



## Effect of Discussion Method on Academic Achievement and Retention in Physical Geography among Secondary School Students in Gombe State, Nigeria

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### ABSTRACT

The study investigated the effects of the discussion method on academic achievement and retention in physical geography among secondary school students. The study adopted a pretest-posttest quasi-experimental design with experimental and control groups. The study sample consisted of 127 senior secondary II geography students. Systematic random sampling techniques were used to select two schools in Gombe LGA. The instrument used for the study is the Physical Geography Achievement Test (PGAT) designed by the researcher. The instrument contained 30 multiple-choice items for measuring students' achievement in physical geography. Three research questions and three hypotheses were formulated to guide the study. The hypotheses were tested, at a 0.05 level of significance. The data collected were analyzed using mean, standard deviation and *t*-test statistical tools. The results showed that Students who were taught Physical Geography Concepts using the discussion method performed significantly better than students who were taught using the conventional method, Students who were taught Physical Geography Concepts using the discussion method retained higher than students who were taught using the conventional method, There is no significant gender difference in the academic performance of male and female students taught using discussion method and There is a significant difference in the retention ability of secondary schools students taught using discussion method and those using the conventional method. Finally, it was recommended that Teachers of senior secondary schools in Gombe LGA should expose Geography students to discussion methods, to promote their academic achievement in Physical Geography concepts

### ARTICLE INFO

Article History  
Received: June, 2024  
Received in revised form: July, 2024  
Accepted: July, 2024  
Published online: September, 2024

### KEYWORDS

Discussion method, Academic achievement, Retention, Geography

### INTRODUCTION

Geography as a school subject has a curriculum aiming at presenting the spatial pattern of interaction of phenomena in space to enhance the learner to view the natural environment as a place of living for proper analysis and decision making through proper teaching method such as the discussion method, many arguments were made concerning the status or position of geography in the academic environment, whether it is a science or an art subject. This is as a result of synthesizing nature of geography that makes it an integrated subject. It employed the concept

of different fields of knowledge to explain spatial interaction of phenomena in space and to provide solutions to environmental issues. The nature of geography requires an approach of teaching that involves dialogue or discussion where ideas are exchange between the teacher and students for clarity and understanding.

In the traditional epoch, many teaching practitioners widely applied teacher-centered methods to impart knowledge to learner's comparative to student-centered methods. Until today, questions about the effectiveness of teaching methods on student learning have consistently raised considerable

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interest in the thematic field of educational research (Hightower, 2011). Moreover, research on teaching and learning constantly endeavor to examine the extent to which different teaching methods enhance growth in student learning.

Discussion method helps the learner with guidance of the teacher to discover and create answers to a recognized problem through a procedure of making a diligent search. Seeking knowledge or information about a phenomenon, it also involves investigating, searching, defining a problem, formulating hypothesis, gathering and interpreting data and arriving at a valid and acceptable conclusion.

Discussion is a teaching approach which works on the principle that many people are to put heads together in terms of knowledge and ideas to find solutions to specified problems. The activities of the discussion group are to be regulated and directed by the teacher or an appointee of the class. Group discussion

may take a variety of forms such as small group, devil's advocate, round table, panel discussion, opposing panel and debate (Adewuya, 2003; Caleb, 2015).

Several studies on achievement in geography subject among Nigerian final year secondary school students revealed under achievement (Ajaja 2010, Adeniyi 2011, Soyinbo, 2014, and damar 2016). The poor performance has been attributed to the attitudinal problems of cognitive and socio-economic problems of teachers, method of teaching in geography (Adeniyi 2011) (Okafor, 2014), and also teacher factor may be due to poor mastery of subject matter which result in skipping of topics. These poor performances are evident in the statistics of WAEC Geography subject results of Gombe Local Government from 2014 – 2017 which indicated the low performance of students in geography. This low performance in Geography in table 1 forms the basis for this study.

**Table 1:** Students' performance in Geography (2013 to 2017)

Year	candidates	Total Pass A - C	% Pass	Total Failure D - f	% Failure
2013	1,123	658	58.59%	465	41.41%
2014	1,856	357	19.23%	1,499	80.77%
2015	1,866	526	28.19%	1,340	71.81%
2016	987	445	45.09%	542	54.91%
2017	858	325	37.88%	533	62.12%

**SOURCE:** Gombe State Ministry of Education (2017).

Table 1 indicated the poor performance of students in geography in the study area between 2014 and 2017, the table shows a total percentage pass of 19.23% in 2014 and 80.77% fail, with slide increase in percentage pass to 28.19% in 2015 and to 45.09% in 2016 while 71.81% and 54.91% fail in 2015 and 2016 respectively, but the performance slightly dropped to 37.88% pass in 2017 with 62.12% fail. Generally speaking, the table shows low performance of students as none of the years in question recorded up to 50% pass except in 2013 where 58.59% was recorded.

