



Impact of Guided-Discovery Strategy on Secondary School Geography Students' Attitude and Performance in Landform Concepts, Dutsin-Ma, Katsina Nigeria

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ABSTRACT

The study examined the effect guided-discovery on secondary school student's attitude and performance in landform concepts of geography in Dutsin-ma, Katsina State. The study used quasi experimental involving pre-test and post-test design. The instruments used for the study are; Landform Concept Achievement Test (LCAT) and Landform Concept Attitude Questionnaire (LCAQ) were developed and administered to 202 sampled students from a population of 3557. The instruments were validated and the reliability coefficients of LCAT and LCAQ were found to be 0.75 and .078 respectively. Experimental group was taught using guided-discovery while control group was taught using lecture method. two research questions were developed and analyzed using descriptive statistics of mean and standard deviation, and two Null hypotheses were verified at $P \leq 0.5$ level using ANOVA. There was also significant difference in the attitude of students exposed to guided-discovery and those taught using lecture $P = 0.036$. Female students had higher means(x) score of 20.94 than male students which shows significant difference. Based on the findings the researchers recommended among other things that, geography teachers should incorporate the use of guided discovery strategy in teaching at secondary schools. Training, workshops and seminars should also be organized by stakeholders in education for teachers on how to use this method effectively.

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INTRODUCTION

Education systems all over the world place much emphasis on science and technology because of their influence on technological advancement which is associated with the national development, this make developing countries including Nigeria to undergone a series of curriculum changes with a view to attain the goals in technological advancement. Therefore, the curriculum content in Nigeria was reviewed in line with the trend of events in our changing world and the need of the learners, hence, the content

give much attention and emphasis on science and technology, computer literacy, information technology, environmental studies like environmental pollution, degradation, global warming, climate change among others.

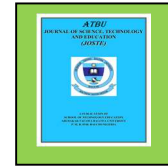
In light of the above, geography as science and a field of study enables students to comprehend features on the earth from a spatial point view. It offers an organized structure for enquiry into questions about the world that surround us. (Jana and Patra 2017). Geography is an inclusive subject, encloses the entire

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observable province of earth's surface and is experienced as part of science, arts as well as social science discipline in schools, it help in preparing learners in the development of their observation skills, critical thinking ability, understanding and adopting to their immediate environment which enable them to face the challenges of 21 century which Nigerian education system is aiming to fight (Alam 2016). Balasubramanian (2016) views geography as a basic science subject for all human beings to learn, it is essential academic field for all works of life as it studies locational and spatial variation in both physical and human phenomena on earth.

Similarly, geography as a field of learning in which characteristics of particular place on the earth's surface are examined; it is concerned with the arrangement of things and with the association of things that distinguish one area from another; it is concerned with the roles of man and his interactions with the environment (Aggarwal 2007). According to Iwena (2008), Geography is a field of study in which physical things within the earth such as rocks, mountain, plains, ocean, river, climate and vegetation are studied. In the same vein, Okam (2009) defines geography as the science of the earth which concerns with Physical Geography, Human Geography, Interface geography and Biogeography.

However, according to National Policy on Education (FGN 2013), the objectives of teaching geography have been thought of in terms of what geography can contribute to the realization of aims of secondary education in Nigeria, these objectives are to; giving learners a sound knowledge of their immediate environment; developing in learners the ability to comprehend and explain natural phenomena; to inculcate in learners useful skills and outlooks which will enable them to make useful contributions to their community and nation at large; developing in learners the critical thinking ability, accuracy and objectivity for proper and logical investigation; to foster in learners a sense of responsibility towards their own society; developing in learners a comprehension of spatial relationship of various features on the surface of the earth as well as

enabling learners comprehend the habitation of man within his environment.

Methods and strategies for teaching geography have been forwarded by Okam (2009), Such methods include; demonstration, field trip, heuristic, project and laboratory, to mention but few. Moreover, the effectiveness of methods and their relevance to student's academic performance were examined by Varma (2007), who stated that geography as a school subject needs a field experience, which means field trip and excursion which present object in its natural colour. Field trip also trains learners on observation, thinking, recording, discussing, co-operation and even leadership. Field trip presents natural objects like land forms, soil types, rivers, mountains and seaside which help in explaining concepts like erosion, deposition, valleys which enhance students' understanding with use of guided-discovery strategy. Gellenstien (2004) agreed that inquiry method can be effective if learners actively participate during the process of learning, they are more likely to remember concepts and information if allowed to discover them by themselves.

