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EFFECT OF VIDEO CLIP INSTRUCTIONAL STRATEGY ON STUDENTS' ACHIEVEMENT AND RETENTION IN ECOLOGY IN ABUJA NIGERIA

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Abstract

This study investigated the “effects of video clip instructional strategy on students' interest and achievement in ecology in Abuja, Nigeria.” The study adopted quasi-experimental research of pre-test, post-test, non-equivalent, non-randomized, control group design. The population for the study consists of 35,155 (15,767 males and females) SS students. Purposive and simple random sampling techniques was used in the three stages to sample 145 students, (80 males and 65 females); students were selected for the study. Two instruments, namely Ecology Achievement Test (EAT) and Ecology Retention Test (ERT), were validated and found reliable for study. Four research questions were raised, and four null hypotheses were formulated for the study. Descriptive statistics of mean and standard deviation were used to answer research questions, while inferential statistics of ANCOVA was used to test the null hypotheses at 0.05 level of significant. The

findings revealed that there is significant difference between the achievement and retention of students exposed to Video Clip Instructional strategy and their counterpart exposed to the conventional method in favour of the experimental group. Also, the findings revealed that there is no significant difference between male and female students' achievement and retention in ecology using the video clip instructional strategy. Hence the researcher recommended that the use of Video clip instructional strategy should be adopted for teaching of Ecology concepts in the secondary schools and in-service training program for Biology Teachers, in the form of workshops, seminars and conferences, should be organized to focus more on how to use video clip instructional strategy in teaching ecology concepts, among others.

Keyword: Video Clip Instructional Strategy, Ecology, Conventional Method, Retention and Achievement

Introduction

The use of technology in education provides the student with a more suitable environment to learn, serves to create interest and learning centered, and help increase the student motivation. The use of technology in this way plays an important role in the teaching and learning process (Isman & Balkan, 2002). In parallel with the technological advances: technology devices particularly computers, began to be use in educational environment to develop audio-visual materials such as animations, video clip and simulation, which resulted in the development of the computer- based instructional techniques (Offili, 2016).

Studying Ecology according to the British Ecology Society (2023) provides a foundation for conserving natural resources, predicting the ecological impacts of pollution and climate change, understanding sustainable use of nature's resources without exhausting them, and protecting endangered species. However, students often struggle to grasp the concepts of ecology. Based on the researcher's observations as an educator, Ecology presents complex and abstract ideas that cannot be effectively taught solely in the classroom. Technology exploration is necessary to solidify understanding and facilitate hand on activities. The current curriculum in Nigeria supports a student-centered approach to education, promoting

teaching and learning that progresses from known to unknown, simple to complex, concrete to abstract, and general to specific, by encouraging students to actively engage and participate in the learning process for better academic outcomes (Adepoju, 2024).

Academic achievement is the attainment of an individual in a subject. It indicates the strength and weakness of a students in a particular subjects or concepts. Achievement is the most appropriate measures for predicting how successful an individual or organisation is (Adeosun,2024, & Umar, 2018). It measures the level of success or otherwise of an accomplishment of a students. It also revealed the remarkable change in the students' performance obtained due to their exposure to certain program of instruction. Therefore, this study looks into the students' academic achievement in ecology.

The role of gender in academic achievement in science education and other subjects' area has precipitated a variety of studies from educational researchers of different field of endeavor and there are different opinions as regards gender and academic achievement. For instance, a comprehensive analysis by Stoet and Geary (2020) found that in nearly all 67 countries studied, the science achievement of 15-year-old girls was on par with, and in some cases exceeded, that of boys when measured by (Programme for

International Student Assessment) PISA test scores. Similarly, in the United States, data from the National Assessment of Educational Progress (NAEP) shows that girls perform equally to boys in science at the 4th and 8th-grade levels (National Centre for Education Statistics, 2022). Therefore, Gender is one of the dependent variables in this study on ecology when students are exposed to video clip instructional strategy.

