

**EFFECT OF AVAILABILITY AND UTILIZATION OF INSTRUCTIONAL
MATERIALS ON ACADEMIC PERFORMANCE OF SECONDARY SCHOOL
STUDENTS IN GEOGRAPHY IN KADUNA STATE**

BY

AlimiOmeiza, IDRIS

MARCH, 2015

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B.Sc (Ed) GEOGRAPHY ABU 2005
M.ED/EDUC/08243/2010-11**

**A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES,
AHMADU BELLO UNIVERSITY, ZARIA IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE AWARD OF MASTERS DEGREE IN
CURRICULUM AND INSTRUCTION, FACULTY OF EDUCATION,
AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA**

MARCH, 2015

DECLARATION

I hereby declare that this work titled “Effect of Availability and Utilization of Instructional Materials on Academic Performance of Secondary School Students in Geography in Kaduna State”, has been carried out by me in the Department of Educational Foundations and Curriculum under the keen supervision of Dr. (Mrs) H. O. Yusuf and Dr. A. F. Mohammed.

The information cited from the literature has been duly acknowledged in the text and a list of references provided. To the best of my knowledge, no part of this dissertation was previously presented or submitted anywhere either in part or whole for any other higher degree.

Alimi Omeiza IDRIS

Date

CERTIFICATION

This thesis titled “EFFECT OF THE AVAILABILITY AND UTILIZATION OF INSTRUCTIONAL MATERIALS ON THE ACADEMIC PERFORMANCE OF SENIOR SECONDARY SCHOOL STUDENTS IN GEOGRAPHY IN KADUNA STATE” meets the regulations governing the award of masters of education degree of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This work is dedicated to my late father Alhaji Idris Ibrahim for his support both financially and spiritually. Also, this work is dedicated to my loving mother Hajiya Idris Hauwa for her prayers, moral support, direction, guidance and love shown to me.

ACKNOWLEDGEMENTS

I acknowledge first and foremost, the unflinching support and faithfulness of Almighty God in seeing me through this stage of my study. My unalloyed thanks go to Dr. (Mrs.) H.O. Yusuf, my indefatigable supervisor, for her valuable guidance and time in the course of writing my thesis. Same goes to my second supervisor, Dr. A.F. Mohammed for his fatherly role, critic and resources invested to accomplish this task.

Thanks to Dr. Bashir Maina, Ayuba Guga and others too numerous to mention in the Department of Educational Foundations and Curriculum for their tutelage, encouragement and contributions during the work. I am grateful to my parents, Late Alhaji Idris Ibrahim and Hajiya Nana Hauwau for being there when I needed them most and for the opportunity given to achieve this feat.

I appreciate the support of the Directors of Zonal Inspectorate Units of the Kaduna State Ministry of Education and their staffers in the collection of relevant information as well as secondary school teachers under the ministry who assisted in responding to my questionnaires. I owe my profound appreciation to Alhaja Sikirat Raji, Omoniwa F. A. for adding glamour to my life through their materialistic, moral, financial and kind attention showed me within the short time we met. May God reward you all (AMEN).

I also extend my sincere gratitude to the Provost, and other management staff of Federal College of Education (FCE), Zaria-Dr. M. I Maccido, Dr. Ango Ladan, Dr. Jibril Lawal; the H.O.D. Curriculum and Instruction, FCE, Zaria, Mal. Buhari Yahaya and others who have been a source of inspiration to my studies. I wish to extend my appreciation to Mr. Ojo Ishaku of Iya Abubakar Computer Centre, ABU Zaria, for doing a marvellous job on my data analysis. I also, extend my sincere gratitude to my wife Bilikis Usman and my children, Hibatullah, Muhammad Sani (As'ad),

Abdullahi, Nana-Khadija. I say your support and encouragement was immeasurable in accomplishing this great task.

ABSTRACT

This research work investigated the effect of the availability and utilization of instructional materials on the academic performance of senior secondary school students in Geography in Kaduna state. The population of this study comprised of all teachers and students of senior secondary schools in Zaria educational zone of Kaduna state. Out of this, a sample of Three Hundred and Thirty-Five (335) respondents were selected for this study. Four research questions and hypotheses were formulated and tested using t- test statistical tool. Quasi-Experimental pre-post test research design was adopted for use in this study. The main instrument for data collection were Geography students' achievement test. A reliability co-efficient of 0.726 was obtained after subjecting the research instrument to vetting and pilot testing. The result of this study indicated a significant effect of the use of instructional materials in the teaching of Geography in senior classes as the mean score of the pre-test of the experimental students was lower than their post-test scores. Similarly, it was revealed that students taught using instructional materials performed well above those who were not taught using instructional materials. However, students taught with instructional materials exhibited higher positive mean interest in the teaching and learning of Geography than their counterparts in the controlled group. To this end, the study recommends that the use of instructional materials should be compulsorily used in the teaching and learning of Geography in senior secondary schools.

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ABBREVIATIONS AND SYMBOLS

SDQ	Students Questionnaire
GAT	Geography Achievement Test
P1	Pre-test
P2	Post-test
X	Treatment for Experimental groups
SPSS	Statistical Package for Social Sciences
<	Less than
>	Greater than
%	Percentage
N	Number of Cases
SD	Standard Deviation
SE	Standard Error
T-Cal	T calculated
T-Crit	T critical
Df	degree of freedom
Exp.	Experimental Group
Cont.	Controlled Group

OPERATIONAL DEFINITION OF TERMS

The following terms have been defined within the context of their usage in this research work.

- **Instructional Materials:** These are materials that teachers of Geography use in teaching and learning process in order to effectively impart knowledge to the learners e.g. chart, maps, graph, globes, wet-mounting and cine projector among others.
- **Effect:** Is the capability of producing a desired result. When something is deemed effective, it means it has an intended or expected outcome, or produces a deep, vivid impression.
- **Performance:** The accomplishment of a given task measured against preset known standards of accuracy, completeness, cost, and speed.
- **Student:** A student is a learner, or someone who attends an educational institution.
- **Experimental group:** These are the students who were taught with instructional materials.
- **Controlled group:** These are the students who were taught without using instructional materials.

CHAPTER ONE INTRODUCTION

1.1 Background to the Study

An educational institution whether formal or non formal performs a significant function of providing learning experiences that lead students or pupils from the darkness of ignorance to the light of knowledge. According to Adedokun and Jamu (2011), Geography is an old discipline from the basis of human knowledge about his environment, the world and his relationship with the element of environment. In view of this, Geography is a subject that focuses on disciplinary change and paradigm shift which makes the use of instructional materials important in teaching and learning. The need for the use of instructional materials in Geography stems from the belief that it is an abstract subject that needs to be centralized for pupils to appreciate as a school subject.

Geography as one of the core subjects at the senior secondary schools will be better facilitated when suitable and relevant instructional materials are employed during its teaching and learning. This is necessary in view of the perception of the National Policy on Education (2013) which grouped Geography as a core subject at the senior secondary level. In order to enhance and facilitate the learning of Geography at the SS level, the instructional materials must take into consideration the need for strategies that will assist the learners to appreciate the subject. Thus, the need for a study that will document the efficiency of instructional materials at the SS level in facilitating the teaching of Geography.

It is within this context that Guga (2011) observed that the school system in Nigeria is patterned along the core curriculum with the hope that learners will be exposed to relevant knowledge, skill and attitude necessary for survival in a larger community. To attain this noble objective of teaching, the teacher needs to put in place ways and manners with which the learner will benefit from instructional materials for illustration.

Since Geography is a core subject at SS level, the need to adopt a more pragmatic approach in its teaching is highly needed. Theories and principles of teaching generally require that, for an effective and efficient teaching process, teachers need to go an extra mile so as to make teaching-learning process more interesting. Psychologists and educators have also agreed on the need of extra means to enhance teaching. Consequently, there is no alternative to the use of instructional materials in the process of teaching.

In fact, the objective prescribed for the teaching of Geography at SS level made it compulsory for the use of instructional materials. For example, the syllabuses for Geography at the senior secondary schools prescribe some objectives to be attained at the end of instruction. These include need for selective teaching, the appreciation of Geography as a dynamic subject, and the facilitation of international solidarity (Kozah, 2007).

Consequently, for the teaching of Geography to be effective and efficient, it is mandatory for teachers to make use of varieties of instructional materials. It was within this context that Adeyemo (1993) in his study observed that there was no adequate instructional material in teaching and learning process in Kwara State. Also, the findings of Fakomogber (1980) showed that in post primary school in Bida, 70% of respondents said Geography teachers did not have instructional materials to utilize in the teaching and learning of Geography. Thus, mass failure as reported in some research works could be minimized if teachers utilize the available instructional materials and also try to improve when such materials are not available.

The present researcher believes that if teachers are adequately trained and groomed to handle various instructional materials during the pre-service training, the objectives of Geography outlined by West Africa Examinations Council (WAEC) and National Examinations Council (NECO) could be attained. On the other hand, if adequate attention is

not given to the availability and utilization of instructional materials, most abstract concepts will not be highly appreciated by the students thereby leading to memorization and relegation of facts, which will not promote effectiveness and efficiency of the learners. Thus, the objectives of effective knowledge, skills, and attitude among students will not be attained. Therefore, this study seeks to investigate the effects of the use of instructional materials on the academic performance of secondary school students in Geography in Kaduna State.

1.2 Statement of the Problem

In spite of the desire for Geography education by so many secondary school students, coupled with the fact that Geography is one of the core subjects as stated in the National Policy on Education (2013), the subject is still facing some problems like non-availability of Instructional materials for effective teaching and learning, effective utilization of the few available resources, and lack of adequately trained teachers to teach the subject. Furthermore, some of the teachers specialized in other related subjects like Political Science, History and Social Studies but are found teaching Geography. Consequently, the teaching of Geography is subjected to the methods of their individual subject areas as well as not seeking for adequate instructional materials to support the teaching process (Ogunleye 2002 in Objoha 2006). Literature indicate that there are inadequate instructional materials for teaching and learning Social Science subjects in secondary schools in Nigeria and Geography is one of the Social Science subjects. From the literature, the researcher concludes that there is the need to further investigate the availability of materials for teaching Geography and thereby establish the effect of these instructional materials on students' academic performance. Therefore, this study sought to establish, if any, the effect of instructional materials on the academic performances of senior secondary schools student in Geography in Kaduna State.

1.3 Objectives of the Study

This study aimed at achieving the following objectives:

1. Determine the difference in the performance of students' in pre-test and post-test for experimental group.
2. Determine the differences in the performances of the students' in pre-test and post-test for controlled group.
3. Compare the performances of students' in post-test scores between the experimental and controlled groups.
4. Determine at what level (class) would the use of instructional materials such as Projector, Wet Mountain, chart, Daiorana, Realia, globe and maps be more effective.

1.4 Research Questions

The following research questions were posed and answered in the study:

1. What is the difference in the performance of students' in pre-test and post-test for experimental group?
2. What is the difference in the performances of the students' in pre-test and post-test for controlled group?
3. What extent can the performance of the students' in post-test between the experimental and controlled groups can be compared in relation to the used or non-use of instructional material in geography in Kaduna state?
4. What level (class) would the use of instructional materials in Geography on students be more effective to another in secondary schools of Kaduna State?

1.5 Research Hypotheses

The following null hypotheses were formulated and tested in this study:

H₀₁: There is no significant difference in the performance of students' in pre-test and post-test for experimental group.

Ho₂: There is no significant differences in the performance of the students' in pre-test and post-test for controlled group.

Ho₃: There is no significant difference in post-test performance of students from experimental and controlled groups in relation to the use or non-use of instructional materials on Geography students in Kaduna State.

Ho₄: There is no significant difference in the performance of Geography students among the various levels (classes) in relation to one another using instructional materials in Kaduna State.

1.6 Basic Assumptions

The following were the assumptions for this study:

1. Instructional materials are readily available in schools.
2. Geography teachers are not well-trained in using instructional materials for teaching Geography.
3. Instructional materials available in schools are not well utilized by teachers.
4. Some of the Geography teachers are not specialist in the subject. They are specialists in other related subjects like History, Literature and Social Studies.
5. Some of the instructional materials are not in good condition, some need repairs or replacement for effective use in teaching and learning Geography.

1.7 Significance of the Study

The objective of this study was to find out whether teachers in senior secondary schools in Kaduna State teaching Geography make optimum utilization of instructional materials and to also find out in general the contributions of instructional materials in teaching and learning process. Furthermore, the study aimed to find how instructional materials can enhance the performance of students if teachers utilize instructional materials in teaching Geography. Consequently, the outcome of this study will be of great

importance to Geography teachers who are being constantly urged to diversify their teaching strategy by changing teaching strategy that can ensure optimum utilization of instructional materials. The teacher, who is called upon to teach, cannot succeed unless he or she is able to utilize appropriate instructional materials in teaching a particular content of the subject. In other to make teaching more meaningful, optimum utilization of instructional materials is to be employed (Mckenzie, 1998).

Another importance of this study is to bring awareness to teachers especially at the pre-service period, that diversification of teaching strategy is the gateway to proper utilization of instructional materials. Objectives of curriculum planning and development as stated by Yusuf (2012) can only be successfully achieved when adequate opportunities are available to both learners and teachers to have suitable instructional materials to interact with. Furthermore, if the teachers selecting materials take cognizance of the diverse backgrounds and interests of the learners, it will go along way in enhancing and promoting teaching and learning.

The research findings would also assist policy makers (the officers of Federal Ministry of Education (FME) and relevant curriculum agencies) because, they will be further informed on the use of instructional materials for teachers and learners. According to Yusuf (2012), the period of self government (before independence) witnessed great development and innovation in our educational system. This necessitated huge investment in the education sector and there was provision of facilities which were complemented by massive teacher training programmes. In other to determine whether the huge investment was yielding result, Western Regional government set up supervision (before independence) and the result was negative. From the statement above this research will also serve as a guide to the policy makers to see the justification for a great investment in

the procurement of relevant, suitable and adequate instructional materials for teaching and learning.

The research outcome would also be of benefit to administrators of schools (principals, H.O.D, and counsellors etc) for the need to encourage teacher in the use of the available instructional materials and where they are not available they would be encouraged to improvise them. If a teacher within the school context is highly motivated and encouraged by his immediate supervisors, he will appreciate the need to always use instructional materials.

Furthermore, the study outcome will assist designers of various instructional materials. When the various factors that enhance and promote the use of the various instructional materials are taken into consideration, the various centers of educational technology both at institutional needs and at resources centers will benefit. They will be encouraged to produce more materials that are recent in the teaching of Geography at secondary school level.