#### Objectives of the Study

1. To find out the effects of discussion method on physical geography

academic achievement of secondary school students in Gombe local Government Area.

2. To examine the difference between male and female students' performance in physical geography when taught using discussion method.

#### Research Questions

1. What are the effects of discussion method on academic achievement among physical Geography secondary school students in Gombe LGA?
2. What is the difference in performance between male and female students in physical geography taught by discussion Method?

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### Research Hypothesis

- Ho<sub>1</sub> there is no significance between the performance of secondary school students in physical geography taught using discussion method and those using conventional method.
- Ho<sub>2</sub> There is no significant difference between male and female performance in physical geography taught using discussion Method in Gombe LGA.

### LITERATURE REVIEW

The theoretical framework that underpinned this study is linked to Piaget's (1936) developmental theory of learning and thinking. The principles of the theory explained that the child should be able to explore his environment for effective learning. A central component of developmental theory of learning and thinking is involving the participation of the learner actively as the key player in the learning process not the teacher. Piaget also said that knowledge is not merely transmitted verbally but must be constructed and reconstructed by the learner. Piaget asserted that for a child to know and construct knowledge of the world the child must act on objects and it is this action which provides knowledge of those objects; the mind organizes reality and acts upon it. Since discussion base method involve critical thinking, the learner should have the ability to act on object(s) by observing, identifying, classifying and even by manipulating the object(s) in its natural environment.

In support of Piaget's, Bruner (1960) held the view that learning occurs by self-discovery. Students are exposed to basic concepts to discover things for themselves through problem based learning strategies and inquiry methods which are activity based orientation. In his contribution, Okafor, (2014) on philosophy of pragmatism maintained that experience is the center of learning. Accordingly, it must be both in body and soul". Thus experience and the child's environment is a strong base in considering the development of discussion strategy which involves learning by doing between the child and his environment. The experiences involve in the discussion are learning by doing, problem solving and practical work which agrees with the pragmatist theory. In their contributions Sorrentino and Bell (2012) in reviewed texts and research summarized

reasons for taking activity based learning into five attributed values which includes Providing first-hand experience, Stimulating interest and motivation, Giving meaning to learning and interrelationships, Observation and perception skills and Personal (social) development, all of which are directly related to the aim of the study that has specific objective of looking at the values in the concept of discussion method. Piaget in an attempt to explain learning, its process and category developed a theory as discussed below:

Cognitive theory of learning according to Piaget, (1936) categorized learners into four groups' base on their experience, which includes; sensorimotor stage (0-2 years), preoperational state (2-6 years), concrete operational state (7-12 years) and lastly formal operational stage. This theory argues that knowledge is constructive. In combination with new knowledge, learners generate knowledge and meaning from their past experiences. At first, learners assign simple meanings to objects and phenomena. Knowledge becomes more complicated as learners become more experience Mang and Mankilik (2010).

Geography as a school subject in Nigeria is a science that studies physical and human processes and spatial patterns on earth in an integrated way over space and time; it examines the spatial distribution of people and their activities; physical and human made features, ecosystem and interactions between humans and the environment in a dynamic context, (Damar, Hulda, & Jonah, 2014). This means, it is concern with the study of how spatial patterns and processes affect the way people live and interact with the environment, how physical and human processes shape the environment, and how humans interrelate with the living and non-living things. Damar (2014) defines geography as an applied science which seeks to apply skills and techniques, knowledge and understanding to issues and challenges in our immediate environment at a local, national, continental and global scale.

Briney, (2014) categorized geography into two main branches. These are physical and human geography; other minor branches include regional geography, integrated geography and cartography. Physical geography studies the surface of the earth particularly the arrangement and function of

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natural features. Briney (2014) further defined physical geography as the study of natural features and processes such as geomorphology, climatology, oceanography, biogeography, landscape ecology, among others. Pradhan (2013) viewed Physical Geography as a natural science that deals with patterns and functioning of nature. This however deals with those aspects of nature which lie outside the human domain but can suffer serious consequences due to human intervention. These aspects include; atmosphere, climate, landforms, soil, ocean among others.

