EFFECTS OF CONSTRUCTIVIST TEACHING APPROACH ON SECONDARY SCHOOL STUDENTS' GEOGRAPHY ACHIEVEMENT IN JOS NORTH LGA OF PLATEAU STATE, NIGERIA

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ABSTRACT: *The study has investigated the effects of a Constructivist Instructional Approach on senior secondary (ii) school students' geography achievement in Jos North Local Government Area of Plateau State, Nigeria. The study adopted the Quasi-experimental research design and random sampling method to select the sample of 110 students from the population of 859. The sample consisted of 46 students in the experimental group, 22 male and 24 females, and 64 students in the control 41 male and 23 females. Intact classes of two schools were used for the study. The research instrument was the Geography Achievement Test (GAT) that was adopted from the past questions of WAEC and NECO SSCE 2015 Gat was validated by three experts from the University of Jos in the department of science and technology education. A reliability coefficient of 0.73 was established through the Guttman split-half coefficient using SPSS 22. Two research questions were answered using mean and standard deviation while the null hypotheses were tested at α 0.05 level of significance using t-test, ANOVA and ANCOVA. Findings from the study revealed that there was a significant difference in the posttest score of the experimental and control group, in favour of the experimental group. The null hypothesis was rejected because (p ≤ 0.05). Furthermore, the study revealed that there was no significant score difference between male and female students of the experimental group that received the treatment on constructivist learning approaches. Based on the outcomes of the study, few recommendations were made.*

KEYWORDS: Constructivism Learning Approach, Geography and Academic Achievement.

INTRODUCTION

Geography is the study of the Earth and its people. It helps us understand how people, places, and environments came to be and how they affect each other. Geography is generally conceived as a science of interrelationship between natural phenomena themselves and between humans and other natural phenomena, and the relationship between human societies. These types of relationships can be discerned from the exposition of Muhammad, (2014) who says that when geographers look at something on Earth, they ask questions. Where is it? Why is it there? How did it get there? How does it affect the people who are living there? How does it affect the natural environment in this era? Today the discipline is not only concerned with descriptions but also with analysis as well as predictions (Gersmehl 2014).

Geography is thus concerned with human-environment interactions in the context of specific places and locations (Reinfried & Hertig, 2011). Huntington, as cited by Munazza (2016), similarly sees geography as a science of relationship, having two main divisions: first, physical geography that deals with the various factors of the environment pointing out how they are related to man or society; second, social geography (human geography), that deals with the same geographic relationship but from a different point of view, namely that of humans, their spatial distribution, social activities and cultural accomplishments. Geography, therefore, evolved to be a discipline that actively pursues a diverse range of inquiries related to space, place, and interactions, especially the dynamics of interaction within and across spaces and places (Baerwald, 2010). Essentially, geography is the study of man's relations with the environment, with the objective of making learners aware of their societies to acquire knowledge and skills to enable them to be productive in society (Kipkogei, 2012)

Geographical education is infused with several key concepts of geography, for example, the concept of scale, the impact of humans on the environment, the impact of the environment on humans and change over time and space (Reinfried, & Hertig, 2011).

ChetRy, (2019) opined that the relevance of the scope of Geography is in various aspects of human life services, environmental management, water resources, disaster management, meteorology and planning just to mention a few. More so, geographers can help in day to day life like tourism, commuting, housing, and health-related activities. the scope of geography ranges from the physical sciences, Astronomy and climatology, Geology, natural histories of Botany and Zoology, human studies of Anthropology, Ethnology, Sociology and History. Today, its scope has become vast and complex that a need has arisen for specialization (Harichandan, Asam, & Sunni, 2017). Consequently, the curriculum of senior secondary schools in Nigeria is reflected in both WAEC and NECO, (2019), The aims and objectives of geography include to

I. Explain the concepts of different characters and the spatial relationship of the features on the earth surface;

II. Explain the concepts of man-environment relations, that is, to analyze the life of man in his physical and cultural environment and explain their interaction.