1.8 Scope of the Study

The study is limited to some selected senior secondary schools in Kaduna State. This study is also limited only to students and teachers teaching Geography at senior secondary schools. Due to the limited time for the study and the financial involvement, it was not possible to involve the entire population of Kaduna State secondary schools, rather the study was limited to Zaria and Sabon Local Government Areas. For uniformity of sample, the study was further limited to the public secondary schools within Kaduna State.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

In this chapter, the study reviewed a number of related literature found useful and having a direct impact on the present research work. The literature review covered the following sub-headings: theoretical framework, concept of Geography, history and objectives of Geography in Nigeria, the teacher and the learner in Geography teaching, concept of instructional materials, community resource persons in teaching, factors that determine the selection of instructional materials in the teaching, factors that determine the level of students performance in secondary schools, the significance of instructional materials in teaching and learning Geography, and empirical studies on the use of instructional materials in teaching.

2.2 Theoretical Framework

The theoretical framework for this study is called the theory of law of effect and exercise. The theory was developed by Edward Thorndike in 1913. The theory states that principles of learning could be directly applied to the teaching process and this involves the process of using instructional materials in teaching and task analysis. Learning methods based on the application of instructional materials to enhance students' academic performance. Therefore, the purpose of this theory is to provide direction in helping students to learn, understand and apply a predetermined set of principles, concepts and procedures. The theory is designed to be prescriptive and to promote effective, efficient and appealing instruction (Nate, 2006). While many instructional theories are focused to a particular field or learning context, this theory is designed to be comprehensive and can be used for most instructional situations. Therefore, the major preconditions for the theory of law of effect and exercise are:

- i. The instructional content i.e. what will be learned. The theory is designed to be appropriate for all learning content, including concepts, procedures and principles.
- ii. The instructional context i.e. learners, location. The theory is designed to be appropriate for all types of learners. Locations can range from classrooms to workshops to correspondence.
- iii. Administrative constraints i.e. budget, time management (Reigeluth, 1999). The theory is designed to be flexible and comprehensive enough to adapt to instructional situations that are limited by time or financial restraints. Instructional values provide a framework that the theory is built around.

The theory is further founded on the following values: Instruction should be customizable to suit the learners' needs and the instructional context, and to be personally meaningful for the learners (Nate, 2006 in Tessmer, et al 1990).

- i. Instruction should be efficient, effective, focus on understanding concepts, procedures and principles; and not just rote learning.
- ii. Instruction should value learners' knowledge, attitudes, skills, input and should be guided, not led or forced and applicable (Reigeluth, 1999b).

On instructional methods, the instructor should use a variety of methods to meet the needs of different learning styles (Morrison, et al, 2001). Each method should also involve multiple components in order to attain the highest possible desired result (Reigeluth, 1999). Regardless of content, the instructor should follow four (4) main methods: Gain the learner's attention, present information, provide practice materials, and provide feedback. Then the components of the methods can be appropriately adapted for different instructional scenarios, ensuring customizable instruction.

Based on the above review of theory regarding use of instruction; the present study is based on the law of effect and exercise theory. Consequently, discussion on further

review will be situated on this theory of instructional materials. The three (3) parts the instructor should use to gain the learner's attention (Nate, 2006 in Gagne 1985) are: Appealing to the interest of the learner, identifying instructional relevance, stimulating prior knowledge.

Appealing to the interest of the learner draws the learner to learning. The instructor can use introductory activities, motivational speeches, or thought-provoking problems to prepare the learners for instructional content. If necessary, the instructor can use more than one kind of attention-focusing tactic. Introductory activities should be fun and engaging for the learner(s), because fun activities can positively influence the attitudes toward both instruction and instructional content. Icebreaker activities, like the "Name Game," are useful for learners who may not know each other or for larger groups. Physical activities, like "Duck, Duck, Goose," are useful for developing psychomotor skills or for relating new instructional content to physical activity. The introductory activities should be appropriate for the learners and should involve all learners' participation. For example, it would be inappropriate for sales professionals to begin a workshop with a game of "Duck, Duck, and Goose." That particular activity does not develop any skills or knowledge needed in a sales profession. However, the same activity would be appropriate for young children who will be learning about numbers or sportsmanship. Motivational speeches should also be appropriate for the learners, and should be presented in a constructive manner. For example, an inspirational story would be appropriate for sales professionals who were learning new sales tactics. However, an inspirational story would mean little to younger children who do not know what cause-effect relationships are or how inspiration affects production. If the instructor uses motivational speeches, he should choose between a self-esteem building speech and an inspirational story.

The instructor can also present thought-provoking problems. These problems are useful for relating new instructional content to cognitive ability and for building problem-solving skills. The problems must be relevant or meaningful for the learner. For example, it would be inappropriate to present a logic problem to a youth baseball team that is learning the mechanics of throwing a ball. It would be more appropriate to present the logic problem to a group of mathematicians or scientists learning about the string theory. The problems should prepare the learners to think objectively about the instructional content.

In identifying instructional relevance, the instruction should be personally meaningful for each learner, and the instructor should identify instances where the instruction will be applicable. The instructor can identify how the instruction will positively impact on the learner's cognitive, attitudinal or psychomotor development by relating the instruction to a current situation or learners' need.

However, in stimulating prior knowledge, before instructing new content, the instructor should respect learners' current skills and knowledge by providing a reference to knowledge the learners should already possess (Nate 2006 in Gagne, 1985). The instructor should encourage learners to think of previous experiences relating to current content, or provide example experiences to stimulate prior knowledge. If the learner lacks prior knowledge, the instructor will need to use less-complex instructional content. When this is done, the instructor can then go to present information or new content.

To present information, the instructor should use six steps. These are: Describing instructional goals, describing knowledge needed, describing instructional content concept, presenting instructional content, providing guidance for learning, and presenting examples that demonstrate the use of content knowledge. While each part of this

instructional method is required, each one is customizable as discussed below, according to the learners' interaction and feedback.

Describing Instructional Goals: The purpose of the instructional goals is to indicate the requirements for successful application of the instruction. All of the instruction relates to specific instructional goal, as a means of striving for efficient and effective instruction (Nate, 2006). Therefore, the evaluation guidelines should also match the instructional goals. The instructor should relate instructional goals to personally-meaningful situations. Since the focus of instruction is on the learner, the goals should reflect that focus. Two ways the instructor can make the goals personally meaningful are with scenarios and multimedia examples. With scenarios, it should mimic real-life application for the learner. Scenarios are valuable for demonstrating application or assimilation (Reigeluth, 1999b) of instructional content while with multimedia is the multimedia examples should demonstrate meaningful, real-life application for the learners. These examples are useful for larger groups, or for groups with less opportunity for content exploration. Along with describing the instructional goals, the instructor should also provide timelines. Timelines are useful for setting guidelines for all types of instruction; timelines define guidelines for self-paced learning, and provide learners with a roadmap in larger instructional settings. In self-paced instructional environments, establishing timelines will not interfere with learner input in the instruction, but will provide a direction that focuses on the instructional goals.

Describing Knowledge Needed: It is very important for both the learners and the instructor that a certain level of knowledge or skill is already attained before instruction begins. The prerequisite knowledge should be less complex than the current instructional content, and should have been stimulated at this point in the instruction. It is also best if the prerequisite content is understood instead of memorized. Understanding is more important for future recall and assimilation (Reigeluth, 1999b), and in order to instruct

with the goal of understanding, the learner should already have a solid base of understanding.

Describing Instructional Content Concept: Understanding is most applicable for content that focuses on concepts, procedures or principles. Therefore, the content should emphasize understanding of a concept within one (or more) of those areas. The content concept should also indicate the direction of instructional guidance. For example, if the concept was a flower, the guidance might include an outdoor adventure for the class. If the procedure was calculating mortgage interest, the guidance might include a demonstration.

Presenting Instructional Content: The instruction should be presented in several small, evenly-sized components. Many would refer to this as “chunking.” It is important to break up the information into chunks that are appropriate for the learners so they do not feel overwhelmed and can come to an understanding of the content at a more efficient pace. Learners who are more advanced can handle larger chunks than less-knowledgeable learners. For example, it would be appropriate to break instruction about early America into segments such as pre-colonial era, colonial era and post-colonial era. It would be inappropriate to present such a broad topic as only one segment. The learners should be involved in the decision-making process about how to learn the instructional content in accordance with the instructional goals. The learners have ideas and inputs that need to be acknowledged. If the learners are involved in the decision-making process, they are taking initiative in their own learning experience, and demonstrating ownership of the instructional content. The instructor and students should collaborate to determine the best instructional approach. Some of the most common approaches are:

- i. Lecture- Good approach for distributing information to a large group, but a poor approach for collaboration and problem-solving.

- ii. Demonstration – Good approach for both visual and tactile learners; allows knowledge to be seen through demonstration.
- iii. Independent Learning – Good approach for learners who progress quicker than other learners or would like more ownership of the instructional content.
- iv. Discussion/Seminar – Good approach for collaboration and interaction.
- v. Tutorial – Can be either programmed or conversational, but is best for only one learner.
- vi. Cooperative Group Learning – Good for establishing group ownership of instructional content and for team-building.

Therefore, learners can develop, explain and defend responses through peer collaboration and consultation (Heinich, et al, 2001). This collaborative approach can raise concerns about efficiency; but involving the learners in the decision-making process allows the learner to take some control of their learning. The instructor needs to motivate the learner to choose methods that are appealing and effective, but also efficient. For example, the instructor should motivate the learners to choose approaches that also allow the instruction to be completed in a given time frame or monetary restraints, which will likely exist in all instructional situations. The instruction should also move from direct to abstract learning (Dale, 1946 in Nate 2006). Dale's "Cone of Experience" demonstrates how instructional efficiency and effectiveness are related. The more abstract a learning experience is (the higher on the cone), the less time it will take to present. However, the more abstract an experience is, the more prerequisite knowledge is needed for understanding. The less abstract the learning experience is (the lower on the cone), the more time it will take for presentation. However, less abstract experiences require less prerequisite knowledge for understanding. Therefore, the instructor should collaborate with the learners to determine the most appropriate learning experiences. This analysis

will ensure efficient instruction. The collaboration of both the instructional approach and the instructional experiences should produce a content presentation that will be interesting for both the instructor and the learners. Involving both participants (the instructor and learner) in the decision-making process will positively impact attitudes toward both receiving and delivering instruction.

Providing Guidance for Learning (Reigeluth, 1999b): The instructor must provide guidance for learning through at least one of the following six tactics:

- i. Dimensions of divergence; the instructor should provide non-examples of the instructional content to foster understanding.
- ii. Representations; useful for learning difficult concepts, representations are abstract experiences like diagrams or paraphrases. Representations are important for ill-defined domains and non-repeating skills.
- iii. Mnemonics; using symbols, numbers or letters to represent more abstract instructional content.
- iv. Algorithms; a step-by-step method used for understanding instructional content.
- v. Mentors; they provide valuable guidance and focus toward instructional content. Fellow learners make good mentors, especially advanced learners.
- vi. Attention-focusing tactics; for procedures, tactics must focus on the necessary actions to complete a procedure in the proper order. More than one tactics can be used for any given situation. Mnemonics are good tactics for instructing concepts and procedures, while algorithms and representations are good for instructing principles. Present examples that demonstrate use of content knowledge similar to the last part, the examples should correlate with guidance. Use a simple-to-complex sequence – Start with a simple example and progress to more complex examples of the content.

Providing Practice Materials: The most important aspect of the practice materials, whether they were chosen by the instructor or the learners, is that they must correlate with the instructional goals. The materials should include a method similar to the method used for goal presentation, a scenario or a multimedia example. The correlation provides a reminder of the goals and how the materials will help reach the goals. The practice materials must also correlate with the instructional examples. Therefore, if the examples contains mnemonics, the materials should include the same mnemonics or otherwise appropriate prompting. The materials should also be provided in a simple-to-complex sequence to maximize the positive effects of chunking the content. Similar to the examples, the practice materials should also include many dimensions of divergence. It is essential for understanding that the learners practice with as many examples and non-examples as possible.

Therefore, there should be more practice materials than instructional examples. The instructor should use motivational tactics to encourage participation in the learning experience. This can be done through praise and encouragement, or through awarding the learners with more ownership of their instructional experience.

Providing Feedback: Throughout the instructional experience, the instructor should provide informative feedback to the learners. The instructor should provide praise for correct answers and encouragement for wrong answers. If the answer is correct, the instructor should avoid restating why the answer is correct; the student already understands why the answer is correct. If the answers are incorrect, the instructor should offer encouragement or correction (Reigeluth, 1999b) with motivational tactics that allow the learner to continue exploring the instructional content. The instructor should avoid giving correct answers, but should allow the learners the freedom to discover the answers. Criticism of procedures or methods of self-discovery should be constructive and edifying.

The feedback the instructor gives should also be immediate. Timely feedback will give the learner an opportunity to both correct errors and progress through the instruction quicker. Understanding is more difficult if feedback is not delivered immediately. Since the instructional experiences, examples and practice materials should all correlate with the instructional goals, so must the feedback. The feedback should provide corrective or affirmative direction towards attainment of the instructional goals. A formal assessment is not necessary, but can be used if the instructor and learners decide a formal assessment would be beneficial for demonstrating the attainment of the instructional goals. Otherwise, the instructor's feedback should provide learners with information to be able to self-assess their progress towards attaining the instructional goals. Feedback should also correlate with the instructional practice examples. Similar to the instructional examples and practice materials, the feedback should use:

- i. Representations- these should mimic or restate the representations used in the examples or materials.
- ii. Mnemonics- if mnemonics were presented earlier, a reminder should be used as feedback.
- iii. Algorithms- if algorithms were presented earlier, a reminder should be used as feedback.
- iv. Attention-focusing tactics- these tactics are useful for providing feedback during procedural instruction or instruction of principles. The instructor can point out specific steps or causal relationships as a means of encouraging understanding.

Finally, the instructor should use prompting, if needed. Referring to knowledge the learner already possesses and to the instructional examples is a good way to foster development toward the instructional goals. Like the other forms of feedback, prompting should relate to both the instructional goals and the instructional examples. The preceding

instructional theory demonstrates a comprehensive approach to instruction, with a slight focus on learner collaboration toward understanding. The four (4) instructional methods – gain attention, present information, provide practice materials, provide feedback – point toward effective and efficient instructional approaches, regardless of content or context.

This theory of law of effect and exercise is recommended for use in most instructional situations, and should be especially useful in instructional situations with more than one learner. Even though the theory leans toward cooperative learning, the comprehensive nature of this theory even allows it to be used for situations that do not appear to accommodate cooperative learning. From here, the theory needs to be evaluated for its effectiveness in instructional settings. While the theory is designed for most instructional settings, the evaluation may indicate that it is only effective in certain contexts, or with certain content. If this is the case, the flexibility designed into the theory should provide effective alternatives to complications.

Instructional materials have been defined by various authors. For example Isola (2010), viewed Instructional materials as things or objects, that makes teaching and learning meaningful. He went further to refer to them as objects or devices, which help the teacher to make a lesson much clearer to the learner.

Accordingly, Agina-Obu (2005), defined instructional materials as tools or materials improvise or imported for teaching and learning in order to help the student and teacher on the process of impacting knowledge. He described them as concrete or physical objects, which provide sound, visual or both to the sense organs during teaching.

