

**EFFECT OF FIELD TRIP AND PEER TUTORING STRATEGIES ON THE ACADEMIC ACHIEVEMENT OF BASIC SCIENCE STUDENTS IN GOKANA LOCAL GOVERNMENT AREA OF RIVERS**

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**ABSTRACT**

*This study investigated the effects of field trips and peer tutoring on the learning outcomes of junior secondary school students in Basic Science, specifically within the context of Gokana Local Government Area of Rivers State. The study aims to determine whether instructional strategies like field trips and peer tutoring significantly impact students' academic achievement and retention. Three (3) primary objectives, research questions and hypotheses guided the study: utilizing a quasi-experimental design with pretest and posttest measures. The study aims to assess differences in learning outcomes based on instructional strategies and gender. The population of the study is about 3,440 students and the sample size consists of students from randomly selected intact classes, with achievement data collected via the Basic Science Achievement Test (BSAT), with 20 multiple-choice items. The reliability co-efficient was ascertained using Pearson Product Moment Correlation Co-efficient (PPMCC), and statistical analyses, including ANCOVA which reveal that students taught through peer tutoring achieved significantly higher mean gains than those in the field trip group, underscoring the effectiveness of peer-assisted learning for academic achievement. The study highlights the potential of peer tutoring to enhance learning in Basic Science and offer insights for educators, administrators, and policymakers aiming to optimize instructional methods in science classrooms. It is recommended that; inclusive teaching practices should be put consideration to support gender equity in science education, male students should endeavor to carry their female colleagues along as they engage in learning, and educators should continue to adopt methods that ensure equal participation and benefits for all students, fostering an inclusive learning environment.*

**Keyword: Effect, field trip, peer tutoring strategies, academic achievement, basic science students**

**INTRODUCTION**

The place of science in the life of any modern society cannot be over emphasized, in fact the level of science and technology as well as scientific literacy in any society is inextricably linked with the pace of development in such a nation. Consequent upon this, much importance is attached to science and technology all over the world. Basic Science is one of the science subjects offered at the junior Secondary School level in Nigerian Secondary Schools, (FRN, 2014). It is a science subject that prepares students to acquire higher knowledge to live effectively in the modern age of science and technology. In view of the importance of science and technology for nation building, research works are being done every day in order to improve the teaching and learning of Basic Science in schools, workshops, seminars, and conferences are being organized by professional bodies to improve the teaching and learning of the subject. Despite the workshops, seminars and conferences being organized by professional bodies in order to improve the teaching and learning of Basic Science, there is still poor performance in Basic science in our junior secondary schools, judging by poor results in achievement tests and examinations taken by the students at the various levels of the educational system (Ibraheem, 2004). Chief examiners reports (2014-2019) on West African School Certificate Examination and National Examination Council (NECO) in Nigeria showed that the performance of students in science subjects have been poor especially in Basic Science.

Low achievement in Basic Science could be attributed to many factors such as attitudinal problems, lack of mastery of the subject language, spelling errors, confusion between similar and related concepts and poor instructional delivery approach (Salau, 2016). The author further mentioned that amongst the factors enlisted above, poor instructional delivery approach seems to be the most prominent factor that could be the major cause of underachievement in Basic Science. Based on the data regarding low achievement in Basic Science, science educators are constantly exploring ways to alleviate the ugly situation of under achievement in the subject as noted by Jumoke and Oludipe (2017). This is by ensuring that the pedagogical approach which is the function of students' achievement in a subject, that is employed in the teaching and learning process should be the type that guarantees creative thinking and optimal learning outcomes. Awolola (2019) state that there exist gaps between curriculum planners' intention and what goes on in the science classroom concerning the recommended teaching methods. This author's statement is a confirmation of Ndioho in Umoru E.S (2017) who earlier pointed out that, the non-impressive achievement of students in Basic Science indicates that the methods of teaching employed by most Basic Science teachers in the classroom are not adequate and interesting. In the same light, Umeh (2020) reiterates that the main cause of students' low achievement is traceable to improper teaching methods employed by subject teachers which centers mainly on excessive talking, copying of notes, rote learning of textbook and memorization of concepts.