III. Demonstrate basic knowledge of the nature and functioning of physical and human, particularly an understanding of their inter-relationship and the resulting issues;

IV.   Organize and formulate principles according to acquired geographical concepts and apply these principles to interpret and analyze spatial problems in the immediate and wider environment.

V.   Demonstrate skills and techniques for accurate orderly and objective geographical investigations to be carried out both in the classroom and in the immediate environment.

VI.   Communicate geographical ideas effectively through reports, graphs, charts, sketches, diagrams and maps;

VII. Explain cultural, social and economic circumstances of people in their immediate environments and those of other countries within the sub-region.

Geography has assumed a unique place in a school curriculum. Sharma, (2017). posit that the objectives of Geography in school curriculum include – the understanding of the living condition of men in different parts of the globe, the acquisition of knowledge of natural resources, development of understanding of the environment and climate factor, knowledge of natural resources, development of understanding of how the environment and climate factor influence our environment, acquisition of the knowledge of the physical and social environment, understanding of geographical principles and theories related to geographical phenomena, development of thinking, reasoning, memory and power of imagination, and the development of scientific attitude and to develop the ability to draw a valid conclusion and interdependent thinking among other things. These objectives show that Geography has an integral relationship with the elements that influence our ways and means of livelihood. Moreover, it influences our education which influences even the society at large. In order to achieve such objectives, the teaching of the subject must be true to the nature of the subject. Therefore, this study will adopt a constructivist teaching strategy by making teaching and learning active and learned-centred

Nigerian secondary school geography teachers have been accused in different studies that they generally teach geography poorly and map reading in particular (Bandugu & Wabbene; 2012; Amosun, 2016; Adeyemi, 2016; Anny, 2016). Amosun particularly stated that geography teachers in Nigerian secondary schools seem excessively scarce to teach the subject and therefore, students look to be critically worried about the subject. This led a lot of students developed extreme dislike for geography, which generally affect the students' academic achievement. Other causative factors of poor academic achievement in geography and map reading include inadequate instructional materials, teachers' poor improvisation skills, teacher-centred methods of teaching like the lecture method (Falana, 2015). Salami (2010) showed that students' academic achievement depends on the cognitive ability of the students, therefore, a suitable method of instruction is needed that could improve the academic achievement of students. Lawali, Sadi, Abbas and Kangiwa (2015) opined that defective teaching produces defective learning that will lead to poor students' academic achievement in sciences subjects at large.

Educators are confronted with a paradigm shift in teaching and learning from behaviourism to constructivism denoting a transformation from teacher-centred to student-centred teaching and learning approach. Constructivism has become a common learning strategy, which is frequently used in the instruction process to guide the learner to bring out his understanding of problem-solving and examining future challenging issues. Success in education results from

effective teaching and learning processes. the value of a constructivist approach, which is based on real-life learning experiences, is uncompromising and apparent. Nireti and Anaun (2014) state that Constructivists' learning has been found to improve students' performance in different secondary school subjects from science and social sciences respectively.

There are different models of constructivism according to Gotep, Adejo, and Igwe, (2017). These include Learning Circle Model (LCM); with three phases: Discovery Phase, Concept Introduction, and Concept Application. 5E Model: Engagement. Exploration, Explanation, Elaboration and Evaluation. ADDIE Model: Analysis, Design, Development, Implementation and Evaluation, and Information Construction Model (ICM): Observe, Interpret, Contextualized, Cognitive Apprenticeship, Collaboration, Multiple Interpretation and Multiple Manifestation. For the purpose of this study, the 5E Model is adopted. (Engagement. Exploration, Explanation, Elaboration and Evaluation)

Çetin and Veli (2015), maintained that the use of a 5E model constructivist approach in a learning environment is most effective in learners' academic success and for the sustainability of the educational system. Samaresh, (2017), states that the 5E model of constructivism approach aids the teaching-learning process in a classroom situation, as it increases both learning outcomes and students' achievements, reduces students' dropouts and burden, stress, anxieties and frustration. So, today's development of new teaching strategies is essential for the all-around development of students that will encourage the thinking skills of the learner by training them on how to contribute to proving solutions to problems (Samaresh, 2017).