Instructional materials are in various classes, such as audio or aural, visual or audio-visual. Thus, audio instructional materials refer to those devices that make use of the sense of hearing only, like radio, audio tape recording and television. Visual instructional materials on the other hand, are those devices that appeal to the sense of sight only such as

the chalkboard or white board, chart, slide and filmstrip. An audio-visual instructional material, however, is a combination of devices, which appeal to the sense of both hearing and seeing such as television, motion picture and the computer. Among the instructional materials the classroom teacher uses, the visuals out-numbered the combination of the audio and audio-visual. Community resource persons are individuals within the community whose expertise and wealth of experience are tapped to enrich the teaching learning activities. They constitute part of the community resource for school which comprises people, places, things, and activities which are used in educating students to become good citizens (Encyclopedia of Education vol. 2:1971).

The community resource persons, if utilized well, can provide a lot of materials for the benefit of both the teacher and learners thus enhancing their efficiency in teaching and learning activities. In patronizing resource persons as human resource, the skills and expertise of the community are tapped as resource materials.

According to Encyclopedia of Education (Vol. 2:1971), writing on nutrition, it was asserted that “parental participation is important resource materials as the school is an extension of learning that started at home”. This assertion is also valid for Geography as its focus is on the individual and the community to which a person belongs. The involvement of parents as useful source of information for the child reassures the child and reminds how much fun learning is at home so as to transfer the positive attitude from home to school. The encouraging thing about using members of the community as important resources is that in every community regardless of size, has place and people which are of interest in Geography as a subject.

Onasanya (2004) gave various kinds of models used in educational Instructional materials such as mental models, theoretical models, mathematical models, diagrams, concrete models, etc. These types of models are of special pedagogic significance in

science, social science (which Geography is one of the subjects) and technology instruction due to the nature of knowledge and knowledge getting process in these disciplines. Concrete models are instructional materials or objects which have likenesses to natural or man-made structure or systems and which are intended to highlight and explain or describe structures, functional processes and relationships in the original. Concrete models are constructed in the effort to understand the behavior of the physical world and the causes of such behavior (Onasanya and Adegbija, 2008). The role of concrete models is summarized as follows:

Simplification of complex phenomena, concretization of complex phenomena, bridging of gaps in distance and time between phenomena and classroom events, enhancing of students to communicate for the important roles which these models can play in teaching and learning process by the uses of instructional material. The present researcher's choice is the concrete model. It is considered the best model to be used in delivering instruction in Geography as a discipline because of the nature of Geography which deals with man, physical and natural phenomena.

2.3 The Concept of Geography

Man has always identified and associated himself with a particular place, tribe or nation, in this case not only with culture and economy, but also with hills and valleys including rivers. He is also concerned with the habitable world, the acumen and other phenomena that are beyond the horizon of his home. This forms the basis of ancient Geography. In contemporary time, the scientific focus in Geography is on the problems at or between places and the distinctive geographic question is that of awareness or locations (Sada (2003) in Adedokun, and Jamu, 2011).

At every level of geographical growth and development attempts have been made to define Geography. Adedokun et al (2011) defined Geography as a subject concerned

with providing accurate, orderly, rational description and interpretation of the variable characters of the earth surface. They also defined Geography as the study of relations between society and natural environment.

The first author that defined Geography in Nigeria was Garnier in (1957). He defined it as the subject which aims at understanding the different characters of the earth's surface. This was followed by that of Mobogunje in (1974), who defined geography from the perspective of the changes in its philosophy and methodology as a subject seeking theoretical explanation to the increasingly higher order efficiency for the intricate and complex pattern of spatial phenomenon. Another definition by Faniran (2004), is that Geography is a way of expressing humanities' feelings about, as well as concern, for total environment including physical features and human environment and especially the interactions, interdependence and inter-relationships among them. Likewise, Okafor (2008), defined it as a branch of science in which you can do virtually anything or different disciplines.

From the above definitions the researcher sees or defines Geography as the mother of all art and social science subjects.

2.4 History and Objectives Geography in Nigeria

The development and characteristics of Geography Education have attracted the attention of many leaders of the disciplines over the years, as evidenced in some of their presidential addresses during the annual conference of Association of Nigerian Geographers (ANG) beginning with Garnier (1957), "Geography and National Development", Barbour (1962), "Geography in Nigeria", Ojo (1978), "The immediate Future of Nigerian Geography", Sada (1978), "Geography in Nigeria: Perspective and Prospects", Adejuyigbe (1985), "The Issue of Relevance in Geography With Reference to Nigeria", Jeje (1985), "Whither Geography", Faniran (1990), "Concern for Geography",

Abumere (1995), "Relevance in Geography Revisited, etc. A summary of all these addresses indicate a concern for the development of geographical education in Nigeria.

To achieve the objectives of Geography Education, appropriate skills need to be applied by teachers in their teaching. A number of skills are therefore necessary for the teacher; skills needed to make him enriched and bigger than life (Onasanya, Adegbija, Olumorin, and Daramola, 2008). The skills expected from the Geography teacher include the use of resources as a way of physically extending his ability to communicate. The resources are to be used when appropriate to increase students' learning especially where the resources are used as personal extension of the teacher. When a public address system is used for example, it is expected to extend one's voice so that a great number of people can hear. In teaching Geography the teacher must therefore acquire the necessary skills for him to have the capacity to fully utilize the appropriate resources in teaching Geography. For the teachers to make their contribution in realizing the objectives of Geography they must utilize adequate resources essential in the teaching of the subject. This means, they must be knowledgeable; know what they have to teach and how they are going to teach them. This is the gateway towards ensuring resources utilization. Therefore, the objectives of Geography in schools were stated as; needs for selective teaching, the appreciation of Geography as a dynamic subject, and the facilitation of international solidarity (Kozah, 2007).

Needs for selective teaching: There are now many maps, dictionaries and encyclopedias printed in large and widely circulated editions leading to the learning of an ever-growing list of geographical features and names of places, countries and products that are no longer regarded as essential. A certain sum of knowledge is however essential if one wants to locate geographical phenomena correctly, hence they should be included in the selection of items to be studied. The aim of selective teaching in Geography must centre on

critical problems requiring solution so as to provide for increasing number of people and to make for a higher standard of living.

Appreciation of Geography as a dynamic subject: Geography is a science which must be seen from a dynamic point of view. That is to say, present and future problems are described and explained by development which has led to existing situations. Geography, whether concerned with a district, country or a world-wide phenomenon will obviously demonstrate the need for widespread cooperation between all the people of the earth. The problems that have to be solved to provide men with food, to supply them with water in sufficient quantity and good quality, to educate them and to give them more and more scientific knowledge increase daily. No single country, however powerful would be capable of undertaking the vast and vital task of improving the living conditions of the whole human race.

Facilitation of international solidarity: It is the business of a well conceived Geography teaching to give children, according to their age, a balanced appreciation of the world problems and perhaps moderate their youthful enthusiasm. The teaching of Geography in schools will thus help to instill in the students valuable ideas of the solidarity that exists between all men. The teaching of Geography makes students feel that it is helping them to have better understanding of the world in which they live, the part they can and should play there, the multitude of books available to them and the vast possibility our planet offers us; provided all efforts are concentrated on the essential and vital questions. Looked at this way, there will be a new appreciation of Geography which will acquire a leading place in any humanistic education appropriate to the 21st century. This conception will bring a larger number of young people to an understanding of the greatness of the task facing the agronomist, economists, geologists, sociologists, architects

and geographers, all of them engaged in professions of which the new world now taking shape will have the most urgent need for.

2.5 The Teachers and Learners in Geography Teaching

The importance of the teacher as a human resource is in the context of the central role he plays in the teaching and learning process. It is the teacher who is expected to give guidance and direction to all activities in the process of learning where selection and rejection become important skills both for students and the teacher (Irving 1985).

The teacher is an important human resource and someone who is supposed to be conversant with the syllabus of the curriculum (Oguntunade, 1989). He is the interpreter and implementer of the curriculum. Indeed, as Oguntunde continues Good teachers are directors or advisers in a learning laboratory atmosphere where individual differences are taken into account.

The teacher is supposed to be someone who has been trained to provide information, direction and guidance in the process of teaching. The teacher's training enables him to find out how to process information. As the implementer of the curriculum, he knows where to look in order to find out what he does not know. The role of the teacher must however not be overblown. According to Alajuruonye (2001), teaching differs from old showed tell practices as much as modern medical techniques differ from practice like applying lecturer and block lettering.

The role of the teacher will therefore be more relevant if he can make students passionate participants by providing participating education. The teacher can be more effective and relevant if teaching offer each and every student a rich, rewarding and unique learning experience.

The professional teacher therefore is someone who is trained and knows the curriculum and can interpret and implement it Dubey and Barth, (1977) and Atif,

Benlamriand Berri (2003). In a society like the Nigerian state, where teaching is taken as a last resort and where the teaching profession is being weakened by products of distant learning system of the National Teachers Institute and satellite campuses, it is difficult to find many teachers whose role will be those of chief guides who know how to find out, process information and at the same time take care of individual differences. In this situation the learners are assumed not to be capable of taking any initiative when the needs arise. The teacher who is the main determiner of what children learn is expected to impart his knowledge by merely telling his pupils what he knows arising from the subject matter. Under this strategy, the learners are expected to always acquire knowledge from the teachers. This strategy ensures that the teacher dominates the lesson as the sources of knowledge emanating from the subject matter. This kind of strategy is not helpful and cannot stand the test of time. The experience of Theroux (2004) is an eye opener when she revealed that she spent a lot of time teaching from manuals and using them like bibles of teaching. I certainly did give them a lot of information, but how much of it they remember I wasn't sure.

No doubt, the teacher is expected to know a lot which the learners may not know; he is certainly the most readily available source of knowledge for his pupils (Oguntunade 1989), as he has access to materials which are not within easy reach of the learners. As a result he synthesizes information from their resources, organizes them and presents them in a form his learners can understand. This does not mean the teacher should be domineering with a lot of spoon feeding in the manner observed in the foregoing paragraph. A teaching strategy in which teaching appears as a combination of information dispensing and custodial child care (Lanier 1997), is old fashioned and tend to relegate other important human resources, and the learners. The teacher role cannot be of the king or queen of the classroom, a benevolent dictator deciding what is best for the powerless

underlings in their care (Lanier 1997). Teachers certainly accomplish more if they adopt the role of educational guides, facilitators and co-learners. They must tilt towards making learners passionate participants in the instructional process by providing project based, participation educational adventures. The day to day job of a teacher must be that of designing and guiding learners through engaging them in learning opportunities. Mc Kenzie (1998), sees the role of the teacher as that of guide on side while students are conducting their investigations.

However, much as the teacher is expected to be the guide on the side especially in this era of information technology, it seems his hands are tied. He is confronted by a number of limitations. The materials needed to perform this role may not be available, when available they may be scarce or in bad shape or even be incapable in utilizing them.

This is to show that apart from the ill-preparedness of teachers as cited by Harceroad (1991), important factors affecting the use of materials as claimed by Ike (1980), are finance, maintenance and non provision of materials by the authorities. All these constraints hinder the teachers in their capacity building; but that notwithstanding, it is the responsibility of Geography teachers to research and construct meaningful educational experiences that allow students to solve real world problems and show that they have learned the big ideas, powerful skills and habit of mind and heart that meet agreed upon educational standards (Lanier 1997).

It is the responsibility of all stakeholders in education to live up to expectation and give teaching its rightful place. This is necessary as teachers are the heart of the education process and the main determinants of the quality and effectiveness of its result (Platt 1970). If teachers are not supported and trained and made to understand their roles as the heart of education process the quality of education is bound to suffer. Adesina (1977)

rightly observed, the quality of education depends on the quality of teachers trained since they can only teach what they know.

2.5.1 The Role of Learners in the Teaching and Learning Process

Despite the central role played by learners in the teaching of Geography the available literature on Geography resources seem to underplay the role of learners as important human resources in the teaching of Geography. There are however quite a few in which the significance of the learner as important human resources is recognized.

Sulaiman (2005) submitted that learners are important source of data and very useful in the inquiry method of teaching. Irving (1985) also recognized the participatory role of the learners by asserting that the art and science of asking question is the source of all knowledge. To be able to do this, therefore, he opined that learners need all the encouragement to find answers to questions by going to books, laboratories, the internet and television.

In the light of the above views about learners, it is therefore pertinent to see the learners in their proper perspective as far as teaching and learning process is concerned. They should not be seen as mere consumers of facts but active creators of knowledge that is, versatile learners (Irving, 1985). As important source of data either as individuals or group members, at home and in the total environment, the learners become committed and motivated and provide important resources for Geography.

By taking learners into confidence, as partners in the teaching and learning process, it means an important strategy is being used by the teacher to allow learning to take place. This is because by ensuring that learners are utilized in any lesson, through active participation, the teacher will be tapping and exploiting the thoughts and views of the learner. This means the potential in the learner will be optimally discovered for the

enhancement of teaching and learning activity. This view is also shared by Mckenzie (1988), who said:

“An educator’s most important responsibility is to search out and construct meaningful educational experience that allow students to solve real world problems and show that they have learned the big ideas, powerful skills and habit of mind and heart that meet agreed upon educational standard” (pp.13)

By focusing on the learner, the goal of education will be realized because the whole goal of education is to develop effective and efficient citizen out of the learner who would be useful to himself and the society contributing meaningfully to his immediate family, society and the nation at large. This is why for this lofty goals of education to be realized the learner must always be taken into confidence by giving him his rightful place as active participant in the teaching and learning activity. It is only by participation that learners are allowed to play and give the teacher an opportunity of exchanging ideas with the learners. Some of their ideas may be better than his. Indeed learners work harder when teachers give them a role in determining the form and content of their schooling – helping them create their own learning plans and deciding the ways in which they will demonstrate that they have in fact, learned what they agreed to learn (Lanier, 1997).

By allowing active participation of the learners the unique characteristics in the learners will be recognized. Some of the unique characteristics are their curiosity, activeness, talkativeness, their love for adventure etc. As a result of these positive characteristics, utilizing the learners in the teaching situation is a prerequisite to proper learning. As children are active and constantly on the move, engaging them in so many activities in which the environment can be a good source of activity, will enhance teaching and learning activity (Dubey and Barth, 1977), more also, when children want to talk and be heard. This is an asset in a teaching focused in utilizing the potentials in learners. Debates and quizzes can be arranged. The children’s love for adventure and

discoveries can also be capitalized upon. Other characteristics of the children such as collecting and gathering things can also be utilized by grouping their learners, through this they learn a lot. In utilizing the resources in the learners the active potentials in them must be taken into consideration and utilized. The era of spoon feeding learners and relegating them to the background is gone. There are a lot of activities that will fully involve the learners. These include quiz, field trips, cartoon, survey, demonstrations, modeling, role playing, story-telling, debates etc.