In spite of the consensual efforts of science educators to alleviate the ugly situation of low achievement of students in Basic Science, Nwezi and Nwosu in Umoru E.S (2017) maintain that the problem is connected to ineffective teaching strategies employed by teachers. The authors also stated that teachers are more inclined to traditional teaching method which appears to be the most dominant teaching method employed by many science teachers. Low achievement in Basic Science could be inability to remember or recall what has been taught during the instruction partly due to ineffective teaching methods. Gambari and Zubairu in Umoru and Itodo (2018) in a study stated that the persistent use of traditional teaching method makes students passive rather than active learners. This does not promote insightful learning and long-term retention of some concepts in Basic Science. Retention is the ability to remember or recall what has been learnt after an interval of time. Odoh (2019) defined retention as the ability of a learner to communicate to others repeatedly and overtime what he /she have learnt and how he/she has come about the results. Muhammad (2017) opined that retention may depend on the method of teaching, the interest and the attitude of the learner or the meaningfulness of the materials to the students.

Oludipe and Oludipe (2016) pointed out that: The traditional teaching method is a process, the current Nigerian level, whether primary, secondary or tertiary institution level mostly tends to resemble a one-person show with a captive but often comatose audience. Classes are usually driven by "teacher-talk" and depend heavily on textbooks for the structure of the course. There is the idea that there is a fixed world of knowledge that students must come to know. Information is divided into parts and built into a whole concept. Teachers serve as pipelines and seek to transfer their thoughts and meanings to the passive students. There is little room for the student-initiated questions, independent thoughts or interaction between students. The goal of the learner is to regurgitate the accepted explanation or methodology expostulated by the teachers. According to Ugwu and Nzewi (2018) in the past, the traditional teaching approach used to impart knowledge was successful, but the minds of current generation vary from those of the previous generation, meaning that the current students of today are highly scientific literate and flow with the new trends in science and technology such as accessing the internet in order to enhance their knowledge. Hence the progression of education and educational technology should follow the progression of time, therefore these calls for new innovative teaching method such as field trip and discovery that could address the needs of the present day students.

For Basic Science to be an effective tool preparing students for higher learning in Sciences and for the enhancement of national productivity, the recommended contemporary teaching strategies for science teaching should be employed by Basic Science teachers in secondary schools. These

recommended contemporary teaching methods as enlisted by Umoru and Adejoh (2019) includes; problem-solving, concept-mapping, constructivist and field trips. However, Basic Science teachers seem not to be inclined to the use of these recent teaching strategies that are student-centered (engages students in active participation in class activities) rather they choose to use the traditional method which is teacher-centered. The traditional teaching method (lecture) can hinder the development of individual students' active and creative abilities and as such, students who are exposed to only this model of education may no longer be considered sufficient for the needs of the future educated citizenry. In the same vein, Danjuma (2016) posits that, activity based instructional strategy such as; discovery method, inquiry, demonstration and problem-solving could enhance academic achievement, self-confidence and creative thinking in learners.

In the opinion of Kurumeh (2018), involvement of students in the teaching and learning process signifies a paradigm shift from the traditional method of teaching to the contemporary approach which is another means of ensuring active learning in science. Thus, the search for strategies that emphasizes active participation of students has engendered the birth of interactions with peers and interactions with the faculty outside the classroom.

Field trip and peer tutoring on the other hand are teaching strategies that enhances students' ability to understand and control their learning. It is an act of learning that is guided by meta-cognition (thinking about one's thought), strategic action (planning, monitoring and evaluating personal progress against standards) and motivation to learn taking the process of control and evaluating one's own learning and behaviour. The evidences from the literature reviewed are not conclusive about the effects of Field trip and peer tutoring on students' achievement. Most of the studies however found significant effect of Field trip and peer tutoring on students' achievement. There are also little or no studies on the effects of Field trip and peer tutoring strategies in the subject area of basic science in junior secondary schools.

### **Statement of the Problem**

In any teaching and learning process, the cardinal objective is to see that the learner should be able to perform tasks and if possible transfer the experience in solving problems in a new situation. One of the objectives of teaching and learning reproduction in secondary schools aims at promoting an understanding Basic Science and consequently Biology concepts with a view of applying such knowledge in solution to real life problems. This objective is hardly been achieved over the years.