Mang and Mankilik (2010) opined that teaching can be thought of as a process that facilitates learning. Effective teaching consists of helping students to acquire and use knowledge and to learn to think and solve problems. Learning on the other hand is a relatively permanent change in an individual's interaction with the environment. Mallum and Haggai (2011) viewed learning as relatively permanent change in behaviour that results from experience in the environment and is manifested in performance.

Achievement is used in synonymous with success. It is something that somebody, has succeeded in doing usually with effort. It implies the act of process of finishing something successfully; success in the area of academic is what is referred to academic achievement, usually assessed with achievement test. Hence achievement refers to the degree of success reached or attained in some specific area, (Enyi 2004). In order word, achievement is the extent of success by an individual. According to Eze (2009) achievement could be referred to as something very good or difficult which was carried out successfully.

Achievement according to Adeyemi (2008) is the scholastic standing of a student at a given moment. It has to do with the successful accomplishment of goals, he further states that purpose of testing an achievement is to help the teacher and the students evaluate and estimate the degrees of success attained in learning a given concept. Academic achievement refers to the accomplishment of academic goals, the educational outcomes of students or rather the extent to which a student, a teacher or an instructor has achieved the stated educational objectives. Chukwunyeremunwa (2014) refers

academic achievement to a successful accomplishment or performance in particular subject area. It is indicated by grades, marks and scores of descriptive commentaries. Usman and Dahiru (2016) describe academic achievement as the assessment of how much students have learned, the extent to which a student has acquired certain information or mastered skill usually because of planned information or training. Academic achievement of students is the ability of the students to study and remember fact and being able to communicate his or her knowledge orally or written form even in an examination condition. Secondary school academic achievement in particular determines development of their future and the large nation (Batunde, 2014). Academic achievement, therefore, could be referred to as degree of success reached or attained by an individual in some general or specific academic area which is measureable. Students, teachers, parents, and society at large are concerned about the academic achievement of students and area used for different purposes. For instant they are used for the following purposes as noted by Enyi (2004).

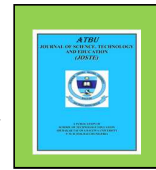
According to Okeke (2002) gender to many social or cultural constructed characteristics, quality, behaviors, and roles which different societies ascribe to females and males. Gender in this context can be referred to as the categorization of people into two namely male and female through interaction with caretakers, socialization in child -hood, peers pressure in adolescence, and gendered work and family roles of which women and men are socially constructed to be different in behavior, attitudes, and emotions. Borgatta (2000) refer gender differentiation as an old and long controversial issue in education, different opinions and view abound on the issue of gender and its effect on student achievement especially in science. There are two strong opposing schools of thought as regards to the effect of gender and academic achievement in science. While some schools and researchers as such Obiekwe (2008) and Okoro (2011) contend that male student achieve higher than their female counterparts in science, the other school of thought, Okeke (2007) is on the view that female achieve as high as their male counterparts when given equal opportunities.

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Okoro (2011) indicated that male student's achievement and interest score were significantly higher than that of their female counterparts expose to three (3) interaction pattern (cooperative, competitive and individualistic pattern). Bichi (2002) defines gender as the amount of masculine and feminine found in a person and obviously while there are mixtures of both in most human beings, the male has a preponderance of masculinity and the normal female has a preponderance of feminine. Okeke (2007) sees gender as socially /culturally constructed characteristics and roles which are ascribe to male and female in any society. There is a general belief among many people that male are superior to female in terms of physical physique, cognition, local reasoning and academic achievement. These gender differentiations in some science related subject has led to variations in academic achievement of male and female students which remain an issue of concern to researchers.

#### METHODOLOGY

The research design used for this study was quasi-Experimental design involving pre and posttests. Two groups were identified for the study, the design was used to cover two schools in Gombe LGA one each represented a group for experimental and control group. The population used in this study consists of all the students in the entire public senior secondary schools offering SSII geography in the study area. The policy of the state is that all day secondary schools are co-educational in nature. This means, both male and female are found in all schools that are within Gombe local government. The population used in the study was eight hundred and fifty-one (851) students, which comprises of 464 males and 387 males respectively.

