



**IMPACT OF INSTRUCTIONAL VIDEOS AND INFOGRAPHICS ON ACADEMIC PERFORMANCE IN PHYSICAL GEOGRAPHY AMONG SENIOR SECONDARY SCHOOL STUDENTS IN KATSINA STATE, NIGERIA**

**By**

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**Abstract**

The study investigated the Impact of Instructional Videos and Infographics on Academic Performance in Physical Geography among Senior Secondary School Students in Katsina State, Nigeria. Two research objectives, two research questions and two tested hypotheses were formulated. The study used quasi experimental and control group design involving pre and posttests. The target population for the study covered 4,211 senior secondary year II students in the study area. A total number of 149 students from three intact classes of SS II were selected and used as sample of the study. Two schools were selected as the experimental groups, while the other one served as the control group. One validated instrument with reliability coefficients of 0.67 namely Geography Performance Test were used for data collection. Hypotheses were tested using ANOVA, and ANCOVA. Findings revealed that significant difference exist in the Mean Academic Performance Scores of students taught Physical Geography using Instructional Videos and Infographics and those taught using lecture method in favour of experimental groups. Findings revealed that significant difference exist between the Mean Academic Performance Scores of male and female students taught Geography using same strategies which implies that the strategies are gender bias. Based on the findings, the study recommended that using Instructional Videos and Infographics in teaching Physical geography in Secondary Schools should be encouraged by State Ministries of Education through training of teachers inform of seminars, workshops and adequate monitoring on how to use Instructional Videos and Infographics in teaching Sciences.

**Key words:** Instructional Videos, Infographics, Academic Performance.

## **Introduction**

Geography is the study of location and distribution of phenomena and natural resources on the earth's features (Salisu, 2021). In essence, Geography is concerned with the location, spatial and distribution of living and non-living things patterns and relations, regional characteristics of these elements on human life and settlement, the forces that change the earth's features and processes, preparation of thematic maps for planning and development, analyses of satellite images for various purposes.

Lacy (2021) stated that any basic understanding of Geography always starts with the study of Physical Geography. Physical Geography focuses on the Earth in the Solar System, The Earth's physical Systems like atmosphere, biosphere and geospheres, Land forms and processes, working of various ecosystems, their relationship with one another. It is an integrated study of the Earth's visible natural environment and understanding the characteristics of land, water and climate, geomorphology, Land forms of various locations, landscapes, Movement of continents and plate tectonics.

According to Stanley (2020), A landform is a feature on the Earth's surface that is part of the terrain. Mountains, hills, plateaus, and plains are the four major types of landforms. Minor landforms include buttes, canyons, valleys, and basins. Tectonic plate movement under the Earth can create landforms by pushing up mountains and hills. Erosion by water and wind can wear down land and create landforms like valleys and canyons. Both processes happen over a long period of time, sometimes millions of years. Landforms can exist under water in the form of mountain ranges and basins under the sea. The Mariana Trench, the deepest landform on Earth, is in the South Pacific Ocean.

According to Moya (2020), teaching method is a mode of organization of the instruction Content, materials and the manner of presentation to the learners. There are number of methods which are available for the teacher's use in teaching science these are classified under two groups; traditional and contemporary methods. The traditional method popularly known as teacher-Centered method is where the teacher dominates the teaching and learning process. Examples, lecture method, demonstration methods and descriptive method among others. Contemporary teaching method are referred to as learners centered method, Here students are actively participate and involved in knowledge generation. Examples are laboratory methods, computer based approach concept and cooperative learning among others, (Ada, 2016). Since geography is an interdisciplinary subject, the way it is taught is supposed to be holistic. The method of teaching and evaluation needs to adequately involve students and secondary schools should contribute to the achievement of intended outcome (Mgona, 2018) and also suggests that teaching geography in recent day need to involve new approach, most of the secondary schools however do not offer these new approaches. The use of new approaches in teaching and learning geography is significant in transforming and enabling the students to understand the subject matter. The use of video content in teaching and learning geography offers new approach of learning geography which is learner centered instruction meaning that learners control the pace of learning activities in the classroom or even outside.

