the control group (Arm B), conventional method of teaching was used. There was no form of intervention or treatment. The two groups were taught separately in their respective classes. The teaching exercise continued for ten weeks. At conclusion of the experiment, all the students in the two groups was given a post-test, which yielded the post-test scores.

**RESULTS**

**Research Question One:** *What is the mean difference in the pre-test scores and post-test scores of students in the peer tutoring group (experimental) and control group in Tai Local Government Area of Rivers State?*

**Table 1: Mean and Standard Deviation of Pre-test and Post-test Scores of Peer Tutoring (Experimental Group) and Control Group**

Group	No	Pre-test		Post-test		Mean Difference
		Mean	Std	Mean	Std	
Experimental	140	11.81	3.11	42.02	8.85	30.21
Control	120	11.87	3.18	28.70	7.77	16.83
<b>Total</b>	260					

Table 1 reveals that the mean score and standard deviation at pre-test stage of experimental group (peer tutoring) was (11.81 and 3.11) while that of control group was (11.87 and 3.18). Meanwhile, the mean score and standard deviation at post-test stage of experimental group (peer tutoring) was (42.02 and 8.85) while that of control group was (28.70 and 7.77). This indicates a mean gain of (30.21 and 16.83) for

experimental group and control group respectively. This therefore shows that students performed better in the post-test stage than the pre-test stage in the favour of experimental group (peer tutoring).

**Research Question Two:** *What is the difference in the mean performance of male and female in the peer tutoring (experimental group) and control group?*

**Table 2: Mean and Standard Deviation Performance of Students in Tutoring Group (Experimental) and Control Group based on Gender**

Group	Peer Tutoring			Control Group		Mean gain
	No	Mean	Std	Mean	Std	
Male	135	55.94	9.35	30.43	6.73	25.51
Female	125	44.58	8.38	25.40	5.20	19.18
<b>Total</b>	<b>260</b>					

Table 2 reveals that mean and standard deviation of post-test scores of students in peer tutoring (experimental group), for male was (55.94; 9.35) and female was (44.58; 8.38). While that of control group for male was (30.43; 6.73) and female was (25.40; 5.20). This therefore shows that the male students have a better result than the female students in both the peer group and control group, with a better performance in the peer tutoring group than the control group because of the effect of the treatment.

**Hypothesis One:** There is no significant difference between the pre-test scores and post-test scores of students in the peer tutoring group (experimental group) and control group in Tai L. G. A of Rivers State.

**Table 3: ANCOVA Results of Pre-test Scores and Post-test Scores of Students in Peer Tutoring Group and Control Group in Tai Local Government Area of Rivers state.**

Source	Sum of Squares	Df	Mean Square	F-value	P-value	Decision
<b>Corrected Model</b>	12613.424	2	6306.712	93.529	.000	Significant
<b>Intercept</b>	13051.017	1	13051.017	193.547	.000	
<b>Pre-test</b>	1609.266	1	1609.266	23.866	.000	
<b>Group</b>	11080.235	1	11080.235	164.321	.001	
<b>Error</b>	19352.589	257	67.431			
<b>Total</b>	448146.000	260				

Table 3 reveals (F 164.321, P= 0.001 < 0.05) which is less than the chosen level of significant between 1 and 257 degree of freedom. Therefore, the null hypothesis is rejected. This indicates that there is significant difference between the pre-test scores and post-test scores of students in peer tutoring group and control group in Tai Local Government Area of Rivers State.

**Hypothesis Two:** There is no significant difference in the mean performance of male and female in the peer tutoring (experimental group) and control group in Tai L.G.A of Rivers State

**Table 4: ANCOVA Results of Post-test Scores of Male and Female in Peer Tutoring and Control Group in Tai Local Government Area of Rivers state.**

Source	Sum of Squares	Df	Mean Square	F-value	P-value	Decision
Corrected Model	13100.913	2	4366.971	66.204	.020	
Intercept	15540.445	1	15540.445	235.597	.016	Significant
Pre-test	1606.909	1	1606.909	24.361	.026	
Gender	11567.723	1	5783.861	137.685	.003	
Error	18865.101	257	65.962			
Total	448146.000	260				

Table 4 reveals (F 137.685, P= 0.003< 0.05) which is less than the chosen level of significant between 1 and 257 degree of freedom. Therefore, the null hypothesis is rejected. This indicates that, there is significant difference in mean performance of male and female students in peer tutoring (experimental) and control group in Tai Local Government Area of Rivers state.

## DISCUSSION

The result reveals that the mean score for pre-test of experimental group and control group was (11.81 and 11.87). While the mean score for post-test of experimental group and control was (42.02 and 28.70). This implies that experimental group has gained a mean difference of 30.21 while the control group also gained a mean difference of 16.83, after post-test. This shows that students performed better in the post-test stage than the pre-test in the favour of peer tutoring group. However, difference in the pre-test and post-test scores of experimental group and control group was as a result of the treatment in the experimental group.

Again, the ANCOVA result reveals (F=164.321, P=0.001< 0.05) the chosen level of significant was obtained. Therefore, the null hypothesis is rejected, which indicates that there is significant difference between the pre-test scores and post-test scores of students in peer tutoring group and control group. The result shows that students performed better in the experimental group than the control group because of the treatment.

This study is in agreement with the study of Nebo (2012) who found difference in the pre-test and post-test scores of experimental and control group of peer tutoring and control group among peers in secondary school student's performance in mathematics. He contributed that competition is fostered particularly by peer tutoring which could possibly affect peer relations and academic performance.

The experiment conducted by Kibuthu (2016) revealed that there is difference between pre-test and post-test of experimental and control groups based on peer tutoring in mathematics of secondary school students. This is also in agreement with the study of Razia (2012) who noted that there is significant difference in the pre-test and post-test of the two groups. He concluded that peer tutoring has proven to be a positive component of increasing self-confidence, effort and focused behaviours among students. Again, this is probably because of the intervention(peer tutoring) that made the students at a post-test stage showed a greater effect than the pre-test stage.

The result reveals that mean of post-test scores of students in peer tutoring (experimental group), for male was (55.94) and female was (44.58). While that of control group for male was (30.43) and female was (25.40). This therefore shows that the male students have a better result than the female students in both

the peer tutoring group and control group, with a better performance in the peer tutoring group than the control group because of the effect of the treatment.

Again, ANCOVA result reveals ( $F = 137.685$ ,  $P = 0.003 < 0.05$ ) which is less than the chosen level of significant between 1 and 257 degree of freedom. Therefore, the null hypothesis is rejected. This indicates that, there is significant difference in mean performance of male and female students in peer tutoring (experimental) and control group in Tai Local Government Area of Rivers state.

This study is in harmony with the studies of Bowman-Perrott *et al.* (2012) who found significant difference in the performance of male students in the experimental group than female students. He noted that female students are lower in mathematics and spatial ability, as male are superior to female on mathematics/problem solving.

Buzbee-Little (2015) also found significant difference in the performance of male students in the experimental group than female students. He acknowledged that the girls develop better verbal skills than boys, while boys are better in mathematical skills.

### CONCLUSION

Peer tutoring enhances academic performance of mathematics students; hence students feel more comfortable and secured as they interact with their peers. Peer tutoring offers opportunity for each participant to become aware of their strength and weakness. It serves as a motivation toward academic performance.

### RECOMMENDATIONS

1. Peer tutoring should be incorporated in the teaching of all the secondary school subjects to enhance academic performance.
2. A teacher who uses peer tutoring learning style should also provide a form of rewarding system to reinforce and motivate students on task behaviour and participation.

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