The study employed systematic Random Sampling technique to obtain its sample size. This study considered only SS II students of geography as target population in sample schools in Gombe local government. To select the sample size, two papers were folded with the names of the schools. As a result, two schools were randomly selected which include government day secondary school (pilot) and government day secondary school Herwagana as control and experimental groups

respectively. A total of 127 students were selected, 61 for experimental group and 66 for control group. The instrument of data collection for this research was Physical Geography Achievement Test (PGAT) which were adopted from pass questions of WAEC SSCE for 2012 to 2017 Geography examination, the instrument consist of only objective test and was made up of 30 questions with multiple choice answers lettered A – D which ran for one hour only and total of 30 marks were allocated to the test questions, each question carry one mark.

The research instrument was validated by two senior lecturers, from Department of Geography, Gombe State University and one senior lecturer from science education, Gombe State University and secondary school geography teacher who had at least ten years teaching experience. The Instruments Physical Geography Achievement Test (PGAT) was pilot tested on SS II geography students of GDSS Gandu in Gombe local government, Gombe State. The data generated was analyzed with a view to determining the characteristics of the test items of PGAT and the reliability coefficient.

The Instruments Physical Geography Achievement Test (PGAT) was pilot tested on SS II geography students of GDSS Gandu in Gombe local government, Gombe State. The data generated was analyzed with a view to determining the characteristics of the test items of PGAT and the reliability coefficient. Pearson moment correlation of test-retest scores was used. The reliability coefficient of the instrument was 0.78, which indicated high reliability index. This means that there were strong relationships between the first test score and second test score. This means that the instrument (two tests) is significantly related. As such, the instrument (PGAT) is considered to be reliable.

The discussion method was used to treat the experimental group. The treatment was done by the researcher alone in the experimental school. Before the actual experiment started the researcher explains in details to the students the features and practices involved in discussion method. The designed lesson plans for discussion method was strictly used in teaching the geography topics by the researcher chosen for the experiment in delivering the actual experiment.

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Before the actual treatment, the research samples were given a pretest. The test was administered by the researcher and his assistance (regular Geography teachers) in the sampled schools. The scripts were marked by the researcher. The pre-test were used to determine the students' initial knowledge of the materials they would learn later and compare the students entry knowledge in both the experimental school and the control school of the concepts involved in the study before the actual treatment of the students.

The main treatment for the study was the teaching of some selected Physical geography Concepts such as development of river systems, concept of erosion, rainfall, environmental hazards and Koppen climatic classification on Senior Secondary School II geography students, using discussion method. Immediately after the treatments, the post –

PGAT was administered to the samples (experimental group). The scripts (both pre – and posttests) were marked by the researcher and the students' scores were recorded. The data collected on the students 'academic achievement using Physical Geography Achievement Test (PGAT) were analyzed using mean and standard deviation in answering the research questions and independent sample t - test statistic was used for testing the research hypothesis. All hypotheses were tested at  $\alpha$  0.05 level of significance.

## RESULTS AND DISCUSSION

### Results

**Research Question One:** What is the effect of discussion method on academic achievement of secondary school students in Gombe Local Government Area of Gombe State?

**Table 2:** Means and Standard Deviation of Posttest Scores for Experimental and Control Groups

Group	N	Mean	Standard Deviation	Mean Difference
Experimental	60	16.68	4.489	6.96
Control	64	9.72	2.433	
<b>Total</b>	<b>124</b>			

Table 1 shows that the experimental group has a mean of 16.68 and a standard deviation of 4.489. The control group has a mean of 9.72 and a standard deviation of 2.433. This indicates that there is a mean difference of 6.96. The difference is in favour of the experimental group. Therefore students taught physical geography using discussion method

performed academically higher than their counterpart taught using conventional lecture method.

**Research Question Two:** What is the difference between the performance of male and female students in Physical Geography taught using discussion method?

**Table 3:** Means and Standard Deviation of Posttest Scores for Male and Female Students in the Experimental Group

Group	N	Mean	Standard Deviation	Mean Difference
Male	32	17.06	4.642	0.81
Female	28	16.25	4.351	
<b>Total</b>	<b>60</b>			

Table 3 shows that the male students in the experimental group have a mean of 17.06 and a standard deviation of 4.642 whereas the female students in the same group have a mean of 16.25 and a standard deviation of 4.351. This indicates that there is a small mean difference of 0.81. The difference is in favour of the male students in the group. Therefore male students taught physical geography using discussion

method performed academically higher than their female counterpart taught the same concepts using the same method.