The 5E Instructional Model of constructivism involves the use of learners construct to think and provide solutions to educational problems. Bybee and Landes (2011) maintain that the 5E model can be used in geography as an environmental science that always needs solutions to maintain the natural settings of the environment. The cycle consists of: the engage, explore, explain, elaborate, and evaluate stages. Bybee (2012) argued that this approach allows students to redefine, reorganize, elaborate, and change their initial concepts through self-reflection and interaction with their peers and their environment. Learners interpret objects and phenomena, and internalize those interpretations in terms of their current conceptual understanding. Geography teachers and curriculum developers may integrate or apply the model at several levels. Each phase of the 5E Instructional Learning Cycle, as it has been modified from Bybee is explained as thus:

Engagement - In this phase, the teacher aims to assess student prior knowledge and/or identify possible misconceptions. This student-centred phase should be a motivational period that can create a desire to learn more about the upcoming topic. Students may brainstorm an opening question or ask themselves.

Exploration. The phase provides the students with a common, concrete learning experience. This phase is also student-centred and incorporates active exploration in which students are encouraged to apply process skills such as observing, questioning, investigating, testing predictions, hypothesizing, and communicating with other peers. This phase of the learning cycle tends to incorporate the main inquiry-based activity or experience which encourages students to develop skills and concepts by the teacher who plays a role of a facilitator.

Explanation – this is a "minds-on" phase that follows the exploration phase, and this is more teacher-directed and guided by the students' prior experience during the exploration phase. The

explanation phase enables students to describe their understanding and pose questions about the concepts they have been exploring. It is likely that new questions will be generated. The explanation phase is an essential, minds-on part of the 5E lesson. Before the teacher attempts to provide an explanation, the students must first have the opportunity to express their own explanations and ideas. Thus, the initial part of the explanation phase is a time for the teacher to serve as a facilitator and ask the students to describe and discuss their exploration learning experiences.

Elaboration - The activities in this phase is the encouragement of students to apply their new understanding of concepts while reinforcing new skills. Students are encouraged to check for understanding with their peers or to design new experiments or models based on the new skills or concepts they have acquired. The goal of this phase is to help develop deeper and broader understandings of the concepts.

Evaluation. In this face, the teacher makes observations of students as they apply new concepts and skills looking for evidence that the students have changed or modified their thinking. More so, students are provided with the opportunity to conduct self-assessment or peer-assessment. This also includes summative experiences such as a quiz, exam, or writing assignment.

Academic achievement is measured by a student's scholastic standard which can be regarded as subject grade or scores (Dori, 2015). This indicates the ability of the learner to show competencies in answering or providing meaningful and correct answers to problems (Lawali, Sadi, Abbas & Kangiwa, 2015) which may be through analysis, conclusion evaluation or other forms of expression to the concepts provided. The scholastic achievement of geography students has been and is still a source of concern and research interest to educators, the government and parents at large. This is so because of the great importance that education has on the national development of the country (Igberadja, 2016).

All over the country, there is a consensus of opinion about the fallen standard of education in Nigeria (Adebule, 2004). Parents and government are in total agreement that their huge investment in education is not yielding the desired dividend. Teachers also complain of students' low performance at both internal and external examinations in geography.

Academic achievement describes the learning outcome that changes the cognitive behaviours of the learner. Mlambo (2011), stated that the academic performance of a student can be regarded as the observable and measurable behaviour of a student in a particular situation. For example, the academic performance of a student in Geography map reading, in particular, includes observable and measurable behaviour of a student at any point in time during a course. In geography students' academic achievement consists of their scores at any particular time obtained from a teacher-made test.