The poor performance in internal and external examinations in Basic Science in recent times is a matter of concern; many suggested that this ugly trend might have been the poor foundation of students in Basic Science. This may also be connected to the method of teaching used by Basic Science teachers, because a good learning is a product of a good method of teaching. Scientific classification and taxonomy has been reported as one aspect of junior secondary school Basic Science curriculum that students find difficult to answer questions as they perform poorly in questions bothering on these concepts. (WAEC Chief Examiner's reports 2014, 2016, 2017 & 2018). This persistent poor performance in these concepts among others leaves no doubt about the ineffectiveness of the teaching method used by Basic science teachers for teaching these concepts. Students may have seen taxonomy as abstract and meaningless concept. Students neither understand the basic concepts nor the underlying process that gave rise to the taxonomy concepts. This may be because the teaching methods used by the Basic Science teachers were teacher-centered methods and does not allow students' participation, therefore imposing poor concept formation and reducing interest of students in Basic Science.

The prevailing practices during Basic Science instructions where emphasis is on transmission of information from the teacher and textbooks to the students makes students resort to learning by memorization, which results in consistent poor performance. It is against this backdrop that this study is necessitated to investigate the effect of field trip and peer tutoring on secondary school students' learning outcomes in Basic Science.

### **Purpose of the Study**

The purpose of this study is to determine the effect of field trip and peer tutoring on students' learning outcomes in Basic Science in secondary schools. Specifically, the study seeks to determine the:

1. Differences in the pretest and post -test mean achievement scores of students taught Basic Science using field trip instructional strategy and Peer tutoring.
2. Differences between the pretest and post -test mean achievement scores of male and female students taught Basic Science using field trip instructional strategy.
3. Differences between the pretest and post -test mean achievement scores of male and female students taught Basic Science using peer tutoring instructional strategy.

### **Research Questions**

The following research questions will guide the study:

1. What are the differences in the pretest and post -test mean achievement scores of students taught Basic Science using field trip instructional strategy and Peer tutoring?
2. What is the difference between the pretest and post- test mean achievement scores of male and female students taught Basic Science using field trip instructional strategy?
3. What is the difference between the pretest and post- test mean achievement scores of male and female students taught Basic Science using peer tutoring instructional strategy?

### **Hypotheses**

The following null hypotheses will be tested at 0.05 level of significance;

**HO1:** There is no significant difference in the pretest and post- test mean achievement scores of students taught Basic Science using field trip instructional strategy and Peer tutoring.

**HO2:** There is no significant difference between the pretest and post- test mean achievement scores of male and female students taught Basic Science using field trip instructional strategy

**HO3:** There is no significant difference between the pretest and post- test mean achievement scores of male and female students taught Basic Science using peer tutoring instructional strategy

### **Scope of the Study**

The study will investigate the effect of field trip and peer tutoring strategies on the academic achievement of basic science students. The study will be delimited to JSII students in Gokana Local Government Area of Rivers State. The academic achievement of the junior secondary school students will be limited to concept of reproduction in Basic Science which form the part of the JS II scheme of work.

### **Significance of the Study**

The findings of this study will be relevant to students as the use of field trip method will expose students to reality of the concept taught and promote their interest in environmental hazards components of basic science, students will also retain more knowledge during field trip activities, thereby improving their achievement and retention. Teachers will through the findings of this study see the need to adopt an innovative instructional strategy such as field trip in teaching Basic Science concepts to motivate and encourage students' active participation in learning process. The school administration will gain from the study through proper engagement of students in practical exercises during field trip and promote discipline and acquisition of knowledge in students through engagement of students in activities. The government through the findings of this study will see the need to adopt field trip method in teaching all concepts in Basic science and other specialized science subjects. Parents/guidance will gain from the knowledge acquired by their children from field trip. The empirical evidence provided by this study will help bridge any existing gap in the literature on the effects of field trip and peer tutoring on students' academic achievement and retention in Basic Science and other science subjects.

## **METHODOLOGY**

This chapter discussed the research design, population of the study, sample and sampling techniques, instrument for Data Collection, validity of instruments, reliability of the instruments, method of data collection and statistical analysis procedure.