Therefore, in utilizing the resources in the learners, much as they provide useful data, it must be remembered that not all learners can be so motivated because they are from different backgrounds. While some parents may be encouraging enough others may be lacking in such encouragement. The parents in rural areas and poor background may not provide the necessary support in utilizing the potentials in children to get the desired data either at home or elsewhere. Here, the skills and expertise of the teachers must come into play to take care of the imminent individual differences arising from different background.

2.6 Teaching Methodology in Geography Education

Geography as a subject has been in existence for several decades. The method used in teaching the subject by most of teachers is lecture method, relatively not in order because Geography by its concept as defined by some authors is more than what the Geography teachers can just handle like arm bench geographers. Hamana, Barber and Terney-purta (2006), cited by Adedokun et al (2011), have identified some pedagogies which offer possibilities for teaching Citizenship Education which is also seen as appropriate for teaching Geography to enhance the performance of Geography teachers and students in combination with instructional materials in teaching and learning Geography. They include;

2.6.1 The Discovery-Inquiry Approach Method in Teaching and Learning Geography Education

It is prevalent in traditional humanities programmes like History, while Geography as a subject is historically oriented. The discovery-inquiry approach insists upon a sequence of problem solving; the identification and understanding of the problem; the formulation of hypotheses, the collection of data, synthesis and conclusion. In Zaria, where this research was conducted the situation is direct opposite because it was glaring to the researcher that the most common method of teaching Geography in the area is lecture method; this method is usually teacher-centered method and the student is usually a passive listener.

2.6.2 Deliberative Approach Method in Teaching and Learning Geography

It is about political decision-making that relies on popular consultation in policy making. Its theorists argue that legitimate lawmaking can arise only through public deliberation; it adopts elements of direct and representative democracy. Many scholars in the area of Geography Education take deliberative approaches to democracy. The approach emphasizes democracy in the classroom, debating societies, legal and human rights education (Adedokun and Jamu, 2011). Therefore, Geography should be seen to be education for social reform whereby learners learn through experimental problem-solving which enables them to learn from their mistakes not arm-bench geographers.

2.6.3 Critical Thinking Approach Method in Teaching Geography

Critical thinking is the basis for a democratic society and it is an important goal of Geography Education. Few studies have demonstrated that social science subject students taught by reflective approach which Geography is one of the social science subjects and it is the concern of this study performed better in achievement tests than those taught using

the lecture approach. In a study to investigate the relative effectiveness of the reflective and the lecture approaches, Adeyemi (2000) found that the scores of the students in the reflective approach was statistically different from those of the students of the lecture approach method after the post test. So in the process of teaching, educators should use approaches which promote problem-solving skills (Lathin, Jotia and Ontiretse 2011), Thus, one of the best ways of teaching Geography in order to enhance the performance of the teacher and student in teaching and learning situation is considered most suitable method. Therefore, teachers' planning should include; choice of appropriate teaching instructional material, choice of appropriate teaching methods, intensive research on the topic to be taught, and determination of the objective for the lesson (Asikhia, 2010).

2.7 Educational Instructional Materials in Teaching and Learning Geography

Some educational instructional materials in teaching and learning Geography include:

2.7.1 Maps and Globes

Maps and globes are very important in the teaching of Geography. In a research conducted by Kozah (2007), the researcher showed that maps and globes are universally accepted as significant instructional materials in teaching and learning Geography, Social Studies, History, etc. Their values lie in their ability to give an almost accurate visual representation of the earth's surface, which makes the study of large and remote areas more accurate and meaningful. Maps are visual scaled representation on a flat surface of the land and water masses of the earth or some portion of it. Although maps are not generally as accurate as globes, they are useful for detailed study and viewing the earth at one time. They also enable students to understand, compare and contrast political units, land masses and water bodies, as well as furnish information about areas, directions, sizes, shapes and distances.

Globes are spherical in shape or representations of the earth surface. They are more accurate than maps because they represent the true shape of the earth; moreover, they show correct distances and direction as well as exact locations and areas of a particular point. In addition, globes can (as maps cannot) be very useful in developing other concepts such as shapes of earth and the relationship with other heavenly bodies, longitudes and latitudes, time relation and distance and comparative size of nations and continents.

2.7.2 The Use of Projected Instructional Materials in Teaching and Learning Geography

Projected materials are the opaque projector, transparent still projector and cine projector. The advantage of projected materials in resource utilization is “their ability to reproduce real objects and events with high fidelity (Encyclopedia Vol. 4). Therefore, to be resourceful, the teacher needs to optically utilize projected materials for his capacity building. This is necessary because as Cable (1970) says, projected materials enable larger number of people to see an illustration. Therefore, for a teacher with large number of students, there is no alternative to the use of projected materials if the teaching must be effective. Moreover, as Dubey and Barth (1977) asserted, films can be a substitute for travel as they give impressions and expressions that are impossible to get in any other way. According to John (1970), whatever the subject is, an important dimension can be added by using the film in instruction. He asserted that the film shows actuality as it happened to provide instant history in images of the actual events in form of 16 millimeter films.

In trying to improve his capability the teacher faces a lot of problems trying to make the best out of these aids. In the first place there are great deals of fuss and recognition which discourage teachers to use them. In addition, the projected materials are costly and may therefore be difficult to come by. This is worsened by erratic power supply

in the country. This means the enabling environment to fully use the projected materials is not there. Abdullahi (2005) explains these to be the problems which force teachers to concentrate on lecture method which will automatically alienate other human resources, like the student who are very relevant to the teaching and learning activities.

Therefore this category of media, very relevant to both teachers and learners, but are expensive and require talents to use them, are just virtually there for use. Even if some schools do have them and can be used to enhance performance in Geography, there is the erratic power supply and apparent lack of technical competence. However, a teacher who finds it difficult to use the projected materials for himself and his students must make every effort to diversify his source of enrichment. This is because the teacher and the students are central in the teaching and learning process of Geography; for that reason, they cannot afford to ignore or remain ignorant of numerous sources of information dissemination.

2.7.3 The Role of Television in Teaching and Learning Geography.

The role of television if used effectively can empower both the teacher and the students. In fact students activities can be enhanced through the use of television. This is because the amount of information it provides is enormous. The role of television as viewed by Walker and Hess (1984), is that:

“the enormous power of television to act as a window to the world, to introduce to us to inaccessible domains is reality in our everyday and public life. We see man walk in the moon, the super bowl is watched by millions of viewers throughout the world; the dust and blood of war are brought home daily”. (Pp.26)

The role of television is supported by Daley (1969) who claims that television will help multiply information sources for the teacher, learners and community leaders and in fact for the public as a whole. To benefit most from television it must be used as an integral part of overall educational programme (Encyclopedia Vol.9:1998). It has been

claimed that 20 years of investigation have shown that generally, students taught by television have done as well as or better than students taught by conventional means (Encyclopedia, 1985). The experience of China is an example of how television can be used as an important means of information dissemination (Epstien, 1982). Walker (1984) has observed that television in 1980's has scarcely begun to influence formal education.

However, for the teacher wishing to integrate television as a source of data empowerment has to wait a bit longer. If in developed countries and China, it had a snail speed progress, in Nigeria, the real impact of television in the education sector is yet to be felt. The dilemma of the teacher to use television is compounded by the fact that television requires the largest investment than any other media (Fitep and Scramm, 1990).

2.7.4 The Computer Assisted Programme in Teaching and Learning Geography

The enormous power of the computer as a resource is underlined by the claims made that it took radio and television several years to make their impact while the computer made its impact in 4years with 119 million connected to the internet by April, 2014 (ehow.com). The internet in 2014 continues to offer novel opportunities to enhance teaching process by opening up the world to class room and vice verse. For the Nigerian educational system, however, the story of this promising impact is a different one. Nigeria is just beginning to be computer literate. Majority of Nigerians, teachers, learners and other citizens are not computer literate. For the possibility of enhancing teachers and learners performance and thereby improving on the Nigerians educational practice which the computer provides Nigeria still has along way to go.

In Nigeria therefore, the issue of computerized instruction is not debatable whether itis superior to traditional methods or not (Morgan and Hall, 2000), to ensure that Nigerians and particularly teachers and students become computer literate. The only solution in the way of Nigerians is to join the computer revolution and begin to have

access to unlimited information where teachers and students alike can have access to information for their intellectual advancement. This is especially important as the teachers and students are at center of teaching and learning activities.

However, when the huge cost of the computer technology is considered and the lack of good will on the Nigerian leadership, who allocates much below the United Nations recommendation of 26% of budgetary allocation on education (Nnoli, 2005), it is difficult to imagine when the computer technology can be the rule rather than the exception. This means for the teachers and students and other community member to have access to the computer and the internet for their intellectual advancement the waiting is long.

2.7.5 Radio Recorder and Record Player in Teaching and Learning Geography

An important way through which participatory learning will be assisted in which learners participation and individual differences are taken into consideration is for the teacher to use the medium of radio and tape records. Dretrich (1966) argues that pronunciation is better for radio listeners. Moemeka (1981) suggests radio reaches areas otherwise inaccessible and also serves as a direct instrument of education for the teacher and learners. Thus, radio and tape recorders are crucial as they seek to increase their intellectual capability. Indeed, they act as devices to multiply and disseminate very widely and quickly certain selected parts of information available.

However, for the teacher and students hoping to make the best out of the radio, they can get much; this is because most of educational programmes by the Nigerian Broadcasting Corporation (NBC) are now effective. But, a good number of the schools do not have the radio even though it is cheap. The radio programmes which started as far back as the 1960 began on a shaky foundation. According to Schramm, Combe, and Kahnert (1967), the radio service in the 1960's was uncoordinated even though radio can

be used in multiplying and distributing, the electronic media owns resources. As a matter of fact, everything must be done to reactivate the radio programmes for it is effective in enriching the teachers and students.

The record and record player like the radio help in enhancing participatory learning. This is more so as they can be used in reproducing pre-recorded materials. It can also be used in individualized learning to enhance performance. Slow learners can benefit from record and record player as they can learn at their own pace. The argument is that, lower Intelligent Quotient (IQ) student gain relatively more using tape recorder. In addition, the teacher needs the recorder to help in reducing the drudgery involved in repeating a representation to a succession of class (Encyclopedia vol.9123).

However, like the radio, in using the record player to enrich the human resources, lots of problems are faced. There is lack of good will to supply them maintain and make optimum utilization particularly with regards to individualized learning in relation to the ratio of teacher to students in many of the schools. This should however not deter teachers from making the best out of the little that may be available. This is essential because as in the opinion of Gordon cited in Adekunle (1999), by using tape recorder, students see themselves as they are actively seen by other students and could gain realistic insight into their personalities and idiosyncrasies.

2.7.6 The Use of Instructional Print Materials in Teaching and Learning Geography

The role of print materials is enormous as they equip the teacher to become versatile in the teaching and learning activities. This is particularly so as a result of the fact that the information technology in Nigeria is slow in its materials.

The print materials which are books, newspapers, magazines and journals are indeed invaluable educational resources for primary and secondary school teachers and students (Edeghere, 2001). Considering the state of Nigeria's economy and the extent to

which the stakeholders in Nigerian education are willing to invest in education, it is not out of place to agree with Udo (2005), that education can succeed at least for Nigeria as at now, only if it is ensured that books are regularly supplied. This is necessary because for foreseeable future, print materials will continue to provide an important source of intellectual empowerment of the teacher and the learners without which their roles as resources will be impaired. This is to suggest that a large proportion of instructional materials found in most Nigerian schools are relying on books, but the books are in short supply.

To ensure that the problems of books are tackled, libraries must be renovated. The significance of libraries is very much in conformity with the enrichment of the two most important aspects in teaching and learning process, the teachers and learners. Thus, as Edeghere (2001) pointed out, libraries are fundamental in stimulating learning skills, creative and reflective thinking and independent self- learning. However, the problem is that the libraries are not easy to find and where they are found the books, magazines and journals are not there. The portable library scheme in Abuja is not a solution to the library problem in Nigeria (Edeghere, 2001), because Abuja is not where Nigeria started and ends.

Another dimension to the books problem is the revelation by Nnoh, (1999). Citing Onyejemezi (1996) the author revealed that “most of the textbooks presently recommended for the various levels of the educational system are unsuitable, inadequate or expensive.” This is where the libraries can come to the rescue. However, like observed earlier, the libraries available are not stocked. The libraries available in Nigerian secondary schools and even in tertiary institutions are only shelves of what they are meant to be. In secondary schools, libraries are more-or-less reading rooms.

2.7.7 The use of non-projected instructional materials in teaching and Learning Geography

The non-projected pictures are most widely used and most readily available. They are easy to prepare and cost little. This is why Geography teachers as well as those who are still in training as Geography teachers are advised to collect and preserve pictures for future use because they are many teachers who fail to think of them as instructional aids; they fail to realize the values that can be derived from them if they are put to proper shape in teaching of Geography by the teacher. John (1970), stated that the teaching and learning tasks to which various, combinations of instructional materials are limited, the teacher himself may present a sequence of learning situation through a planned combination of materials or may be used to substitute for film as information given, while he attends to other professional matters. He may provide extra tutoring for these pupils who need it by planning individual instructional programmes which employ combinations of media or encourage gifted pupils to learn on their own through similar planned programmes.

2.8 The Concept of Academic Performance

Most people know that academic performance generally refers to how well a student is accomplishing his/her tasks and studies. In educational institutions, success is measured by academic performances or how well a student meets standards set out by curriculum planners or policy makers and the institution itself. Although, education is not the only road to the success in the working world, much effort is made to identify, evaluate, track and encourage the progress of the students in schools. Parents care about their children's academic performances because they believe good academic result will provide more choice and job security. Schools though invested with fostering good academic habits but for the same reason, they are also often influenced by concerns about the school's reputation and the possibility of monetary aid from government institutions,

which can hinge on the overall academic performances of the school. State and federal departments are charged with improving schools and so, devise methods of measuring success in order to create plans for improvement (ehow.com, 2014).

2.8.1 Factors that Determine the Level of Academic performances in Teaching and Learning Geography

Academic performance is the grade being given to students either falling below the grade or expected standard after a test or exam conducted (Idris, 2012). Poor academic performance according to Adewole (2004), is a performance that is adjudged by the examinee/test and some other significant variables as falling below an expected standard. The interpretation of this expected or desired standard is better appreciated from the perspective of cognitive ability of the evaluator of the performance. The evaluator or assessor can therefore give different interpretations depending on some factors. The search for the causation of poor academic achievement is unending and some of the factors they put forward are: Motivational orientation, self-esteem/self efficacy, emotional problems, study habits, teacher consultation and poor interpersonal relationships, especially in Geography as a subject.

Aboula (2013) also made efforts to categorize factors militating against good academic performance into four principal areas which are:

Causation resident in the child such as basic cognitive skills, physical and health factors, psycho-emotional factors, lack of interest in school programme.