Guided-discovery as an approach involves engaging the learners in simple experimental activities (structured or unstructured) with genuine 'Lets' find out exercises. The inquiry approach involves helping the learners use their inquiry and reasoning abilities to discover facts and principles (Gbamanja, 1991). Studies relating to the use of these strategies with students' academic achievements seem to suggest that they are more effective than the traditional expository approach (Njoku, 2004 and Udo, 2010).

Lecture method involves verbal presentation of ideas, concept, and generalization of facts. In lecture method, the teacher does most of the talking. It is less tedious, saves time and provides fascinating and aesthetically stimulating experience especially for the new students on topics of interest (Obeka, 2009). However, lecture method is teacher-centered with little or no participation of students. In lecture method, students remain passive listeners (Joshi, 2008).

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Despite the relevant methods and strategies proposed by scholars, there are yet numerous problems of teaching geography in schools. Eno (2007) highlighted that teachers frequently adopt wrong methods of teaching. However, Eno (2007) classified teaching methods into two (2); that which relies on the learners observing directly what can be seen, and that which relies on the learners observing from second-hand materials. Geography teaching will not be right if it becomes essentially bookish study. Therefore, science teachers should ensure that teaching and learning process is based on scientific attitude by encouraging students to find out as much information for themselves under the guidance of the teacher (hands-on and mind-on) (Olorukooba 2012). The problems of teaching and learning of geography is associated with inadequate qualified teachers. No matter how the curriculum is, if there are no qualified teachers, the goals may not be achieved (Lasser 1987).

Instructional strategies adopted by teachers in teaching-learning process have influence on students' academic performance and attitude (Okam 2009). Similarly, Atadoga (2008) stated that instructional strategies adopted by teachers at all levels of education in imparting knowledge and skills to the learners are determined by teachers abilities, topic to be taught, learners age, population, available resources and space. Hence, instructional strategies have influence on students' academic performance.

Academic performance is defined by Buasari (2009) as the level of performance in the subject as exhibited by an individual learner. According to Ogunduku and Adeyemo (2010), academic performance is the exhibition of knowledge attained or skills developed by students in school subject usually designed by test scores or by marks assigned by teacher which can be low or high. Researchers on reasons for poor academic performance revealed that possible causes would include lack of ability, poor teaching methodology and negative attitude, among others (Usman, 2010, Atadoga & Lakpini, 2013 & Obeka, 2013). Poopola (2010) revealed that academic performance is a function of various factors such

as method of teaching, teachers qualifications, learners home background, school environment, attitude, interest and class size, among others.

Attitude as a variable in this study and a factor in the learning of science is defined as an internal state that influences the personal action of an individual (Gagne, 1977). He further recognized attitudes as a major factor in subject choice. Attitudes are acquired through learning and can be changed through persuasion using variety of techniques. Attitudes, once established, help to shape the experience an individual has with object, subject or person. Attitude changes gradually.

People constantly form new attitudes and modify old ones when they are exposed to new experiences (Adesina and Akinbobola, 2005). Teaching strategies can also influence the attitude of students positively or negatively. Olorukooba (2001) reported that students taught using cooperative learning strategy in science has positive attitude and derived more educational benefits from group work. It is on the basis of teaching and learning of geography that, this study investigated the impact of field trip and guided discovery on student's attitude and performance in landform concepts among secondary school students in Dutsin-ma Education Zone.

STATEMENT OF THE PROBLEM

Students' failure in senior secondary school West Africa Examination Council (WAEC) is becoming rampant in which only few candidates obtain the requirement for further studies into Nigerian higher institutions. Although there were several studies carried out in order to alleviate the poor performance of students in geography, still the poor performance persists. In line with persistent poor performance which may be due to ineffective use of teaching methods, lack of positive attitude, this study sought to determine if the use of guided discovery would enhance geography students' performance and attitude or not. In an effort to find out the causes of students failure in geography, a study was carried out by Abdulkarim (2011) indicating that more than 80% of geography teachers in secondary schools in

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Kaduna state teach with obsolete and inadequate instructional materials.