## **RESEARCH DESIGN**

The study was conducted using quasi-experimental designs, using pre-test, post-test and post-test group design.

### **Population of the Study**

The target population of this study consisted of all N.C.E II Social studies students of the Colleges of Education that offered Social Studies education at N.C.E. level in North-west zone, Nigeria. The population of the students was three thousand four hundred and forty (3,440) as depicted in Table 1.

### **Sample and Sampling Techniques**

Random sampling technique was used to select four co-educational schools in the local government area where this study was carried out. Afterward, students in four intact classes will be used to conduct the research

### **Instrument of data collection**

The study used one (1) instrument for data collection that is, Basic Science Achievement Test (BSAT). The instrument (BSAT) was developed to test the academic performance of basic science students. The instrument contain 20 multiple-choice items (A-D option) and 2 marks for each item, and the instrument was developed using the course content of the topic that was taught.

### **Reliability of the Instrument**

The reliability co-efficient was ascertained using Pearson Product Moment Correlation Co-efficient (PPMCC). A pilot test was conducted with an intact class to discover the reliability of the instrument. Thus, the researcher conducted a basic science test to 40 students (20 male and 20 female) students outside the study area. The scores of this test was used to determine the reliability coefficient of the instrument.

### **Validity of the Instrument**

The instrument developed for the study, that is, BSAT was given to researcher's supervisors and other experts in Ignatius Ajuru University of Education in order to ascertain the content, construct and criterion related validity of the instrument as recommended by Maiwada (2006) that for an instrument to be valid for a particular study it requires expert check to ensure content validity. This gave the instrument the quality it requires for it to be valid for a study that is expected to be of benefit to education. The experts' corrections were incorporated into developed instrument to ensure content and construct validity of the instrument.

### **Method of Data Collection**

The researcher collected an introductory letter from the Department of basic science that will be presented to the school to seek for permission from the school authorities in order to have contact with both teachers and students. The researcher discussed with the basic science teachers in the participating schools and make necessary arrangements for the study. They were well acquainted with the objectives, nature and requirements of the study. The researcher divided the students into two groups- experimental and control groups and taught them separately. Thereafter, the researcher administered the test instrument on the groups.

**Method of Data Analysis**

Regression was used to answer the research questions and to test the hypotheses at 0.05 level of significance.

**RESULTS AND DISCUSSION**

**Research question 1:** What are the differences in the pretest and post -test mean achievement scores of students taught Basic Science using field trip and conventional lecture method?

**Table 1: Mean gain in academic achievement scores of students taught using peer tutoring (PT) and those taught using field trip (FT)**

	N	Pretest		Posttest		Gain	
		Mean	SD	Mean	SD	Mean	SD
Peer tutoring	56	6.875	2.930	35.661	5.202	28.756	2.272
Field trip	59	7.627	3.306	24.576	2.673	16.949	0.633

Table 1 showed the mean gain in academic achievement scores of students taught using PT and those taught using FT. It showed that students taught using PT had a higher mean gain (mean = 28.756, SD = 2.272 ) than the students taught using FT ( mean = 16.949 , SD = 0.633).

**Research question 2:** What is the mean gain in academic achievement scores of male and female student students taught using peer tutoring?

Gender	N	Pretest		Posttest		Gain	
		Mean	SD	Mean	SD	Mean	SD
Male	23	7.000	2.747	35.696	7.201	28.696	4.454
Female	33	6.788	3.090	35.636	3.296	28.848	0.206

Table 4.2 showed the mean gain in academic achievement scores of male and female students taught using PT. It showed that female students taught using PT had a slightly higher mean gain (mean = 28.848, SD = 0.206) than the male students ( mean = 28.696 , SD = 4.454)

**Research question 3:** What is the mean gain in academic achievement scores of male and female student students taught using field trip?