Causations resident in the family such as; cognitive stimulation/basic nutrition during the first two years, type of discipline at home, lack of role model and finance.

Causation resident in the school such as, location of the school, physical building and inter-personal relationship among the school personnel.

Causations resident in the society such as instability of educational policy, underfunding of educational sector, leadership and job. If all these can be given a proper consideration, academic performance of Geography student will improve.

2.9 The Significance of Instructional Materials in Teaching and Learning Geography

In this era of information technology teachers are continuously being urged to avail themselves with a variety of instructional materials found to have significant impact in improving learning. It has been found that learning is easier through the use of instructional materials. It is believed that students understand and remember better what they see and do (Umar, 2004).

According to Adebimpe (1997), students learn more and faster when audio-visual materials are employed. Dubey, Onyabe and Prokupetk (1980), argued that instructional materials when used wisely could be used to realize the goals of education. In this regard, Adewole (2004) stated that instructional materials can be used to promote and encourage effective teaching and learning activities in Geography teaching.

Adeyanju (2005) asserted that some findings have shown that students are stimulated more when taught with instructional materials. Writing in the same vein, Adole (1997) argued that instruction involving the use of audio-visual materials facilitates permanency of learning. In his own contribution Adeyemo (1993) opined that the use of audio-visual makes subject matter real and understandable. Others like the National Council for Educational Technology have confirmed that research has shown that the use of computer by both staff and students increases student's performance.

It is based on the strength of the above views arising from various researches by educationists that formed the basis of this work. The objective was to establish the contribution of instructional materials in improving teaching and learning in Kaduna State.

2.9.1 Factors that Determine the Selection of Instructional Materials in Teaching and Learning Geography

Instructional materials have been defined by various authors. Adebimpe (1997) viewed them as didactic materials or things which are supposed to make learning and teaching possible. According to Agina-obu (2005), instructional materials are also described as concrete or physical objects which provide sound, visual or both to the sense organs during teaching. While instructional materials are referred to as objects or devices which help the teachers to make a lesson much clearer to the learner (Lasola, 2010). Therefore, the selection of instructional materials in teaching and learning Geography are determined by the particular aspect of Geography teacher intends to teach at a particular point in time. For example, the teacher may want to teach part of Africa countries in the world; this has to do with the use of Global and Atlas as instructional materials, but if he wants to teach type of rocks, he has to bring in type of rocks, that is real object, to the class for illustration and all other aspects of the subject in teaching and learning process of Geography.

2.9.2 Constraints in Instructional Materials' Utilization in Teaching and Learning Geography

A lot of constraints are faced in utilizing of resources. Some of these problems could be that some of the aids needed by the teacher to be effective may not be available or may be scarce or in bad shape. Other problems are time, financial resources and space which could be against the effective involvement of students; for example, in organizing simulation games funds may not be available in addition to limited time and space.

This inadequate utilization of materials is lamented by Harcelroad (1991), who asserts that acceptance and use of films by teachers have fallen drastically. Hacrelroad further explains that there is ill preparedness of the teachers. This ill preparedness had to do with

the fact that, they may not be professionally trained to use them while a good number of the schools do not have them.

In a survey conducted by Adewole (2004), it was revealed, that over $\frac{1}{2}$ (half) of the respondents claimed that each of the 22 items listed in the survey were not available. Out of the 89 respondent only 25 use 16mm motion picture and only 27 use overhead transparencies. Therefore, the problem may not be limited to inadequacy of supply but even the few available ones are not being made use of.

In his study, Ike (1990) found out that among the factors affecting the use of materials are finance, maintenance, non provision of the materials by the authorities concerned and the negative attitude of teachers. Olu and Scramm (1969), expressed similar concern on the under utilization of resources especially film. The reason is the ill preparedness of teachers to use them and some are poorly acquainted with them.

The ill preparedness of teachers in human capacity building for competent teaching and effective learning is more glaring in the use of computer. In this area, the teacher faces serious limitations. The fact that the majority of Nigerian teachers are not computer literate means the teachers are limited in their capacity to avail themselves of the opportunity provided by the computer through the global computer network the internet. This fact which is as a result of primitive level of Nigerian infrastructure (Suleiman, 2005) makes it impossible or at least extremely difficult for information technology to make meaningful impact on education.

Other constraint faced by the teacher is lack of funds to finance student activities such as education visits, improvising infrastructural materials or even invite resource persons. Other activities like simulation games require money which may not be available. There could also be problem of insufficient space and over crowdedness and time to organize activities like quiz, debates. In a country where even paper is in short supply in many

schools, it is difficult to see how teachers can make effective use of these materials needed in human capacity building. This is why the instructional materials with graduates of teachers colleges were usually lecturer notes taken from the course Oladele (1984). This trend continues up to the tertiary institutions in the country where teachers graduate without adequate idea on the use of institutional materials that can boost their capacity as human resources.

2.10 Review of Empirical Studies

In his study Liman (1984), focused on print and non print materials in teaching and learning in schools in Sokoto State. He found out that for more senses to be involved in teaching and learning process, there is absolute need to involve the use of appropriate instructional materials. This underlined the importance of resources as learning process.

Ike (1980), in this study on the other hand tried to find out the factors that affected the utilization of instructional materials in schools and colleges of Imo State. He was able to find out, among other factors, inadequate funds as an obstacle to purchasing of instructional materials as well as the failure of teachers to utilize the materials even when available because of nonchalant attitude of teachers. On the whole, he concluded that there was an inadequate instructional material in the state for teachers to be able to optionally utilize the resources in teaching.

The significance of material resources as highlighted above in bringing about teaching efficiency has prompted a number of studies from students and scholars determined to go to the field to have a specific assessment of the contribution of material resources in teaching and learning process and the assistance given in realizing the objectives of Geography Education.

Adeyemi (2000a) studied the utilization of instruction media in teaching of literary classes in Kwara State and found out that:

- i. Such materials as projecting material, radio and television contributed to real understanding;
- ii. The unfortunate thing is that they are not available and;
- iii. This tends to affect the academic performances of the students.

The study has a relationship with the present study in such a way that in conducting the research work it was discovered that those who taught with instructional materials performed much better than those who were not taught with instructional materials.

Lathin and Ontiretse (2011) conducted a study on the availability and utilization of instructional materials for science teaching in some selected post primary institutions in Jema'a Local Government Area of Kaduna State. In the findings of the study the inadequacy of the materials was established. The few instructional materials available were not utilized in the teaching due to ill preparedness of teachers, lack of appropriate materials and erratic power supply. This study shows that instructional materials play a vital role in teaching and learning process. Due to the reason above, the study has a relationship with the present finding.

A study was carried out by Jekayinfa (2012) to find out the effects of instructional resources on the academic achievement of secondary school students in History. For the purpose of the study, data were collected from five hundred and five (505) respondents comprising of 15 History students, eleven (11) History teachers and seven (7) principals in eleven (11) selected secondary schools in Ogbomosho North and Central Local Government Area of Oyo State. Teachers and students in the sampled schools were served with an investigator constructed questionnaire. History Achievement Test was also administered to the students in the selected schools. Results of the study indicated that adequate supply of instructional resources have significant effect on students' performance

in History. This is in line with the present study, that is, instructional material improves academic performance of learners.

Lathinand Onthirets (2011) in their study, on how Social Studies is taught with regard to the use of instructional materials and how they impact on students' performance especially during the Botswana Primary School Leaving Examination (BPSLE) contended that the manner in which students are taught in Social Studies eventually negatively impacts on the goal of teaching students to become vibrant and active citizens. The study was carried out in Lobatse South East Inspectoral Area, Lobatse, Botswana, which comprises of primary school teachers who have been trained to specialize in the teaching of one subject and in some instances there are no subject specialists. This qualitative research used interviews, participant observation and a questionnaire to collect data. The results of the study revealed that there was absolute need for teachers to change their teaching approaches.

Asikhia (2010)'s study examined the perception of students and teachers on the causes of poor academic performance among secondary school students in Ogun State, Nigeria. Subjects for the study were one hundred and thirty-five (135) students and fifty (50) teachers randomly drawn from five secondary schools in Odogbolu Local Government Area of Ogun State. Questionnaire was used to collect the relevant data for the study and percentages and chi-square were used to analyze the research questions. Responses of teachers showed that teachers' qualification and students' environment do not influence students' poor performance but teachers' methods of teaching influence poor academic performance.

Onasanya and Omosewo (2011)'s study examined the effect of using standard instructional materials and improvised instructional materials on secondary school students academic performance in Physics in Ilorin, Nigeria. The samples consisted of

selected secondary schools in Ilorin metropolis of Kwara State. The research employed a quasi-experimental design of the pretest-posttest non-randomized control group design. Two hypotheses were designed and tested at 0.05 level of significance. From the analysis, the following findings were made.

(1) There is no significant difference between the students taught with standard instructional materials and those taught with improvised instructional materials i.e. mean score on the posttest ($t = 4.09$, df_{14} , $p = 0.05$).

(2) There is no significant difference between the posttest scores of the experimental group and control group. This shows that the improvised instructional material in the comparison of the mean score of experimental and the control groups were of the same entering level with regards to academic ability ($t = 1.23$, $df = 7$, $p = 0.05$).

Adeyemi (2000b) studied the utilization of instructional media in teaching of literary classes in Kwara State and found out that such materials as projecting materials, radio and television contributed to real understanding but unfortunately not available. Asikhial (2010) worked on the availability of the use of audio-visual aids in post-primary schools in Bida. The findings showed that about 70% of the teachers did not have aids to utilize. Over half (1/2) of them said, most of the aids for studying were not available, only very few of them used projecting materials. These studies have made useful contributions in raising awareness on the need for optimum utilization of resources in teaching and learning and in achieving the aims of government in particular and education in general.

The review of these empirical studies in this research are similar to the purpose of the investigation on instructional resources and also differ from it in such a way that some of the empirical studies reviewed focus their attention on a specific instructional materials while the present research is concerned with the effect of the use of instructional materials

on the academic performances of senior secondary school students in Geography in Kaduna State.

As much as they touched on several aspects of resources, their works could not be exhaustible, because all studies have delimitations. These researches dealt with specific areas and with different problems which were of interest to the researchers concerned. This is why a study of this nature is undertaken on an entirely different area of Kaduna state of Nigeria and though concerned with instructional materials, its focus is on the performance of SS students in Geography. Therefore, the study dealt with an entirely different problem which may have some relationships with previous works already done; the focus of this research is on an entirely different scope and problem. In fact, it is based on the belief that the topic of his study has not been presented anywhere and couple with the desire to make some contribution to knowledge.

2.11 Summary

In this chapter the central role played by resources in increasing teaching efficiency and good performance on the part of the learner and availability of the resources are highlighted. A number of writers have written on one or more of the resources and in all cases have pointed out how optimum utilization of resources can increase teaching efficiency and performance in Geography in particular and indeed in all other disciplines. It has shown in their different writings the need to have adequate material resources and also the need for the teacher to optimally utilize them.

These resources, when used optimally, have been shown to increase teaching efficiency. Community resources, projected materials, television computer, radio, record player, print materials and so on, have all been shown to have impact on teaching and learning process. The appropriateness of instructional materials to be used in teaching a particular concept in order to acquire the set of goals in teaching and learning Geography

is one of many problems. This can be due to non-availability of instructional materials or the available ones are in bad shape; there is also the issue of inadequate finance, time and space and also the ill-preparedness of the teacher to utilize the available material resources. As such, the study was out to investigate effect of the availability and utilization of instructional materials on the academic performance of senior secondary school students in geography in Kaduna state.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter examined the methodology adopted for this research study. The methodology includes the research design, population of the study, sample and sampling procedure, instrument used for data collection, validity and reliability of the instrument, pilot study, procedure for data collection and method of statistical analysis.

3.2 Research Design

The research design employed in this study was Quasi – experimental design. This method was employed because the study was interested in the outcome of performance of students for those who are taught with or without the use of instructional materials. The research design consisted of two groups namely controlled and experimental groups which have been illustrated as follows:

Exgrp $P_1 \times P_2$

Congrp $P_1 - P_2$

P_1 = pretest

P_2 – post test for the groups

X = Treatment to Exp groups

- Use of Traditional lecture method to control group

3.3 Population

The population of this study comprised of all students and teachers of Geography in Senior Secondary Schools of Zaria Education Zone of Kaduna State. Information available from the Inspectorate Office of Kaduna State Ministry of Education, Zaria, indicated that there were eleven (11) senior secondary schools located in the six (6) districts that made up the zone. These schools were strategically located in both rural and urban areas. The teachers' population was put at seven hundred and ninety eight (798) and

students population at sixteen thousand, two hundred and twenty (16,220) respectively. It therefore shows that, there are seventeen thousand and eighty (17,018) respondent altogether. The break down for this is shown in table 3.3.1 below:

Table 3.3.1: population of teachers and students in senior secondary school of Zaria Educational Zone

S/N	Name of the schools	Students	Teaching staff
1.	G.G.S.S kofanGayan, Zaria	1498	68
2.	G.G.S.S Kaura, Zaria	639	34
3.	G.G.S.S Zaria	947	33
4.	G.G.S.S Magajiya, Zaria	520	28
5.	G.G.S.S Pada, Zaria	455	28
6.	Barewa college, Zaria	2535	83
7.	G.G.S.S K/Kuyambana, Zaria.	1693	30
8.	Alhuda-huda College, Zaria	3223	83
9.	G.G.S.S TudunJukun, Zaria	2946	46
10.	G.S.S DaKaci, Zaria	1373	29
11.	G.G.S.S (WTC), Zaria	1291	80
	TOTAL	16220	798

Source: Ministry of Education Inspectorate Division (2013)

3.4 Sample and Sampling Techniques

The use of intact classes was adopted for both controlled and experimental groups for the two schools selected (Barewa College, Zaria and GSS Dakaci, Zaria). Barewa College, Zaria had 190 S.S1 students used as the experimental group while G.S.S Dakaci, Zaria consisted of 145 S.S1 students as controlled group for the study. The two schools were chosen for obvious reasons ranging from availability/use of instructional materials to school locations/ classes; one school was from rural area and the other school from urban area due to the nature of the research design. However, S.S1 students form the sampled classes' category.

3.5 Instrumentation

For the sole purpose of data collection, a researcher designed achievement test was used for this study. This comprised both pretest and post-test. Teaching with instructional materials was only used for the experimental group to ascertain its effect on the students.

The controlled group was not exposed to treatment. Ten lessons were used for both groups.

3.5.1 Achievement Test

A Geography Achievement Test (GAT) was used to collect data on students' scores using selected topics relating to soil, rocks, planet, rainfall, transportation, land farms, earthquake, structure of the earth, erosion, climate, longitude and latitude. An achievement test is a written examination carefully designed in Geography as a teaching subject by the teacher to be undertaken by students to assess their level of knowledge, understanding and comprehension over a given task and at a period of time after using instructional materials for the students. The tests were conducted under the ethics of a normal examination rules and regulation on the selected schools for the students. The total number of the objective questions was forty (40) and two and half (2½) marks were awarded for each, total (100) marks.