**Hypothesis One:** There is no significant difference between the performance of Secondary School Students in Physical Geography taught using discussion method and those taught using conventional lecture method.

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**Table 4:** T-test Results on Posttest Scores for Experimental and Control Groups

Group	N	Mean	Standard Deviation	df	t-value	P-Value	Decision
Experimental	60	16.68	4.489	122	10.832	.000	Ho Rejected
Control	64	9.72	2.433				
<b>Total</b>	<b>124</b>						

Results in Table 3 where the t-value (122, 124) = 10.832 indicates that the p-value (.000) is less than the level of significance (0.05) and therefore the null hypothesis is rejected. This means there is significant difference in academic achievement between the performance of Secondary School Students in Physical Geography taught using discussion method and those taught using conventional

method. The experimental group having the higher mean (16.68 ± 4.489) performed significantly better than the control group with the lower mean (9.72 ± 2.433).

**Hypothesis Two:** There is no significant difference in academic performance between male and female students taught Physical Geography using discussion method.

**Table 5:** T-test Results on Posttest Scores for Male and Female Students in the Experimental Group

Group	N	Mean	Standard Deviation	df	t-value	P-Value	Decision
Male	32	17.06	4.642	58	.696	.489	Ho accepted
Female	28	16.25	4.351				
<b>Total</b>	<b>60</b>						

Results in Table 5 where the t-value (58, 60) = .696 indicates that the p-value (.489) is greater than the level of significance (0.05) and therefore the null hypothesis is accepted. This means that there is no significant difference in academic between male and female Secondary School Students taught Physical Geography using discussion. The method is gender friendly.

knowledge acquired after the application of the treatment.

The finding of research question one and hypothesis one revealed that geography students taught using discussion method had high mean academic achievement scores than those taught using conventional methods. This implies that the use of discussion method in teaching physical geography concepts enhances students' academic achievement in the subject. While the findings in hypothesis one indicate that there is significance difference in the performance of secondary school students in physical geography taught using discussion method and those using conventional method, as shown from the result in table 4.4, the hypothesis one was rejected, the findings further shows that the performance in physical geography between the experimental and the control group are not equivalent in terms of their

The reasons for the good achievements of the experimental group when comparing the general academic achievements of experimental group and control group is that the students in experimental group were stimulated to learn by seeing themselves in a group and also feel free to communicate and find the solution to their problems themselves Hence, the result of the study revealed that the adoption of discussion method in Geography in general and Physical Geography in particular enhances the academic achievement of students in Geography.

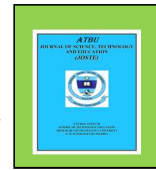
The findings also concretized the earlier findings of Falode (2015) who worked with discussion method on human geography and concluded that discussion method improve students' academic achievement. This also agrees with the findings of the following researchers whom discovered that students engaged in discussion method performed significantly higher than their counter part been exposed to conventional method among them include: Rahman (2011), Louis and Abdeljalil (2014) and Kagoda (2009) who investigated the

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effect of teaching and learning of Geography through discussion.

Their findings indicated that students exposed to discussion method of teaching have a higher academic achievement/performance than their counterpart who was exposed to conventional method. Damar (2016), in their studies have shown that students taught using discussion method have greater academic achievement/performance than their counterpart who was taught using conventional method. These similarities with the present study could be attributed to the fact that similar research design and intervention period was employed. The findings also agrees with the findings of (Ngozu, 2012; and Mailoushi & Busa, 2019) which shown that discussion method is an ideal method for teaching geography related concepts of physical geography.

The finding of research question two and hypothesis two shows that male taught using discussion method did perform slightly better than the female taught using the same discussion method in terms of academic performance in physical geography. The findings show that students did not performed significantly different with reference to sex; however, gender has been one of the predictor variables that may be factored in students' academic performance. In this study, findings revealed that there is no significant difference between the achievements of male and female students in the experimental group. This corroborates the findings of (Ngozi, 2012; Filgona & Sababa, 2017; Shri, Krishna & Badri, 2013; Peter, 2014). This means that there is no significant difference in academic between male and female Secondary School Students taught Physical Geography using discussion. The method is gender friendly.

Based on the findings that emanates from this study, it was recommended that: Teachers of senior secondary schools should expose Geography students to discussion method to promote their academic achievement Also, Geography teachers should incorporate the use of discussion method to complement the traditional method.

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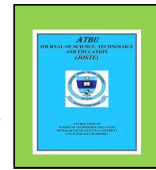
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