Videos are one of the most frequently used media in classrooms. Instructional videos are considered to be powerful learning tools in comparison to static representation because they can present visual and auditory information at the same time (Hong, Pi & Yang, 2018). Instructional videos may induce higher levels of cognitive load because students have to continuously integrate incoming information with previous information that also needs to be maintained in working memory (Van der Meij, 2017). Therefore, it is important that the learner engages in adequate information processing while watching the instructional video (Merkt, Weigand, Heier, & Schwan,

2020). When instructional videos are aligned with the working of the human mind, better learning outcomes are expected (Mayer & Mayer, 2017).

According to Cameron, Cam and Lorie (2021), Infographics is the most distinctively geographical materials and constitute visual images as form of communication which includes a pictorial representation of data, photographs, drawings, graphs, diagrams, topography etc.

Moya (2020) opined that academic performance of students is a key feature in education. It is considered to be the centre around which the whole education system revolves. Similarly, Anthony (2018) asserted that students' academic performance serve as a bedrock for knowledge acquisition and the development of skills. Additionally they emphasized that the top most priority of all educators is academic performance of students. Academic performance is the knowledge gained which is assessed by marks by a teacher and/or educational goals set by students and teachers to be achieved over a specific period of time. They added that these goals are measured by using continuous assessment or examinations results.

Ibe (2019) define poor academic performance as the attainment that is adjudged by the examinee and some other significant as falling below an expected standard function of poor method of teaching. Student's performance in physical Geography like landform concepts has declined in recent years. WAEC chief examiner reported that candidates who sat for the 2020 and 2021 WASSCE have limited knowledge in Physical Geography and inability to define terms in Geography (WAEC, 2020 & 2021).

Gender has remained a debating issue and has also remained relevant in education because it has been linked to performance and participation in certain profession. Evidence from research findings indicate gender gap achievement in favor of males (Moya, 2020), & Silas, 2016), while some revealed that gender is not a factor in teaching and learning (Amosa, 2020). This generated

a gap and justifies the need to determine the extend gender as a variable influenced students performance in the study.

### **Statement of the Problem**

Geography as an academic discipline is one among the most important subjects in any environment, as it facilitates learning and understanding of how the world's basic physical systems work and affect our everyday life. Due to the vast significance of geography, the researcher is intended to investigate the impact of instructional videos and Infographics on academic performance in physical geography among senior secondary school students in Katsina State, Nigeria, as to improve the quality teaching and learning of the subject.

In recent times, poor performance of students in physical Geography more especially in landforms concepts at senior secondary school final examinations WAEC and NECO, has generated much concerns to science educators (Ajibade, 2019).

In any teaching and learning process, the cardinal objective is to see the learners being able to construct knowledge using their senses to select, organize and integrate information provided to them using instructional videos and info-graphics. However, in schools, empirical evidences shows that Geography more especially landforms concepts were taught using lecture method with little or no instructional materials in Dutsin-ma Zonal Education Quality Assurance, Katsina State Nigeria. This makes learning of Geography more especially landforms concepts by memorization, which results in poor comprehension by the students.

### **Objectives of the Study**

The objectives of this study are to:

1. examine the impact of instructional videos and Infographics on Academic Performance in Geography among Senior Secondary school students of Dutsin-ma Zonal Education Quality Assurance, Katsina State, Nigeria.

2. examine the impact of instructional videos and Infographics on Academic Performance of male and female Geography Students of Senior Secondary schools in Dutsin-ma Zonal Education Quality Assurance, Katsina State, Nigeria.

### **Research Questions**

The research questions of this study are:

1. What is the difference between the mean academic performance scores of Students taught Geography using instructional videos and Infographics and those taught using lecture method in senior secondary Schools of Dutsin-ma zonal Education Quality Assurance, Katsina State, Nigeria?
2. What is the difference between the mean academic performance scores of male and female Students taught Geography using instructional videos and those taught using Infographics in senior secondary Schools of Dutsin-ma zonal Education Quality Assurance, Katsina State, Nigeria?

### **Research Hypotheses**

In this study, the following null hypotheses were formulated which will be tested at 0.05 level of significance:

**H<sub>01</sub>:** There is no significant difference between the mean academic performance scores of Students taught Geography using instructional videos and Infographics and those taught using lecture method in senior secondary Schools of Dutsin-ma zonal Education Quality Assurance.