	N	Pretest		Posttest		Gain	
		Mean	SD	Mean	SD	Mean	SD
Male	22	7.773	3.779	24.546	2.972	16.773	-0.807
Female	37	7.541	3.042	24.595	2.522	17.054	0.520

Table 4.3 showed the mean gain in academic achievement scores of male and female students taught using FT. It showed that female students taught using FT had a higher mean gain (mean = 17.054, SD = 0.520) than their male colleagues (mean = 16.773, SD = - 0.807)

**HO<sub>1</sub>:** There is no significant difference in the mean gain in academic achievement of basic science students taught using peer tutoring and that of those taught using field trip.

**Table 4.4: ANCOVA test of difference in mean gain in academic achievement of male and female student taught basic science using peer tutoring**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3496.931 <sup>a</sup>	2	1748.465	101.689	.000
Intercept	14577.333	1	14577.333	847.801	.000
Pretest	20.359	1	20.359	1.184	.279

Groups	3483.051	1	3483.051	202.570	.000
Error	1874.176	109	17.194		
Total	106772.000	112			
Corrected Total	5371.107	111			

a. R Squared = .651 (Adjusted R Squared = .645)

Table 4.4 showed the summary of Ancova of difference in the gain in mean academic achievement test scores between students that are taught basic science using FT and those taught using FT. The table showed that the mean difference is significant ( $F_{1, 111} = 202.57$ ,  $p = 0.000$ ) since  $p < .05$ . Therefore, null hypothesis 1 was rejected.

**HO<sub>2</sub>:** There is no significant difference in the mean gain in academic achievement of male and female student taught basic science using peer tutoring.

**Table 4.5: ANCOVA test of difference in mean gain in academic achievement of male and female student taught basic science using peer tutoring**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	25.456 <sup>a</sup>	2	12.728	.461	.633
Intercept	9732.201	1	9732.201	352.544	.000
Pretest	25.408	1	25.408	.920	.342
Gender	.001	1	.001	.000	.994
Error	1463.098	53	27.606		
Total	72703.000	56			
Corrected Total	1488.554	55			

a. R Squared = .017 (Adjusted R Squared = -.020)

Table 4.5 showed the summary of Ancova of difference in the gain in mean academic achievement test scores between male and female students that are taught basic science using FT. The table showed that the mean difference was not significant ( $F_{1, 55} = 0.000$ ,  $p = 0.994$ ) since  $p > .05$ . Therefore, null hypothesis 2 was rejected.

**HO<sub>3</sub>:** There is no significant difference in the mean gain in academic achievement of male and female student taught basic science using field trip.

**Table 4.6: ANCOVA test of difference in mean gain in academic achievement of male and female student taught basic science using field trip**

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1.634 <sup>a</sup>	2	.817	.111	.895
Intercept	5282.545	1	5282.545	716.672	.000
Pretest	1.601	1	1.601	.217	.643
Gender	.051	1	.051	.007	.934
Error	412.773	56	7.371		
Total	36050.000	59			
Corrected Total	414.407	58			

a. R Squared = .004 (Adjusted R Squared = -.032)

Table 4.6 showed the summary of ANCOVA of difference in the gain in mean academic achievement test scores between male and female students that are taught basic science using FT. The table showed that the mean difference was not significant ( $F_{1, 58} = 0.007$ ,  $p = 0.934$ ) since  $p > .05$ . Therefore, null hypothesis 3 was rejected.

### Summary of Findings

1. Students taught using peer tutoring (PT) achieved a significantly higher mean gain in academic achievement scores (mean = 28.756, SD = 2.272) compared to those taught using the field trip (FT) method (mean = 16.949, SD = 0.633). ANCOVA results showed a significant difference in mean gain scores between the two groups ( $F(1, 111) = 202.57, p = 0.000$ ). The null hypothesis (HO1) was rejected, indicating a significant advantage of the peer tutoring method over the field trip method.

2. Female students had a slightly higher mean gain (mean = 28.848, SD = 0.206) compared to male students (mean = 28.696, SD = 4.454). ANCOVA results indicated no significant difference in mean gain scores between male and female students taught using PT ( $F(1, 55) = 0.000, p = 0.994$ ). The null hypothesis (HO2) was rejected, suggesting that gender does not significantly influence the effectiveness of peer tutoring.