3.6 Pilot Study

A pilot study was conducted in G.G.S.S Dogon Bauchi Sabon Gari Local Government of Kaduna State. The pilot test was conducted to test the standardization of the instrument before adopting pre-test and post-test for the study. The entire administration processes was conducted within two (2) weeks. This was because the researcher wanted to use the respondents who would not be part of the actual research work in order not to be conversant with the questions before hand. The reason for this pilot study was to determine the reliability of the instrument, its difficulty level and whether it has power to discriminate over the obtained results. The achievement test was personally administered by the researcher and equally collected and scored for proper corrections before the final draft of the instrument.

3.7 Reliability of the Instrument

Reliability of the instrument was established by the Test re-test method using the Pearson Product Moment Correlation. Forty students were used for the reliability calculation. Consequently, a reliability coefficient of .726 was obtained. This reliability co-efficient was considered adequate for the internal consistency of the instrument. This was a confirmation of test of reliability by Spiegel, (1992) and Stevens, (1996). According to them, an instrument is considered reliable if it lies between 0 and 1, and that the closer the calculated reliability coefficient is to zero, the less reliable is the instrument, and the closer the calculated reliability co-efficient is to 1, the more reliable is the instrument. This therefore confirms the reliability of the data collection instrument used as fit for the main work.

3.8 Validity of the Instrument

The achievement test (pretest and post test) was designed for Geography as a teaching subject by the researcher. It was reviewed by the researcher's supervisors and experts in the field of Curriculum and Instruction, Ahmadu Bello University, Zaria, to ascertain the face and content validity of the instrument in line with the objectives of the study. This is supported by Kerlinger (1973) in Bodunde (2004) that validation of instruments by experts is an effective method of content validity of research instruments. However, necessary corrections and modifications were made based on the advice of experts.

3.9 Procedure for Data Collection

A letter of introduction was collected from the Department of Educational Foundation and Curriculum, Ahmadu Bello University, Zaria to the Inspectorate Unit, Kaduna State Ministry of Education, Zaria to enable the researcher seek for their approval

and permission to visit schools under their jurisdictions. After the letter was delivered to the respective school heads, they provided all necessary assistance required by the researcher. The data collection was carried out by the researcher on the respondents' with the aid of research assistants because of the school and time frame of the study. A total number of 335 Geography Achievement Test (GAT) were administered in the selected schools. In administering the pre-test, both the two groups were given the test while the administration of post-test was done after the teaching session of both the experimental group with instructional material and the controlled group without instructional material. Therefore administration of the pre test and post-test for both experimental and controlled group was done in eight (8) weeks.

3.10 Scoring Methods

In order to gather the needed information for the study, questions designed in the achievement test were subjected to the following scoring formular:

0 – 39 as (F) Fail

40 - 49 as (D) Pass

50 – 59 as (C) Good

59 – 69 as (B) Very Good

70 and above as (A) Excellent

However, the grand total for both the pre-test and post test groups was One hundred (100) marks, each of the results obtained from each group were compared and statistically analyzed.

3.11 Procedure for Data Analysis

The data obtained was subjected to analysis. The test techniques used included descriptive statistics (frequency count and mean) and inferential statistics, like t- test and One way Analysis of Variance (ANOVA). Hypotheses 1 and 2 were tested using t – test to determine whether or not, there exists significant difference between the means of the

independent sample or not at 0.05 alpha level of significance. While hypothesis 3 and 4 was tested using ANOVA since there exists more than two variables contained in it. This was facilitated using a Statistical Package for Social Sciences (SPSS) with the aid of computer soft ware.

The use of independent t-test is born out of the fact that the test variable of post-test and pretest are quantitative while the independent test are factor variable i.e. schools used or accessed were two independent samples location, gender and test group which in each were two independent samples.

CHAPTER FOUR

PRESENTATION, DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter reported the results of data analysis conducted on a study entitled “Effect of the availability and utilization of instructional materials on the academic performance of senior secondary school students in Geography in Kaduna State. Responses of respondents to the research instrument were analyzed to ascertain the differences in their performance covering the pretest and post test scores of those exposed to the teaching using instructional materials and those who were not. Their numerical strength were 190 and 145 for experimental and controlled groups respectively. The first section presents the frequencies and percentage distribution of the bio data variables. The second section answers the research questions while the third analyzed and discussed the research hypotheses at 0.05 level of significance. A summary of the findings were presented. The chapter ended with the discussion of the findings for each hypothesis and research question.

4.2 Analysis of Research Questions

Research Question One: What is the difference in the performance of students’ in pre-test and post-test for experimental group?

Table 4.2.1: descriptive statistic for pre-test and post-test-experimental group

Variables	N	Mean	Std. Deviation	Std. Error Mean
Experimental	190	46.4579	5.99522	.43494
Experimental	190	56.7316	6.66083	.48323

Table4.2.1 revealed that the mean performance of students who were taught with instructional materials- 46.4579 against their counterparts who were not taught using instructional materials- 56.7316 with standard deviation of 5.99522 and 6.66083

respectively. This implies that there are differences in the performance of students as a result of the huge effect of the instructional materials used in teaching them.

Research question two: what is the difference in the performance of the students' in pre-test and post-test for controlled group?

Table 4.2.2: descriptive statistic for pre-test and post-test –controlled group

Variables	N	Mean	Std. Deviation	Std. Error mean
Controlled	145	44.5473	3.9852	.25322
Controlled	145	46.6586	4.64418	.38568

Table 4.2.2 revealed that performance of student's in the pre-test score is 44.5473 against their post-test score 46.6586 with standard deviation of 3.9852 and 4.64418 respectively. This implies there is a slight difference in the pre-test and post-test performance of the students.

Research Question Three: To what extent can the performance of students' in post-test between experimental and controlled groups be compared in relation to the use or non-use of instructional materials in Geography in Kaduna State?

Table 4.2.3: Descriptive statistic for controlled and experimental group

Treatment Groups	N	Mean	Std. Deviation	Std. Error Mean
Control group	145	46.6586	4.64418	.38568
Experimental Group	190	51.5947	5.81496	.42186

Table 4.2.3 revealed that the mean performances in Geography of experimental group and control group. The Control group computed mean performance was 46.6586 while the experimental group computed mean performance was 51.5947 implying that the experimental group students had higher mean performance than the control group as a result of the effect of the treatment.

Research Question Four: At what level (class) would the use of instructional materials in Geography on students be more effective to another in secondary schools of Kaduna State?

Table 4.2.4 descriptive statistic for the level (class) in the use of instructional material will be more effective

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
SSI	75	51.1667	6.05958	.69970	49.7725	52.5608	34.50	64.00
SSII	55	51.6818	5.58218	.75270	50.1727	53.1909	40.50	61.50
SSIII	60	52.0500	5.77010	.74492	50.5594	53.5406	40.50	65.00
Total	190	51.5947	5.81496	.42186	50.7626	52.4269	34.50	65.00

Table 4.2.4 revealed the opinion of students' respondents in Geography across the various classes on where the use of instructional materials would be most effective in teaching the subject. Details however showed that the use of instructional materials becomes more effective at SSIII class since they are almost getting ready for their final examinations and graduation. A close examination of the table indicates varied frequencies of students per class with different mean values, standard deviation and confidence level of acceptance respectively. An average class boundary has depicted above points to the fact that with higher bound of 53.5406 as against those from SSI and SSII of 52.5608 and 53.1909, it therefore confirms that SSIII class is most appropriate for the use of these instructional materials.

4. 3 Testing of Research Hypotheses

This section presents the results of the hypotheses. Altogether, three null- hypotheses were tested using different statistical tools.

4. 3. 1 Null-Hypothesis One

There is no significant difference in the performance of students' in pre-test and post-test for experimental group.

To test this hypothesis, the performance of students exposed to the use of instructional materials (experimental group) compared with those who were not taught

using instructional materials was analyzed using paired t –test to determine if significant difference/improvement exist between the two scores or not.

Table 4.3.1: Paired sample t-test statistics between students’ in pre-test and post-test-experimental group in geography

Variables	N	MEAN	Sd	Std. Er	Df	T-Cal	T-Crit	P (sig)
Experimental (pre-test)	190	46.4579	5.99522	.43494	189	28.119	1.96	0.000
Experimental (post-test)	190	56.7316	6.66083	.48323				

P calculated < 0.05 t calculated > 1.96 at df 189

According to the paired sample statistics table 4.3.1, significant difference exists in the performance of students taught using instructional materials and those who were not taught using instructional materials. This is /due to the fact that the calculated p value of 0.000 is less than the 0.05 alpha level of significance and the calculated t value of 28.119 is higher than the t critical value of 1.96 at df189. Their mean scores were 46.4579 and 56.7316 for those taught with instructional materials and those who were not taught using instructional materials respectively, showing that they had an increased academic performance in Geography after being exposed to the treatment of instructional materials. This implies that significant effect exists in the performance of the students as a result of using instructional materials in Geography Therefore the null hypothesis which states that there is no significant effect of instructional materials on the performance of students in Geography, is hereby rejected.

4.3.2 Null-Hypothesis two

There is no significant differences in performance of students’ in pre-test and post-test for controlled group in geography. To test this hypothesis the performance of the students in controlled group analyzed using paired t-test to determine if significant difference between the two scores or not.

Table 4.3.2: paired sampled t-test statistics between the students' in pre-test and post-test-controlled group

Variable	N	Mean	Std.	Std. error	df.	T-cal	t-crit	p(sig)
Controlled								
(pre-test)	145	38.4456	3.9852	.32544	144	15.561	0.98	.000
Controlled								
(post-test)	145	46.6586	4.64418	.38568				

P calculated < 0.05 t calculated is > 0.98

According to the paired sampled statistic above, there is significant difference exists in performance of the students' in pre-test and post-test due to the fact that the calculated p value of 0.000 is less than the 0.05 alpha level of significance and the calculated t value of 15.561 is higher than the t-critical value of 0.98 at df 144.

4. 3. 3 Null-hypothesis Three

The null hypothesis states that there is no significant difference in the pre-test and post-test performance of students from experimental and controlled groups in relation to the use or non-use of instructional materials on Geography students in Kaduna State. The Independent t-test sample statistics was used to test this hypothesis because the computed test variable of performance is quantitative while the factor variable of groups is divided into experimental and control, hence the appropriateness of Independent t –test statistics tool.

Table 4.3.3: Independent t-test sample statistics on the mean difference of experimental and control group of students in the academic performances in Geography

Variable	Std. t Grps	N	Mean	Sd	Std. Er	df	T-Cal	T-Crit	Sig (p)
<i>Mean performances in Geography</i>	Exp.	190	51.5947	5.81496	.42186				
	Cont.	145	46.6586	4.64418	.38568				
						333	8.382	1.96	0.000

Calculated p < 0.05, calculated t > 1.96 at df 333

The result emanating from the above Independent sample t-statistics showed that significant difference exists between students exposed to instructional materials (experimental group) and their counterparts who were not exposed to the treatment (control group) in their academic performance in Geography. This is due to the fact that the calculated significance (P) value of 0.000 is lower than the 0.05 alpha level of significance while the calculated t value of 8.382 is higher than the 1.96 critical t values at df333. Their calculated mean academic performances were 51.5947 and 46.6586 by all the experimental and control group students respectively, implying that there is a significant effect in their performance as a result of the treatment. Therefore, the null hypothesis which states that there is no significant difference in the performance of students who were exposed to the treatment (experimental) and those that were not exposed to the treatment (control) in Geography, is hereby rejected.

4.3. 4 Null-Hypothesis Four

The null hypothesis states that there is no significant difference in the performance of Geography students among the various levels (classes) in relation to one another using instructional materials in Kaduna State. To test this hypothesis, the mean values of Geography students from the various classes was computed using One way Analysis of Variance (ANOVA) statistics to determine at what level (class) would the use of instructional materials becomes more effective for the students' interest.

Table 4.3.4: One way Analysis of Variance (ANOVA) statistics on the effectiveness of the use of instructional materials on Geography students' in various classes.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	26.596	2	13.298	.391	.677
Within Groups	6364.198	187	34.033		
Total	6390.795	189			

Outcome of the above one way analysis of variance (ANOVA) statistics revealed that significant difference exists on the effectiveness of the use of instructional materials at one class or the other. It is obvious that the calculated F-value of 0.391 is lower than the table value of 2.60 at 0.05 alpha level of significance, while also their computed sum of square for between groups stood at 26.596 and 6364.198 for within groups respectively, implying that there is a significant effect on the performance of students from the various classes. Therefore, the null hypothesis which states that there is no significant difference in the performance of Geography students among the various levels (classes) in relation to one another using instructional materials in Kaduna State is hereby rejected.

4. 4 Summary of Major findings

The following are the major findings of the study:

1. There is significant difference in the performance of the students' in pre-test and post-test score for experimental group.
2. There is a significant difference in the performance of the students' in the pre-test and post-test score for controlled group.
3. There is significant difference in the pre-test and post-test performance of students from experimental and controlled groups in relation to the use or non-use of instructional materials on Geography students.
4. There is significant difference in the performance of Geography students among the various levels (classes) in relation to one another using instructional materials.

4. 5 Discussions of Research Questions

The testing and analysis of research questions were presented, based on this the following discussions were arrived at. The aim is to determine if the research questions raised had been answered or not. In research question one, it was established that a

significant difference exists in the performance of students' taught Geography with instructional materials as against those taught without the use of instructional materials. This perhaps could be attributed to the effect of instructional materials used before the post-test. The essence of this, was to ascertain the worth of the instructional material in teaching and learning process and possibly support its use or otherwise. One is not surprise with the results of this analysis since a science subject of this magnitude cannot be taught in abstract form and anticipates a better result from the student. It is practically not possible. The research question two shows that the controlled group has a little or no difference in pre-test and post-test because they were not exposed to treatment.

On research question three, it is evident that there is a great difference in the performance of those exposed to treatment in the experimental group when compared with their counterparts in the controlled group. This was made manifest in the results obtained from data analysis (see table 4.3.2 for details). It is normal in an ideal situation that students taught using instructional materials should perform better in the subject (Geography) than those who were not taught using the same materials especially when compared from the groups involved. The use of instructional materials provides the teacher with interesting and compelling platforms for conveying information since they motivate learners to learn more.

A close look at research question four presents a tabular analysis undertook in the testing of its hypothesis using one way analysis of variance. Table 4.3.3 examined the opinion of respondents in the various classes on which level would the use of instructional materials be more effective than the other especially in the teaching and learning of Geography. It was observed in the analysis that SSIII class as suggested by the respondents is the appropriate class.

4.6 Discussions on Research Hypotheses

This section discusses the findings of the study in respect of the three hypotheses analysed in the foregoing section.