**H<sub>02</sub>:** There is no significant difference between the mean academic performance scores of male and female Students taught Geography using instructional videos and those taught using Infographics in senior secondary Schools of Dutsin-ma zonal Education Quality Assurance.

## **Methodology**

The study employed a quasi-experimental control group design involving pre-test and post-test for both the experimental and control groups.

The population for this study consists of all Senior Secondary year two (SSII) students offering Geography in Dutsin-ma Zonal Education Quality Assurance. There are sixteen (16) senior secondary schools in Dutsin-ma Zonal Education Quality Assurance. All the schools are offering Geography. The schools have a total population of four thousand two hundred and eleven (4,211) Geography students consisting of one thousand nine hundred and ninety (1,990) male students and two thousand two hundred and twenty one (2,221) female students.

The sample of this study consisted of a total number of 151 SSII students selected from three public senior secondary schools offering Geography in the study area. Out of this number, 85 are males and the remaining 66 are females. Initially, the schools were selected using purposive sampling technique in consideration of the gender (male and female students) and subsequently employed simple random sampling and assigned to experimental and control groups. An intact class of SSII were used from each school.

The study utilize one instrument Geography Performance Test (GPT). The GPT instrument consists of forty (40) items test adapted from West African Senior School Certificate Examination (WASSCE) conducted by the West African Examination Council (WAEC) from 2017 to 2021. All the 40 questions adapted for this instrument are objective (multiple choice) items in Physical Geography with four options (A-D) out of which only one option is correct for each of the items. The items are based on the topics selected from SS II Geography syllabus relating to landform concepts.

Geography Performance Test (GPT) instrument was validated by two lecturers from Geography department, Umaru Musa Yar'adua University, Katsina. The instruments were pilot tested at

GDSS Tamawa. An intact class with total number of fifty four (54) SSII Geography Students was used for pilot testing the instruments. The Students were tested twice with an interval of two weeks using test-retest method. The scores obtained were analyzed using Pearson Product Moment Correlation (PPMC) were the common inter-item correlation coefficient  $r$  is obtained at 0.67 indicating that the instruments has consistency of the items, thus the instruments is said to be reliable for this study.

## Result

**Ho<sub>1</sub>. There is no significant difference between the Mean Academic Performance Scores of Students taught Geography using Instructional Videos and Infographics and those taught using Lecture Method.**

**Table 1: ANOVA of Performance Scores of the Subject in the Experimental and Control Groups**

Grouping	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	593.73	2	296.86	34.98	0.01
Within Groups	1239.05	146	8.487		
<b>Total</b>	<b>1832.79</b>	<b>148</b>			

Table 1 presents ANOVA of significant difference between the mean performance scores of geography students taught landform concepts using instructional videos, Infographics and those taught the same concept using lecture method. From the result, sum of squares between groups is 593.73, sum of squares within groups is 1239.05. F-Value recorded is 34.98 and p-value obtained is 0.01. The P-Value is less than alpha value of 0.05, hence there is significant difference. Consequently, null hypothesis which stated that there is no significant difference between the Mean Academic Performance Scores of Students taught Geography using Instructional Videos and Info-graphics and those taught using Lecture Method is rejected. To determine the direction of disparity, the researcher run post-Hoc test using sheffer and the result is presented in Table 2.



**Table 2: sheffer's posthoc test of Direction of Difference among Groups**

(I) grouping	(J) grouping	Mean Difference (I-J)	Std. Error	Sig. <sup>a</sup>	Remark
Instructional Videos	Graphics	1.57091*	.60313	.04	*Sig.
	Lecture Method	4.64955*	.56631	.00	*Sig.
Graphics	Instructional Videos	-1.57091*	.60313	.04	*Sig.
	Lecture Method	3.07865*	.59302	.00	*Sig.
Lecture Method	Instructional Videos	-4.64955*	.56631	.00	*Sig.
	Graphics	-3.07865*	.59302	.00	*Sig.