Similarly, Nwagbo (2001) has discovered that many science teachers prefer the traditional lecture method of teaching in which one person (the teacher) presents a spoken discourse on a particular subject and shy away from activity oriented teaching methods which are student-centred such as discovery method, field trips and computer-based science simulations method among others. Nwagbo (2006) stresses that such teacher-centred approach which places the teacher as sole possessor of knowledge may not enhance achievement or promote positive attitude towards learning. Udo (2010) in a research investigating the effects of guided-discovery, student's centered demonstration and lecture methods, shows that student-centred demonstration performed significantly better than those taught with lecture method.

A lot of effort through researches has been made to improve geography teaching in schools in Nigeria. Like Maikano (2007) and Usman(2010) who worked on the impact of laboratory teaching strategy, their findings show significant difference in favor of laboratory strategy in promoting students' positive attitude and academic performance. In spite of their study findings and recommendations, students have continued to perform poorly in the subject. However, there still exists a gap in the application of fieldtrip and guided-discovery to find out their effectiveness towards improving teaching and learning of geography and science in general. Similarly, limited literatures exist on the impact of fieldtrip and guided-discovery on student's attitude and performance at secondary schools in the study area.

Objectives of the Study

The study is guided by the following objectives to;

1. examine the effect of guided-discovery on students' academic performance in landform concepts of senior secondary school geography.
2. find out the effect of guided-discovery on students' attitude in landform

concepts of secondary school geography.

Research Questions

The following research questions guide this study.

1. What is the mean difference of guided-discovery on students' performance in landform concepts and those exposed to lecture method?
2. What is the mean difference of guided-discovery on students' attitude in landform concepts and those exposed to lecture method?

Null Hypotheses

The following null hypotheses guide the study.

H01: There is no significant difference between the performance of students taught landform concepts using guided-discovery and those taught through lecture method

H02: There is no significant difference between the attitudes of students taught landform concept using guided discovery and those taught through lecture method.

METHODOLOGY

The study adopted quasi-experimental control group design of pre-test and post-test. Experimental group was taught using guided-discovery method. While control group was taught using lecture method. This design was adopted from (Sambo 2008) who describes this design as one that offers numerous advantages. Groups were assigned to experimental and control groups before giving the treatment. Three intact classes two experimental and one control group were used for the study. Both experimental and control groups were pretested on academic performance and attitude before the treatment. The same instruments were used in pre-test and post test.

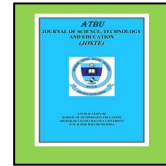
The population of this study consists of all public Senior Secondary Schools SS II geography students in Dutsin-ma Education Zone. The total number of public Senior Secondary Schools is twenty one (21) with enrolment of population of 3557 comprising 2176 male and 1383 female.

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A total number of 201 SSII geography students from three public Senior Secondary Schools in Dutsin-ma Education Zone formed the sample of the study. Schools were randomly assigned to experimental and control prior to the administration of the treatment. Two intact classes, one for experimental and one for control group were used for the study. A random sampling by balloting was used in selecting the sample of the study. The choice of this sampling technique was to give each member in the population an equal chance to participate in the study and to be free from biased.

Landform Concepts Achievement Test (LCAT) was developed by the researchers in order to examine the performance of students in landform concepts of Senior Secondary School Geography. The test consists of two sections (section A & B) section A bio data of the students while section B consist of 40 questions on landform concept. The test items consisted of forty objective items with four alternatives (A-D). Bloom taxonomy was employed to have equal distributions of the test items where knowledge occupied 15 questions, Comprehension with 16. The validity of the instrument was obtained by presenting the instrument to a panel of three experts with PhD. Qualifications in the Department of Science Education of Ahmadu Bello University, Zaria. Experts in geography including supervisors and secondary school geography teachers with at least ten years teaching experiences also validated the instrument. The validation of LCAT is to ensure that the instrument/questions test exactly the performance of students and or whether there is ambiguity in statement of the questions, and to give recommendations towards improvement of the instrument.