4.6.1 Hypothesis One

The result of this study revealed significant difference in the performance of students taught Geography with the use of instructional materials and those taught without the use of instructional materials. In the case of the hypothesis, assessment of students' performance in Geography in only one group was focused on. This was with a view to examining if instructional material has an effect or not on academic performance.

Instructional materials are introduced to teaching of Geography to drive home the points been raised by the subject teacher and equally aid students' understanding of what is been taught. Where such are not provided for use or maybe, the subject teacher cannot use such material. It therefore means great effect on its poor use or non-use would be felt.

4.6.2 Hypothesis Two

The result of the hypothesis two shows that as they did not exposed to treatment, the result for the both pre-test and post-test has a slight difference which is still at lower level of performance of the students.

4.6.3 Hypothesis Three

The result showed that students exposed to the use of instructional materials (experimental group) performed better those who were not (controlled group). The post-test scores of students' academic performance in both groups provided the outcome of this analysis.

The reason may simply be attributed to unimpressive performance of the two groups in the pre-test evaluation. Thereafter, treatment was administered solely on the

experimental group and tested. The results however confirmed the importance of the treatment given and the anticipated result.

4.6.4 Hypothesis Four

One of the observations of this analysis indicates that there exists worth-while significant difference in the class at which is more effective to use instructional materials to another. A lot of reasons could be advanced for this difference in opinions raised. Firstly, the mere fact that students were exposed to treatment could spur their preference in the subject no matter how difficult it particularly at the graduation class. Secondly, the personality of subject teacher (Geography) matters a lot as a deciding factor to students' interest in education. Lastly, such variables as environment, method of instruction and appropriate use of instructional materials by the teacher among others could serve as potent factors for the interest of the learners.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the work. This was followed by conclusion, recommendations and suggestions for further studies.

5.2 Summary

This study investigated the effect of the availability and utilization of instructional materials on the academic performance of senior secondary school students in Geography in Kaduna State. The purpose of this study centred on the need to determine the effect or otherwise of the use of instructional materials in the teaching and learning of Geography. Four research questions and hypotheses each were formulated to guide the research work. The theory of Edward Thorndike on instructional materials formed the basis for the research; consequently, both theoretical and empirical studies were extensively reviewed.

The research design employed in this study was Quasi-experimental while the target respondents were teachers and students of two distinct groups- experimental and controlled. The population of this study comprised of all public senior secondary school students selected from among those located in Urban and Rural areas. Out of this, a sample size of three hundred and thirty five (335) respondents was selected from among SSI students for the research work. Sole research instruments adopted in this study to collect relevant data from the respondents was achievement test (pre and post test).

5. The data analysis was done using descriptive and inferential statistics such as t-test and one way analysis of variance to establish the extent to which both the research questions and research hypotheses were being retained or rejected. Therefore, some of the major findings are; there is significant difference in the performance of the students' in

pre-test and post-test score for experimental group. Also there is a significant difference in the performance of the students' in the pre-test and post-test score for controlled group.

5.3 Conclusions

Based on the findings of this study, the following conclusions are made:

1. The use of instructional materials to teach Geography at the senior secondary schools in Kaduna State has an effect on students' performance in the subject.
2. Teaching Geography through the use of instructional materials enhances better students' performance in the subject.
3. Students' taught Geography using instructional materials have a higher level of preference in the subject than those taught without the use of such materials.

5.4 Recommendations

The following recommendations are hereby suggested as a result of the outcome of this study:

1. Teachers of Geography in Kaduna State should endeavour to make use of instructional materials to teach the subject. Where they are not available they should improvise.
2. Government at all levels as well as private schools proprietors should endeavour to provide adequate instructional materials in schools. Furthermore, the curriculum should be designed in such a way that the use of instructional materials is given prominence.
3. School administrators (Principals, Head of Unit) need to ensure proper maintenance and constant use of instructional materials by Geography teachers.

4. Designers of instructional materials need to work closely with publishers so as to produce appropriate materials that would make proper understanding of the concepts in syllabus and textbooks easier.

5.5 Suggestions for further studies

The following suggestions are proposed for further research;

1. This research can be replicated in other states of the country.
2. A research on the availability of instructional materials for teaching other subjects can be undertaken in the nearest future.
3. Research can also investigate the efficiency of the teachers in handling instructional materials in teaching and learning process.

5.6 Implication of the findings

Based on the outcome of this study, the following are the major contributions of the study knowledge:

1. The study empirically established the fact that the use of instructional materials in teaching Geography led to better students' performance in Kaduna state.
2. That the interest and attitude are arising and sustained when adequate, relevant and appropriate instructional materials are used.
3. Failure in the attainment of objectives was mainly due to poor or lack of use of instructional materials.
4. Contribution to the existing body of empirical knowledge in the use of instructional materials in school settings.

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APPENDIX A

STUDENTS' ACHIEVEMENT TEST IN GEOGRAPHY

(PRE-TEST AND POST-TEST)

1. The nearest planet from the sun is
 - a) Mars
 - b) Pluto
 - c) Earth
 - d) Neptune
2. Which of the following is not a proof that the earth is spherical?
 - a) Circulation horizon
 - b) driving poles on a level ground
 - c) Sunrise and sun set
 - d) varying lengths of day and night.
3. Which of these gases is most abundant in the atmosphere?
 - a) Argon
 - b) Oxygen
 - c) Nitrogen
 - d) Hydrogen
4. Rocks which have changed their form due to intense heat or pressure are called.
 - a) Igneous
 - b) Metamorphic
 - c) crystalline
 - d) sedimentary
5. A resistant mass of highland left standing after the surrounding areas have been worn down is called
 - a) Fold Mt.
 - b) Residual Mt
 - c) Block Mt
 - d) Altimeter
6. Earthquake shocks are recorded using an instrument called
 - a) kilometer
 - b) seismograph
 - c) Radar
 - d) Altimeter
7. Which of these pairs of land forms resulted from faulting?
 - a) Zeugen and Rock pedestal
 - b) Block mountain and rift valley
 - c) arch and stack
 - d) water fall and Delta
8. only one of these features is an extrusive land form
 - a) sill
 - b) Lava plateau
 - c) batholith
 - d) dyke
9. Only one of these rocks changes under great heat and pressure into slate
 - a) Clay
 - b) limestone
 - c) basalt
 - d) granite
10. The two planet located between the sun and the earth in the solar system are

- a) Mercury and Mars b) Mercury and Venus
- c) Venus and Neptune d) Mercury and Neptune
11. An example of organically formed sedimentary rock is
- a) Clay b) peat c) shale d) silt
12. The barysphere is rich in
- a) Silica and magnesium b) iron and nickel
- c) Iron and magnesium d) iron only
13. Which of these layers of the earth has the lowest temperature
- a) Stratosphere b) mesosphere c) troposphere d) thermosphere
14. The part of sial consisting of water and plant life are called
- a) Sial and mesosphere b) Hydrosphere
- c) Hydrosphere and biosphere d) Sima and hydrosphere
15. Only one of these planets has 2 satellites
- a) Pluto b) Earth c) Neptune d) mars
- 16) An eclipse of the moon occurs when the earth
- a) Revolves round the sun b) Comes in between the moon and the sun
- c) Rotates on its axis d) Comes in between the moon and the stars
17. Which of the following is responsible for the formation of block mountains?
- a) Folding b) Faulting c) Deposition d) Sedimentation
18. The saucer – shaped igneous intrusion that solidify on the bedding planes is called
- a) Batholiths b) Laccoliths c) Lopoliths d) Sill
19. The breaking off of surface layers of large boulders in mechanical weathering is called
- a) Deflation b) Exfoliation c) Frost action d) Hydraulic action
20. Only one of these is a process of river transportation

a) Corrosion b) Traction c) Erosion d) Hydraulic action

21. When folding is so severe that two limbs of the fold dip in the same direction, the fold is called

a) Over fold b) Recumbent fold c) Over thrust fold d) Asymmetric fold

22. The bend at which the head waters of a weaker river is diverted into a stronger river is called

a) Wind gap b) Differed junction
c) Elbow of capture d) Asymmetric

23. Caldera lakes result from the action of

a) Weathering b) Vulcanicity c) Earthquake d) Relief fault

24. A downward growing pinnacle of slender rock is called

a) Cave b) Pillar c) Stalactite d) Stalagmite

25. Which of these can be described as a great circle?

a) Tropic of cancer b) Equator
c) Artic circle d) Tropic of Capricorn

26. Which of these fold mountains is in Africa?

a) Atlas b) Alps c) Artic circle d) Tropic of Capricorn

27. Only one of these is not a process of chemical weathering

a) Oxidation b) Hydration c) Attrition d) Carbonation

28. Sea tides are caused mainly by the influence of

a) Star b) sun c) Earth's rotation d) Asteroids

29. A major feature found in a river in its youthful stage is

a. Delta b) Flood plain c) Waterfall d) Meander

30. One of the features of a fold mountain is

a. Graben b) Dyke c) Anticline d) Horst

31. Which of these is not a form of mass movement?
- a) Land slide b) Rockslides c) Earthquake d) Talus creep
32. The part of the lithosphere which forms the ocean floor is called
- a) Nikel b) Nife c) Sial d) Sima
33. Which of these is true of sedimentary rocks?
- a) Crystal line in nature b) Basaltic in nature
- c) Laid down in strata d) High resistance to erosion.
34. Which of these land forms is not produced by faulting?
- a) Fault scarp b) Rift valley c) Horst d) Lopolith
35. The earth rotates on its axis in
- a) Circular b) Horizontal c) Anti-clockwise d) Clockwise
36. Rock texture refers to the
- a) Colors of its mineral grains b) Weight of its mineral grains
- b) Sizes of its mineral grains d) Concentration of its mineral grains
37. A good example of calcareous rock is
- a) Lignite b) Limestone c) Peat d) Dolomite
38. The sun is vertically overhead at the equators on
- a) 21st March and 21st June b) 21st March and 21st September
- c) 21st June and 21st September d) 21st September and 21st December.
39. The dry, cold and dusty air mass experienced in West Africa between November and March
- a) INTER-tropical front b) Tropical maritime air mass
- c) Tropical continental air mass d) Equatorial maritime air mass
40. The mean atmospheric conditions of an area over a considerable time is known as
- a) Weather b) Climate c) Lapse rate d) Atmospheric pressure

41. Wall – like features formed when masses of solidified magma cut across bedding planes are called

- a) Sills b) Laccoliths c) Dykes d) Batholiths

42 The process when iron in ferrous state changes into ferric state by addition of oxygen is called

- a) Oxidation b) Hydrolysis c) Carbonation d) Solution

43. Only one of these is not a slow movement type

- a) Rock slump b) Talus creep c) soil creep d) Solidification

44. The primary work of rivers at the upper course of rivers is

- a) Deposition b) Solution c) Erosion d) Suspension

45. Which of these features is/are not produced at the upper course of rivers

- a) Gorges b) Water falls and rapids c) Cataracts and pot-holes
d) Deltas & estuaries.

46. All these are delta except

- a) Senegal B) Nile c) Niger d) Ganges

47. The dry zone between the elbow of capture and Misfit River is called

- a) Wind gap b) Master stream c) Elbow of capture d) Bay

48. Calculate the local time in New York longitude $75^{\circ}W$ when it is 9:00 am

In Zaria, longitude $15^{\circ}E$

- a) 4:00 am b) 4: 00 pm c) 3:00 am d) 3:00 pm

49 Calculate the distance of a town from the equator if it is located on longitude $15^{\circ}E$ and on latitude $14^{\circ}N$

- a) 1232km b) 1554km c) 1665km d) 1665m

50. The local number of time zones in the world are:

- a) 12 b) 10 c) 24 d) 14

APPENDIX B

PILOT STUDY ANALYSIS

Reliability

Availability and Utilization of Instructional materials on the Academic Performances of Senior Secondary School Student in Geography in Kaduna State.

Students Achievement test

Raw scores of the two sets of tests for determining the coefficient of reliability of the test instrument

S/NO	X	Y	X ²	Y ²	XY
1	62	63	3844	3969	3906
2	70	69	4900	4761	4830
3	51	52	2601	2704	2652
4	63	64	3969	4096	4032
5	63	62	3969	3844	3906
6	43	44	1849	1936	1892
7	46	47	2116	2209	2162
8	39	40	1521	1600	1560
9	52	56	2704	3136	2912
10	62	60	3844	3600	3720
11	33	35	1089	1225	1155
12	61	60	3721	3600	3660
13	63	63	3969	3969	3969
14	50	52	2500	2704	2600
15	42	42	1764	1764	1764
16	40	41	1600	1681	1640
17	41	39	1681	1521	1599
18	68	69	4624	4761	4692
19	63	63	3969	3969	3969
20	65	68	4225	4624	4420
21	46	45	2116	2025	2070
22	51	50	2601	2500	2550
23	52	50	2704	2500	2600
24	51	52	2601	2704	2652
25	57	53	3249	2809	3021
26	44	42	1936	1764	1848
27	58	57	3364	3249	3306
28	63	63	3969	3969	3969
29	59	58	3481	3364	3422
30	46	42	2116	1764	1932
31	41	42	1681	1764	1722
32	44	45	1936	2025	1980

33	68	65	4624	4225	4420
34	46	47	2116	2209	2162
35	65	66	4225	4356	4290
36	66	67	4356	4489	4422
37	61	60	3721	3600	3660
38	72	72	5184	5184	5184
39	40	41	1600	1681	1640
40	41	40	1681	1600	1640
			$\sum X^2=119720$	$\sum Y^2=119454$	$\sum XY=119530$
N=40	$\sum X=2148$	$\sum Y=2146$			

Note: x and y are first and second tests scores for students

(Statistics for finding reliability)

Pearson Product Moment Correlation computed for the Reliability index for the instrument used in the pilot study of the research.

The formula for Pearson Product Moment Correlation is given below:

$$R = \frac{N(\sum xy) - (\sum x)(\sum y)}{\sqrt{((N(\sum X^2) - (\sum X)^2)(N(\sum Y^2) - (\sum Y)^2))}}$$

N=Number of respondents

X is test scores at first administration

Y is test scores at second administration

$\sum x$ is scores at first administration is summed

$\sum y$ is scores at second administration is summed

$\sum x^2$ is scores at first administration is squared and summed

$\sum Y^2$ is scores at second administration is squared and summed

$(\sum x)^2$ is scores at first administration is summed and squared

$(\sum Y)^2$ is scores at second administration is summed and squared

Where

			$\sum X^2=119720$	$\sum Y^2=119454$	$\sum XY =119530$
N=40	$\sum X=2148$	$\sum Y=2146$			

Pearson Product Moment Correlation formula is:

$$r = \frac{N(\sum xy) - \sum(x) \sum Y}{\sqrt{((N(\sum X^2) - (\sum X)^2)(N(\sum Y^2) - (\sum Y)^2))}}$$
$$= \frac{40*119530 - 2147*2146}{\sqrt{40*(119720)^2 - 40*119454 - (119454)^2}}$$
$$=.726$$

r=.73

APPENDIX C

LESSON PLAN FOR EXPERIMENTAL GROUP

Name of Teacher:	Idris Alimi
Name of School:	G.S.S Dakaci, Zaria
No. of the Students:	70
Sex:	Male and Female
Subject:	Geography
Topic:	Structure of the Earth
Duration:	45mins.
Date:	
Instructional Materials:	Wet Mounting & Diorama
Teaching Skills:	Use of instructional materials
Behavioural Objectives:	At the end of the lesson students should be able to: <ol style="list-style-type: none">1. Define the outer structure of earth2. Identify the outer structure of the earth3. Sketch the outer structure of the earth4. Appreciate the beauty of the structure of the earth
Previous Knowledge:	The students have been taught the calculation of latitude and longitude
Introduction:	The teacher introduces the lesson by asking the students question based on the previous lesson or topic i.e. what are the differences between latitude and longitude?