Table 2 presented sheffer's posthoc test of Direction of Difference among Groups. Result revealed significant difference between geography students taught landform concepts using instructional videos and those taught same concept using Infographics at  $P=0.04 < 0.05$ . Significant difference also exist between the experimental groups and control group at  $P=0.00 < 0.05$ .

**Ho<sub>2</sub>. There is no significant difference between the Mean Academic Performance Scores of Male and Female Students taught Geography using Instructional Videos and those taught using Infographics**

**3: Results of ANCOVA of Performance Scores of the Subject between Male and Female Experimental Groups**

Source	Type Sum Squares	III of Df	Mean Square	F-Value	P-Value	Remark
Corrected Model	258.979 <sup>a</sup>	4	64.826	10.826	.000	
Intercept	1856.492	1	1856.492	310.424	.000	
Preperf	130.809	1	130.809	21.873	.000	
Gender	141.246	3	47.082	7.873	.000	Significant
Error	532.265	89	5.981			
Total	83779.000	94				

Table 3 presented ANCOVA of significant difference in the academic performance scores of male and female geography students taught landform concepts using instructional videos and those taught the same concept using Infographics. Result shows that the sum of square of the gender is 141.246, mean square is 47.082, F-value is 7.873 and p-value of 0.00. Hence the p-value is less than the alpha value of 0.05 therefore the null hypothesis which stated that there is no significant difference between the mean academic performance scores of male and female geography students taught landform concepts using instructional videos and those taught same concept using Infographics is rejected. To determine the direction of disparity, the researcher run Pairwise Comparisons test of difference in Table 3.

**Table 3: Pairwise Comparisons test of Direction of Difference among Groups**

(I) gender	(J) gender	Mean Difference (I-J)	Std. Error	Sig. <sup>a</sup>
male exp. 1	female exp. 1	.256	.714	1.000
	male exp. 2	1.798	.714	.081
	female exp. 2	3.054*	.722	.000
female exp. 1	male exp. 1	-.256	.714	1.000
	male exp. 2	1.542	.706	.190
	female exp. 2	2.797*	.714	.001
male exp. 2	male exp. 1	-1.798	.714	.081
	female exp. 1	-1.542	.706	.190
	female exp. 2	1.256	.714	.493
female exp. 2	male exp. 1	-3.054*	.722	.000
	female exp. 1	-2.797*	.714	.001
	male exp. 2	-1.256	.714	.493

Table 3: present Pairwise Comparisons test of Direction of Difference among male and female experimental Groups. The result reveals that male experimental I shows no significant difference to female experimental I at P-Value 1.00 and male experimental II at P-Value 0.08 but shows significant difference to female experimental II at P-Value 0.00 then female experimental I shows no significant difference to male experimental I and male experimental II at P-Value 1.00 and 0.19 but shows significant difference to female experimental II at P-Value 0.01, also male experimental II shows no significant difference to both male and female experimental groups at P-Value 0.08, for male experimental I, then 0.19 for female experimental I and 0.49 for female experimental II respectively. Finally, female experimental II shows significant difference to male and female

experimental I at P-Value of 0.00 and 0.01 but shows no significant difference to male experimental II at P-Value of 0.49. This implies that there is no significant difference between male experimental I, female experimental I and male experimental II but significant difference only exist between male experimental I and female experimental II and also between female experimental I and female experimental II.

### **Discussion of the Findings**

The findings shows that significant difference exist between the mean performance scores of Geography students of the experimental groups and control group. findings shows that significant difference exist between the mean performance scores of male and female Geography students of the experimental groups.

### **Conclusion**

Based on the findings of this study, the study concluded that Instructional videos and Infographics are capable of improving student's academic performance far better than lecture methods. Instructional videos and Infographics are capable of improving male student's academic performance better than female students.

### **Recommendations**

Based on the findings of this study, the researcher recommends that:

1. The use of instructional videos and graphics in teaching geography in schools should be encouraged by State Ministries of Education through training of teachers periodically using seminars and workshops to teachers on how to use instructional videos and Infographics in teaching.

2. The Teacher Training Institutions and professional bodies such as NTI and STAN, to organize a special re-training, workshops, and seminars to Geography teachers on how to use instructional videos and Infographic.

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