Not only that, academic achievement is the effect of education, the degree to which a learner, tutor or institution has achieved their educational goals Farooq, Chaudhry, Shafiq, and Berhanu (2011) further defined academic achievement as the total of each student's demonstrated learning, knowledge, skills, ability, and indeed cognitive, affective and psychomotor domains. It is on this note that Ali, Haider, Munir, Khan and Ahmed (2013) stated that, academic achievement as measured by the examinations of the traditional kind involves most of the capacity to express oneself in a written form. It requires the capacity to retain propositional knowledge, to select from such knowledge appropriately in response to a specified request and

to do so without reference to possible sources of information. The capacity to memorize and organize materials is particularly important. Elliot and McGregor (2001) proposed a corporation of approach and avoidance orientations to academic achievement. That is, the outcome can either be a success or a failure.

When students expect success, they are motivated towards an approach orientation, while, students expecting failure are motivated towards an avoidance orientation. Matos, Lens & Vansteenkiste, (2007) academic achievement constructs reflect an organized system, theory, or schema for approaching and evaluating one's performance in an achievement context. It also refers to energization and direction of behaviour, competence-based affect and cognition in academic settings. Bertolini, Stremmel and Thorngren (2012), came up with the following as student achievement factors, which is impacted on several levels including students' personal factors, their interactions with others such as parents, teachers, and administrators, and lastly, the larger systems that surround the student e.g. school districts, neighbourhoods, local economy, political policy, and multicultural relations. Others include teaching methods, instructional materials and teaching experience. Researchers have proved that the constructivist based teaching approach is promising in geography and environmental issues and it has a positive effect on both students' performance (Chowdhury, 2016; Gotep, Adejo, Igwe, 2017; & Samaresh, 2017). In view of the aforementioned evidence, the question that arises as to whether the constructivist approach has any impact on secondary school students' achievement in geography lies the rationale of this present study. For this study, the constructivist teaching approach will be tested to determine whether it can make a difference in students' performance in geography. However academic achievement varies between gender groups.

Gender refers to socially constructed differences between males and females. Scholars, policymakers, and practitioners have observed and seem to agree upon socially constructed differences between males and females and the significant effects on their lives. Some are of the opinion that males perform better than their female counterparts in areas of sciences and physical subjects like geography. While subjects that involved oral skills like English and literature, females perform more than their male counterparts. Studies were conducted across the world among the students (Mankumari & Ajay 2017; Attah & Ita 2017) maintained that gender is not a factor that determines the academic achievement of students in secondary school. While Irfan and Shabana, (2012) state that there is a gender difference in the academic achievement of secondary school students.

The Problem of the Study

Based on the analyses of the Northern Zonal Office of the Plateau state ministry of education, the achievement of students in Jos North Local Government in geography is not encouraging. In 2015 – 2016 the percentage passes at credit level and above ranges from 19.50% to 36.02% respectively. Furthermore, the percentage of the students' performance in 2017 to 2018 indicated credit level passes ranges between 16.91 and 28.81 respectively. Here, the analyses show that a significant number of students were unable to achieve credit level passes and could not qualify for admission into higher institutions to read geography. In view of this, the study was carried out to establish the effects of constructivist teaching strategies on students' geography achievement in the study area.

Purpose of the Study

This study was carried out to investigate the constructivist teaching Approach on Senior Secondary School Students Geography Achievement in Jos North LGA of Plateau State. The specific objectives of the study include finding out the following:

1. Pretest and posttest geography achievement of the experimental and control groups.

2. Posttest geography achievement of male and female students in the experimental group.

These were accomplished through the following research questions and hypothesis:

Research question

1. What are the pretest and posttest geography achievement mean scores of the experimental and control groups?

2. What are the posttest geography achievement mean scores of male and female students in the experimental group?

Hypothesis

1. There is no significant difference between the experimental and control group on pretest geography achievement.

2. There is no significant difference between the experimental and control group on posttest geography achievement.

3. There is no significant difference between male and female students in the experimental group on posttest geography achievement.