Presentation:	The teacher presents the lesson by defining the structure of the earth as been grouped into two zones. These are the outer structure and the internal structure.
Step 1:	<p>The teacher teaches them the outer structure of earth, which is made up of four zones. These zones or layers are:</p> <ol style="list-style-type: none"> <li data-bbox="810 712 1023 741">i. Lithosphere <li data-bbox="810 786 1038 815">ii. Hydrosphere <li data-bbox="810 860 1082 889">iii. Atmosphere and <li data-bbox="810 934 1002 963">iv. Biosphere
Step II:	The teacher teaches them importance of each zones or layers
Step III:	The teacher teaches them characteristics of each zones or layers
Step IV:	The teacher teaches them interaction within and between the four (4) zones
Evaluation	<p>The teacher evaluates by going over the topic and allow the students to ask questions and ask them to:</p> <ol style="list-style-type: none"> <li data-bbox="810 1659 1406 1762">a. Name the zones in the outer structure of the earth <li data-bbox="810 1807 1406 1910">b. Briefly discuss importance of one of the zones etc.
Conclusion	The teacher concludes the lesson by

giving the students note to copy in their note
books

2ND LESSON PLAN

Name of Teacher:	IdrisAlimi
Name of School:	G. S.S. Dakaci, Zaria
No. of the Students:	70
Sex:	Male and Female
Subject:	Geography
Topic:	Internal Structure of the Earth
Duration:	45mins.
Date:	
Instructional Materials:	Opaque Projector & Models
Teaching Skills:	Use of Instructional Materials
Behavioural Objectives:	At the end of the lesson, students are expected to be able to: <ol style="list-style-type: none">1. Define the internal structure of the earth2. Draw the internal structure of the earth3. Identify the internal structure of the earth4. Differentiate between the outer structure and inner structure of the earth.
Previous Knowledge:	The students have been taught outer structure of the earth
Introduction	The teacher introduces the lesson by reversing the previous topic for the students i.e. the outer structure of the earth
Presentation	The teacher presents the lesson by defining

the internal or inner structure of the earth been made up of three (3) concentric layers.

Step 1

The teacher teaches them the concentric layers of inner structures of the earth, they are three:

- i. Crust (Lithosphere)
- ii. Mantle (Mesosphere)
- iii. Core (Barysphere)

Step II

The teacher teaches them the characteristics of each concentric layers of the internal or inner structure of the earth

Evaluation

The teacher evaluates the lesson by going over the lesson and allow the students to ask some questions.

Conclusion

The teacher concludes the lesson by giving them note to copy

3RD LESSON PLAN

Name of Teacher:	IdrisAlimi
Name of School:	G.S.S Dakaci, Zaria
No. of the Students:	70
Sex:	Male and Female
Subject:	Geography
Topic:	Types of Rocks
Duration:	45mins.
Date:	
Instructional Materials:	Charts &Realia
Teaching Skills:	Use of Instructional Materials
Behavioural Objectives:	At the end of the lesson students should be able to: <ol style="list-style-type: none">1. Define types of rock2. Draw the structure of the rocks types3. Economic important of the rock to man.4. Appreciate the beauty of the rocks types
Previous Knowledge:	The students have been taught structure of the earth
Introduction:	The teacher introduces the lesson by going over the previous topic inner or internal structure of the earth
Presentation:	The teacher presents the lesson by defining rock as any mineral material, it may be a combination of different mineral

elements such as silica which contains silicon and oxygen

Step I: The teacher teaches the students different type of rock e.g. igneous rock, sedimentary rocks and metamorphic rocks.

Step II: The teacher teaches students types of igneous rocks i.e.:

- i. Plutonic (intrusive) igneous rocks
- ii. Volcanic (extrusive) igneous rocks

Step III: The teacher teaches the students types of sedimentary rocks i.e.:

- i. Mechanically formed sedimentary rocks
- ii. Organically formed sedimentary rocks
- iii. Chemical formed sedimentary rocks and importance of sedimentary rocks to man

Step IV: The teacher teaches the students characteristics of metamorphic rocks, mode of formation and difference between sedimentary and metamorphic rocks.

Step V: The teacher teaches the students, the economic importance of rocks to man

Evaluation: The teacher evaluates the lesson by

going over the topic and give the students
note to copy.

Conclusion

The teacher concludes the lesson by
allowing the students to ask questions base
on the topic taught.

APPENDIX D

LESSON PLAN FOR CONTROL GROUP

Name of Teacher:	IdrisAlimi
Name of School:	G.S.S Dakaci, Zaria
No. of the Students:	70
Sex:	Male and Female
Subject:	Geography
Topic:	Structure of the Earth
Duration:	45mins.
Date:	
Instructional Materials:	None
Teaching Skills:	Conventional Talk and Chalk
Behavioural Objectives:	At the end of the lesson students should be able to: 5. Define the outer structure of earth 6. Identify the outer structure of the earth 7. Sketch the outer structure of the earth 8. Appreciate the beauty structure of the earth
Previous Knowledge:	The students have been taught the calculation of latitude and longitude
Introduction:	The teacher introduces the lesson by going over the previous lesson or topic i.e. calculation of latitude and longitude
Presentation:	The teacher presents the lesson by

defining the structure of the earth as been grouped into two zones. These are the outer structure and the internal structure.

Step I:

The teacher teaches them the outer structure of earth, which is made up of four zones. These zones or layers are:

- v. Lithosphere
- vi. Hydrosphere
- vii. Atmosphere and
- viii. Biosphere

Step II:

The teacher teaches them important of each zones or layers

Step III:

The teacher teaches them characteristic of each zones or layers

Step IV:

The teacher teaches them, interaction within and between the four (4) zones

Evaluation

The teacher evaluates the lesson by asking the students the following questions the topics and allow the student to ask question and ask them to:

- a. Name the zones in the outer structure of the earth
- b. Briefly discuss importance of one of the zones etc.

Conclusion

The teacher concludes the lesson by

giving the students note to copy in their note
books

2ND LESSON PLAN

Name of Teacher:	IdrisAlimi
Name of School:	G.S.S. Dakaci, Zaria
No. of the Student:	70
Sex:	Male and Female
Subject:	Geography
Topic:	Internal Structure of the Earth
Duration:	45mins.
Date:	
Instructional Materials:	None
Teaching Skills:	Conventional Talk and Chalk
Behavioural Objectives:	At the end of the lesson, students should be able to: <ol style="list-style-type: none">1. Define the internal structure of the earth2. Draw the internal structure of the earth3. Identify the internal structure of the earth4. Differentiate between the outer structure and inner structure of the earth.
Previous Knowledge:	The student have been taught outer structure of the earth
Introduction	The teacher introduces the lesson by reversing the previous topic for the students i.e. the outer structure of the earth
Presentation	This teacher presents the lesson by defining

the internal or inner structure of the earth been made up of three (3) concentric layers.

Step 1

The teacher teaches them the concentric layers of inner structures of the earth, they are three:

- iv. Crust (Lithosphere)
- v. Mantle (Mesosphere)
- vi. Core (Barysphere)

Step II

The teacher teaches them the characteristics of each concentric layers of the internal or inner structure of the earth

Evaluation

The teacher evaluates the lesson by going over the lesson and allow the student to ask some question.

Conclusion

The teacher concludes the lesson by giving them note to copy.

3RD LESSON PLAN

Name of Teacher:	IdrisAlimi
Name of School:	G.S.S Dakaci, Zaria
No. of the Students:	70
Sex:	Male and Female
Subject:	Geography
Topic:	Types of Rocks
Duration:	45min.
Date:	
Instructional Materials:	None
Teaching Skills:	Conventional Talk and Chalk
Behavioural Objectives:	At the end of the lesson, students should be able to: <ol style="list-style-type: none">1. Define types of rock2. Draw the structure of the rocks types3. Economic important of the rock to man.4. Appreciate the beauty of the rocks types
Previous Knowledge:	The students have been taught structure of the earth
Introduction:	The teacher introduces the lesson by going over the previous topic inner or internal structure of the earth
Presentation:	The teacher presents the lesson by defining rock as any mineral material, it may be a combination of different mineral

elements such as silica which contains silicon and oxygen

Step I: The teacher teaches the students different type of rock e.g. igneous rock, sedimentary rocks and metamorphic rocks.

Step II: The teacher teaches students types of igneous rocks i.e.:

- iii. Plutonic (intrusive) igneous rocks
- iv. Volcanic (extrusive) igneous rocks

Step III: The teacher teaches the students types of sedimentary rocks i.e.:

- iv. Mechanically formed sedimentary rocks
- v. Organically formed sedimentary rocks
- vi. Chemical formed sedimentary rocks and importance of sedimentary rocks to man

Step IV: The teacher teaches the students characteristics of metamorphic rocks, mode of formation and difference between sedimentary and metamorphic rocks.

Step V: The teacher teaches the students, the economic importance of rocks to man

Evaluation: The teacher evaluates the lesson by

going over the topic and give the students
note to copy.

Conclusion

The teacher concludes the lesson by
allowing the students to ask questions
base on the topic taught.

APPENDIX E
RAW SCORES FOR THE STUDENTS PERFORMANCE

s/no	Exp pre	Exp post	Control Pre	Control post
1	50	57	45	52
2	40	58	40	56
3	42	50	42	41
4	55	50	50	50
5	41	60	41	46
6	50	58	24	47
7	41	50	50	49
8	24	45	46	48
9	52	70	49	52
10	55	67	45	49
11	50	69	41	40
12	49	53	32	41
13	46	50	51	46
14	45	52	48	50
15	50	67	51	40
16	47	50	49	40
17	44	52	44	46
18	56	67	43	45
19	42	50	52	50
20	45	53	42	50
21	50	71	39	40
22	46	52	48	55
23	46	54	40	29
24	54	59	55	50
25	60	70	47	53
26	50	69	50	50
27	55	60	43	46
28	44	50	54	59
29	49	55	42	51
30	40	50	52	54
31	54	59	40	45
32	41	50	39	40
33	47	55	50	41
34	60	68	46	24
35	46	50	38	51
36	41	52	47	45
37	31	50	50	44
38	50	65	48	55
39	51	59	46	53
40	41	50	50	55

s/no	Exp pre	Exp post	Control Pre	Control post
41	40	50	45	44
42	50	60	46	47
43	40	50	44	49
44	46	52	40	41
45	46	55	50	52
46	58	70	45	51
47	45	55	50	46
48	46	57	52	48
49	45	55	50	50
50	50	65	46	41
51	54	67	54	51
52	50	68	48	56
53	54	62	50	46
54	55	57	46	49
55	42	52	50	54
56	47	54	32	42
57	58	65	46	50
58	47	54	23	48
59	32	51	43	50
60	50	58	45	56
61	50	52	59	56
62	40	52	48	50
63	50	60	40	42
64	41	52	49	50
65	44	50	50	52
66	51	57	42	49
67	52	60	44	51
68	45	55	43	56
69	50	60	50	46
70	52	60	47	50
71	53	52	51	50
72	50	65	40	49
73	39	50	42	54
74	42	52	50	50
75	45	60	42	35
76	50	65	40	41
77	51	69	55	40
78	48	57	40	40
79	46	58	51	50
80	49	57	56	54

s/no	Exp pre	Exp post	Control Pre	Control post
81	51	65	48	39
82	41	54	50	41
83	44	56	56	40
84	42	52	52	46
85	50	60	52	50
86	45	50	41	52
87	50	65	50	47
88	43	52	49	50
89	42	51	41	43
90	51	60	50	51
91	52	68	50	40
92	53	53	56	48
93	46	50	35	40
94	47	50	43	45
95	48	54	42	44
96	43	52	49	50
97	50	62	50	51
98	44	55	48	49
99	41	50	50	47
100	50	65	54	50
101	54	67	50	49
102	43	53	57	50
103	50	69	39	51
104	45	50	45	50
105	50	69	40	52
106	43	53	42	48
107	41	50	43	50
108	42	51	44	43
109	45	52	50	50
110	42	57	48	50
111	49	55	57	45
112	41	50	53	43
113	50	61	56	50
114	24	45	52	45
115	50	64	54	50
116	46	54	29	45
117	49	50	40	49
118	50	56	42	50
119	45	50	46	54
120	51	57	50	44

s/no	Exp pre	Exp post	Control Pre	Control post
121	47	52	41	52
122	44	50	44	49
123	42	51	51	46
124	49	55	41	50
125	46	50	50	45
126	48	52	18	40
127	50	65	41	44
128	41	54	51	45
129	31	50	48	44
130	51	61	45	50
131	41	56	42	55
132	40	50	40	48
133	50	65	28	47
134	40	52	45	50
135	46	54	42	46
136	58	70	51	49
137	45	54	45	50
138	47	50	40	52
139	41	54	42	42
140	31	50	49	44
141	39	49	34	45
142	42	52	40	50
143	45	55	44	52
144	50	65	46	54
145	52	59	50	53
146	41	50		
147	50	61		
148	40	50		
149	46	52		
150	49	54		
151	45	52		
152	54	64		
153	42	52		
154	50	62		
155	54	69		
156	41	51		
157	54	64		
158	43	52		
159	50	69		
160	53	67		

s/no	Exp pre	Exp post	Control Pre	Control post
161	55	60		
162	40	50		
163	45	55		
164	39	49		
165	29	70		
166	45	52		
167	50	68		
168	44	54		
169	55	65		
170	54	68		
171	42	52		
172	47	57		
173	48	53		
174	46	54		
175	50	64		
176	41	52		
177	51	63		
178	43	53		
179	50	60		
180	45	54		
181	41	50		
182	50	66		
183	31	40		
184	40	51		
185	54	65		
186	45	55		
187	50	62		
188	46	55		
189	47	56		
190	50	69		

APPENDIX F

RESULTS OF THE TREATMENT OF HYPOTHESES USING OPINION

RESPONSES OF RESPONDENTS

Hypotheses	Statistical techniques used	df	Decisions
1	Paired T-test	189	Rejected
2	Independent T-test	333	Rejected
3	Independent T-test	333	Rejected