3. Female students achieved a slightly higher mean gain (mean = 17.054, SD = 0.520) than male students (mean = 16.773, SD = -0.807). ANCOVA results showed no significant difference in mean gain scores between male and female students taught using FT ( $F(1, 58) = 0.007, p = 0.934$ ). The null hypothesis (HO3) was rejected, indicating that gender does not significantly influence the effectiveness of the field trip method.

Peer tutoring was significantly more effective than the field trip method in improving students' academic achievement in basic science. Gender did not significantly affect the academic gains in either instructional method, demonstrating that both methods were equally accessible and effective across genders.

### Discussion of Findings

The findings indicate that peer tutoring (PT) was significantly more effective than the field trip (FT) method in improving students' academic achievement in Basic Science. This aligns with prior research, which emphasizes the effectiveness of collaborative and interactive learning methods like peer tutoring. These approaches encourage active engagement, promote knowledge sharing, and develop metacognitive skills, leading to better academic outcomes (Topping et al., 2018; Järvelä, et al., 2020). The significant difference ( $F(1, 111) = 202.57, p < 0.000$ ) in the mean gain scores suggests that peer tutoring creates a supportive learning environment where students can clarify concepts and build confidence through mutual support. In contrast, the field trip method, while engaging, may be limited by logistical challenges and time constraints, which could reduce its effectiveness in delivering in-depth content comprehension (Chang & Chiu, 2020).

The results reveal no significant difference in mean gain scores between male and female students taught using peer tutoring ( $F(1, 55) = 0.000, p = 0.994$ ), despite a slightly higher mean gain for female students. This finding aligns with studies showing that peer tutoring benefits all students equally, regardless of gender, as it leverages collaboration and interpersonal interaction to enhance learning (Dawson et al., 2021). Although females had a marginally higher mean gain, the difference was statistically insignificant, suggesting that gender does not play a pivotal role in determining the effectiveness of peer tutoring. This supports the assertion that the method is inclusive and equitable, providing similar academic benefits across diverse student demographics (Kitsantas & Zimmerman, 2020).

Similarly, there was no significant difference in the mean gain scores of male and female students taught using the field trip method ( $F(1, 58) = 0.007, p = 0.934$ ). Female students had a slightly higher mean gain, which aligns with existing literature suggesting that females often show higher engagement in experiential learning settings due to greater attention to detail and reflection (Oppermann et al., 2020). However, the statistical insignificance of the difference underscores that both genders benefit equally from experiential methods like field trips, provided they are well-structured.

## SUMMARY

This study investigates the effect of field trips and peer tutoring on students' academic achievement in Basic Science in secondary schools. It addresses persistent poor performance in Basic Science, attributed to ineffective teaching methods that rely heavily on teacher-centered approaches, leading to abstract and uninterpretable content for students. Three research questions and null hypotheses guided the study to determine differences in academic achievement between the teaching methods (field trips and peer tutoring) and gender differences in achievement for both teaching methods. Quasi-experimental designs were used to explore differences in pretest and posttest group achievement scores between these teaching strategies, as well as gender differences within these methods.

The target population of this study consisted of all N.C.E II Social studies students of the Colleges of Education and random sampling technique was used to select four co-educational schools in the study area. The instrument used for data collection was the Basic Science Achievement Test (BSAT) which consists of 20-item multiple-choice test validated by experts and piloted for reliability. Students were divided into experimental and control groups and taught using either field trips or peer tutoring. Students taught using peer tutoring showed significantly higher academic gains compared to field trips. No significant gender differences were observed. Similarly, no significant gender differences were found, though female students had slightly higher mean gains.

## CONCLUSION

This study showed that peer tutoring is better than field trip in the teaching of basic science, however both method seems not to give equal opportunities to male and female students.

## RECOMMENDATIONS

Based on the findings of this study it was recommended that:

- i. Male students should endeavor to carry their female colleagues along as they engage in learning.
- ii. Basic science teachers should adopt learning activities that can encourage female students to learn.
- iii. Schools should integrate peer tutoring into their Basic Science curriculum to leverage its proven effectiveness in improving academic achievement.
- iv. Field trips should be carefully planned with clear learning objectives, pre- and post-activity sessions, and opportunities for reflective discussions.
- v. Educators should continue to adopt methods that ensure equal participation and benefits for all students, fostering an inclusive learning environment.

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