Research Methodology

The research design of the study was the Quasi-Experimental research design. The population of the study was 859 SS II students that choose geography as one of their school subjects in the Jos North Local Government Area of Plateau State. The sample of the study was 110 SS II students that choose geography as one of their school subjects. In Jos North Local Government Area of Plateau State.

Table 1, showing the sample size of both the experimental and control groups

Groups	Gender		Total
	Male	Female	
Experimental	22	24	46
Control	41	23	64
Total	63	47	110

Through random sampling, two schools were assigned experimental and control groups respectively. There were 46 students from the experimental group consisting of 22 males and 24 females, while 64 students form the control group, consisting of 41 males and 23 females Summing up to 110. Both schools were coeducational. Intact classes of the two schools were used for the study, as it was not permitted by the school authorities to distort their class arrangement for the purpose of the study. The experimental group received treatment (constructivist teaching approach) while the control group was taught using the marker and talk method. Geography achievement test (GAT) was used in data collection which was adopted from the past questions of WAEC and NECO SSCE 2015 - 2018 GAT consisted of 30 objectives and three essay questions. The questions were subjected to validation by three University experts, two from science and technology education at the University of Jos and one in test and measurement and one experienced geography teacher. The instrument was trial-tested and a reliability coefficient of 0.73 was established through Guttman split-half coefficient using SPSS 22,

Data Collection Procedure

The experimental and control groups were administered the pretest instrument GAT at the first instance to determine their entry achievement. After that, the researcher involved a school teacher to teach the control group using the traditional method of marker and talk, while the researcher taught the experiment group through the use of the 5E model of the constructivist approach. The same topics were taught for the period of six weeks after which the posttest was administered to both the experimental and the control groups. Data collected was analyzed using mean and standard deviation to answer the research questions while t-test and ANCOVA were used to test the null hypothesis 1, 2, and 3.

Research Question 1: What is the pretest and posttest geography achievement of the experimental and control groups?

Table 2: Pretest and Posttest Mean Scores of Experimental and Control Groups

Group	Pretest			Post-test		
	Mean	Mean Diff	SD	Mean	SD	Mean Diff
Experimental	36		2.5	67	1.4	
		5				31
Control	41		3.8	44	2.9	

Table 2 indicated that both the pretest means scores of the experimental and the control groups were low- 36 and 41 with a mean difference of 5 in favour of the control group. On the posttest mean score, the experiment group mean score was 67 and the control group was 44. This marked a mean difference of 31 in favour of the experimental group. This illustrates an improvement in the effectiveness of the 5E constructivist model

Research Question 2: What is the posttest geography achievement of male and female students in the experimental group?

Table 3: **Pretest and Posttest Mean Scores of Male and Female Students in the Experimental Group**

Group	Pretest			post-test		
	Mean	mean diff	Sd	Mean 2	mean diff	Sd
Male	37		2.5	62		1.4
		2			4	
Female	35		2.3	66		2.9

Table 3 reveals that during the pretest, male students had a mean score of 37 and while the female had a mean of 35 with a mean difference of 2 in favour of the male students with SD of 2.5 and 2.3 for the male and female students respectively. On the other hand, the posttest mean score for the experimental group for both male and female students were 62 and 66 with a mean difference of 4 in favour of female students with an SD of 1.4 and 2.9 for the male and females respectively.

Hypothesis 1: There is no significant difference between the experimental and control group on pretest geography achievement.

Table 4: **Summary t-test for Pretest Geography Achievement of Experimental and Control Groups Post-test Analysis.**

Group	N	Df	t-test	P-value
Experimental	46			
		108	3.58	0.068
Control	64			

P ≥0.05 (sig. two tail)

Table 4 shows that t-test value was 3.58 with df 108, P - value was 0.068. Since the p-value was greater than 0.05, the null hypothesis was accepted. So, there is no significant mean score difference between the experimental and control group on pretest geography achievement.