Pilot testing was conducted on group of 30 students in Government Senior Secondary Schools Wurma which is within the population but out of the sample. The school selected has similar characteristics with the entire schools in the study area. Also, students with similar characteristics were used in terms of class, age, and knowledge background in geography. The reliability coefficient found to be 0.75. This is in view of Tuckman (1975) who agreed with the interval of

two to three weeks between first test and second test.

Also, Landform Concept Attitude Questionnaire (LCAQ) was administered to the same group, split half method of odd and even numbers was used to test the reliability of the scores of 30 students. The scores of the two halves were correlated using Spearman Rank Order Correlation. The reason for correlating is to obtain the reliability coefficient of the instrument and consistency as well as determining the appropriateness of the instrument.

Two different treatments were applied to experimental and control groups. The experimental group was taught with guided-discovery method while control group was taught using conventional lecture method. Before treatment, pre-test was administered to experimental and control groups to determine their ability and help in sampling the subjects. After treatment post-test was administered by the researchers to all groups in order to determine whether there was significant difference in the performance among the three groups. After treatment post-test was administered by the researchers to all groups in order to determine whether there was significant difference in the performance among the three groups. A marking scheme was formulated in which each correct answer/option in LCAT attract one mark making the total mark to be 40. While, LCAQ of 20 items for measuring students' attitude on landform concepts was structured to have 5-point rating scale, questions that are in positive form has 5=SA, 4=A, 3=U, 2=D and 1=SD. While questions that are in negative form the responses has 1=SA, 2=A, 3=U, 4=D and 5=SD. Skeweness and kurtosis were used for analyzing the mean scores of the groups. The computation involved the use of Statistical Package for Social Sciences.

RESULTS

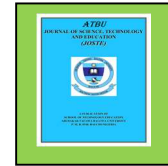
Research Question 1: Sought to find difference in mean academic performance scores of geography students taught landform concept using guided-discovery and those taught the same concept using lecture method. The mean and standard deviation of post-test academic

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performance of experimental and control group are presented in Table 1.

Table 1: Mean and Standard Deviation of Post-Test Performance of Students in Experimental and Control Groups.

Variables	N	Mean	SD	SE
Experimental	80	21.2375	6.78652	.75876
Control	79	17.1772	5.71718	.64323

Table 1 presented the Mean and standard deviation of post-test academic performance of subject in experimental and control groups. From the result obtained, experimental group recorded a mean of 21.23 and standard deviation of 6.7 while control group recorded a mean of 17.17 and standard deviation of 5.71. Students exposed to landform concept

using guided-discovery recorded the highest performance followed lecture method.

Research Question 2: Sought to establish the extent of students` attitude in landform concept when taught using guided-discovery. Skeweness and Kurtosis of post attitude test of experimental and control group were compared in Table 2.

Table 2: Skeweness and Kurtosis of Attitude of Experimental and Control Groups

Variables/Group	N	Min.	Max.	Mean	Std. Dev	Skeweness	Kurtosis
		Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
EG	76	33.00	89.00	54.8158	1.67	14.61297	.614
CG	68	35.00	86.00	58.5441	1.74	14.40401	.232

Table 2 presented the Skeweness and Kurtosis of attitude of experimental and control groups. From the result, the skewness obtained in experimental group is 0.614 and standard error of 0.276 while Kurtosis is -.634 and standard error of 0.544. In control group, the skewness obtained is 0.232 and standard error of 0.291 while Kurtosis is -1.042 and standard error of 0.574.

Null hypotheses formulated were tested at P< 0.05 level of significance.

H01: There is no significant difference in the performance of students taught landform concept using guided-discovery and those taught with lecture method.

Table 3: ANOVA of Post Test Performance of Students in Experimental and Control Groups.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	961.423	1	480.711	11.128	.000
Within Groups	10065.539	233	43.200		
Total	11026.962	235			

*Significant at p ≤ 0.05

Results of the ANOVA statistics in Table 3 shows that significant difference exists in the mean scores among subjects in the experimental and control groups with mean squares between

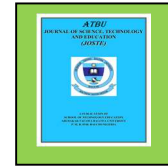
group of 961.423, and mean squares within group of 10065.539 respectively. The calculated ANOVA, F=11.128 is higher than F critical of 2.60 and the P-Value of 0.00 is less than alpha value.