Hypothesis 2: There is no significant difference between the experimental and control group on posttest geography achievement.

Table 5: Summary of Difference Between the Experimental and Control Group on ANCOVA analysis of Posttest Geography Achievement.

Source	Type III Sum of Squares	df	Mean Square	F	P-value
Corrected Model	960.00	1	960.0032	10.80	0.00
Intercept	22206.60	1	22206.6	249.80	0.00
groups	960.00	1	960.0032	10.799	0.00
Error	9600.87	108	88.89694		
Total	171536.00	110			
Corrected Total	10560.87	109			

Table 5 indicated that the ANCOVA calculated value of F (10.80) DF is 109 and the P-value 0.00, by this, P-value is $\leq \alpha$ 0.05 level of significance, the researcher failed to accept the null hypothesis. Therefore, there is a significant mean difference between the experimental and control group on posttest geography achievement in favour of the experimental group.

Hypothesis 3: There is no significant difference between male and female students in the experimental group posttest geography achievement.

Table 6: ANCOVA Summary of Analysis of Difference Between Male and Female Student on Posttest Geography Achievement of Experimental and Control Groups.

Source	Type III Sum of Squares	df	Mean Square	F	p-value
Corrected Model	4.872[a]	1	4.872	0.086	0.771
Intercept	8093.733	1	8093.733	142.415	0.00
Gender	4.872	1	4.872	0.086	0.771
Error	2500.606	44	56.832		
Total	89636	46			
Corrected Total	2505.478	45			

Table 6 revealed that the f-calculated value is 0.086, with a degree of freedom (45), while the p-value is 0.771. Since the p-value is > 0.05 level of significance, the null hypothesis is accepted. Meaning, there is no significant difference between male and female students in the experimental group posttest geography achievement.

DISCUSSION OF RESULTS

The study established a significant difference between the geography achievement of secondary school students taught using the 5E model of constructivist approach at the posttest level. In addition, there is no significant means score between male and female students in the experimental group. Thus, the students taught using the constructivist model achieved significantly better than those taught using the conventional teaching method. This means that the constructivists' teaching was found to be more effective than the conventional methods pen and talk method with regard to achievement. This corroborates the findings of Samaresh (2017), Çetin, and Veli (2015), Nireti, and Anaun, (2014), Gotep, Adejo, and Igwe (2017), Fereshte and Hassan (2015), Tuwoso (2016), who reported that the 5E model of constructivist teaching is an effective method that produces a positive student's academic achievement, using the appropriate model of the approach. Constructivists' strategies lead students to know that acquiring real knowledge is better than rote learning that can be easily forgotten. It helps students to contribute their own idea to learning and this shows that their minds are not totally empty and vacant.

The study also corroborates the findings of (Ahmed 2016) who revealed that there was no significant mean score difference in the achievement of male and female students in the experimental group. This shows that the constructivist approach is gender-friendly. Both male and female student's display the power of Engagement. Exploration, Explanation, Elaboration and Evaluation, with respect to the 5E model of constructivist.

This agrees with the findings of Samaresh (2017), who studied the effectiveness of the constructivist approach on the academic achievement of secondary school students in science. Based on the study, it was discovered that the constructivism teaching strategy is effective in teaching science subjects. Therefore, the disproportion of students' achievement if taught using the constructivist approach, will be determined only with higher-order cognitive ability.

RECOMMENDATIONS

Base on the findings of this study, the researcher recommended that:

I.   Geography teachers should improve their instructional approach by using constructivism strategy in teaching geography because it is effective in teaching and learning geography.

II. Workshops and seminars should be organized at regular intervals to orient teachers on the constructivist teaching approach.

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