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This indicates that there is significance in the mean scores of the three groups. Hence, the null hypothesis which stated that there is no significant difference in the performance of students taught landform concept using guided-discovery and lecture methods is rejected. To determine the

direction of disparity, analysis using Schaffer's Post-hock Test is presented in Table 3.

H02: The is no significant difference in the attitude of students taught landform concepts using guided discovery and those taught with lecture method.

Table 4: Kruskal Wallis of Post-Test Attitude of the Subject in Experimental and Control Groups.

Group	N	Mean Rank	H-Value	Df	Asymp. No. Sig.
experimental 1	76	111.91	5.279	1	0.071
control	68	105.76			
Total	202				

*Significant at $p \leq 0.05$

The result in Table 4 compared the change of attitude of students in experimental and control groups. The result shows that the Experimental Group and the control groups have mean rank values of 111.91, 89.74 and 105.76 respectively. The Kruskal Wallis observed was 5.279 and the p-value observed was 0.071. Since the p-value is greater than 0.05, there is no significant difference in the attitude of students. Therefore, the null hypothesis that states that there is no significant difference in the attitude of students taught landform concepts using guided discovery and those taught with lecture method was retained.

DISCUSSION OF RESULTS

Findings in Table 3 showed that significant difference exists in the performance of students taught landform concept using guided-discovery and lecture methods. The finding is in line with that of Ajaja (2010) who investigated the effect of field studies on learning outcome in Biology and found a significance difference in process of science scores between pre-test and post-test of field trip students, a significant difference in process of science test scores between students exposed to field trip experiences and those who were not exposed. It also agreed with that of Bichi (2000) who investigated knowledge gains of two groups of higher school Biology students and found significant difference only with the experimental group. Similarly, Students who had participated in

the trip were judged to be superior in their abilities to evaluate tasks related to scientific inquiry when compared to non-trip students-test. The findings also agreed with that of Patrick (2010) which shows significant difference in the process of science scores between pre-test and post-test of field trip students; significant difference in the process of science test scores between students exposed to field trip and those who were not and a strong correlation between process of science score and biology achievement score.

Finding in Table 4 shows that there is significant difference in the attitude of students taught landform concepts using guided discovery and those taught with lecture method. Azure (2009) investigated the effects of self-image and attitude as predictor of student's performance in basic science at the tertiary level. The result indicated that there was a significant relationship between achievement and high self-image perceived importance of science and dislike for the subject.

Similarly, Poopola (2010) reported that student's positive attitude to science correlates highly with their science achievement. Akinbobola (2008) adds that many factors can influence a person's attitude, including past experience and social influences. Other factors that may influence attitude is the students' home background and peer influence. The effect of peer group on students attitude if not properly managed can change the student's predisposition to any subject, science inclusive. Moreover, Ogunsola (2001) believes that the choice of subject by

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students has some relationship with social background of the parent that is if the parents are educated they will encourage their wards to take up science subjects. Ojo (2007) emphasize the importance of attitude in influencing students' acceptance or rejection of situations. It influences behaviour and have implications for learning. The above conduct their research in other subject, hence this research focus on what will be the impact of field trip and guided-discovery on attitude and performance on landform concept of geography in secondary schools.

CONCLUSIONS

Based on the findings from this study it is concluded that, Students exposed to landform concepts using guided-discovery has the highest performance than followed by lecture method. On the other hand students exposed to land concept using guided-discovery methods show more positive attitude towards geography than those taught using lecture method. Therefore, teaching students landform concepts with guided-discovery is better than using lecture method since the method improves students' attitude and performance.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

1. The Federal and State Ministry of Education should equip secondary schools with adequate facilities for guided-discovery instructions.
2. The Federal Government of Nigeria through State Ministries of Education should collaborate with professional bodies such as ANG and STAN to train teachers through workshops and seminars on use of guided-discovery in teaching Geography Concepts at secondary schools.
3. Curriculum development bodies like NAERDC should introduce or encourage the teachers on the need to use guided-discovery at secondary schools.

4. Principals at secondary schools should motivate geography teachers to be using guided-discovery while teaching geography at secondary school level.

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