Despite the importance of Biology to National development, chief examiner report WAEC (2019 - 2023) states that, students are not doing well in Ecology concepts. It was stated that students find it challenging or difficult to answer questions that has to do with Ecology. This shows in the choice of questions that students answer or are unable to answer during their external examination as Ecology was listed as one of the aspects in biology that students have not been doing well. Students seem to be failing as most students find ecology boring hence lack curiosity and interest to learn it and this has affected their achievement in the concept. Previous researchers reported that student's achievement and interest in Biology over the years is not encouraging and also studies conducted on students' academic performance in science education showed low achievement over the years (Adeosun, 2024). These level of students believe teachers of Biology and other stakeholders,

researchers especially to seek ways of keeping the percentages of failure in Ecology under constant check. The inability of students to perform well and develop positive interest in questions relating to Ecology as well as achievement are attributed to many factors such as teachers' instructional methods, strategies or techniques, the broad curriculum, Laboratory facilities, school-related factors, teacher-related factors, and students' interest among many others.

Video clip instructional strategy is a strategy that involves using short video segments to support teaching and learning. This Video clips can be illustration of complex concepts which shows real- life world applications, enhance engagement and motivation and provide visual explanations. It's also characterized as short focused, targeted content and multimedia, that is a combination of visual and auditory elements. By incorporating Video clip into instruction educator can create more engaging and effective learning experiences. At this juncture, incorporating multimedia visual aids into teaching is essential. Enefu (2021) believes that, the application of video clip in the teaching of science subjects, especially biology enhances the use of simulations, projectors, display screen, cameras, smart boards, smart phones among others in teaching complex and boring concepts like

ecology. From the foregoing, it is envisaged that, this approach video clip instructional strategy will produce a better result than what is being obtained from the mere prevailing conventional teaching approach.

The need for constant upgrading becomes imperative more so, that the achievement and retention of students in the subject is always a source of concern to all stakeholders in education. Hence, there is need for teachers to adopt innovative and suitable teaching strategies to bring out desirable outcome in students since teaching strategy is crucial for the achievement of success in science.

Retention is the term used to denote a demonstration that meaningful learning has taken place, maintained, and sustained over time which can be proved through recall, recognition, recitation, or practice (Abu & Flowers, 2019). Retention is the ability of an individual to hold factual knowledge, skills, images, and figures in memory and at the same time retrieve for use when the need arises. Meaningful learning is judged from the ability of a student to recall, retrieve, reproduce, or apply the learned material in a similar situation. One of the reasons for students' forgetfulness could be traced to poor teaching methods that are usually teacher-centered and inflexible for students learning (Otor, & Egbodo, 2016; Boston, Diaz, Gibson, Ice, Richardson, & Swan, 2019). When students are provided with first

aids learning materials like visiting sites, it is likely that, they will show confidence in learning; get motivated, have control over their learning, become active learners and gain retentive and durable knowledge and skills. Field trip boost retention rates up to 60% - 80% (Gottsegen, 2019). This study, therefore, seeks to investigate the effects of video clip instructional strategies on students' achievement and retention in ecology in Abuja, Nigeria.

Statement of the Problem

Research evidence has shown that there is rapid increase yearly in the enrolment of students in science subject especially Biology (Nsofor, 2017). But the achievement and retention of students in (WAEC) examination results continue to decline (Nekang & Agwagah, 2019). Will these low achievement and retention be associated to poor teaching strategies, the didactic method of teaching characterized by teacher centeredness, is it that some concepts are very difficult for teachers as well as the students to learn or lack of use of new technologies in teaching be the causes of these dismal achievement and retention. Several teaching methods have been used to salvage these situations such as Computer-Aided Instructional Concept Maps (CAICM), Computed Based Learning (CBL), Computer-Vee Maps, and Analogy among others. But these strategies of

instruction have not yielded good results among Biology students' achievement and retention. Therefore, the need for a more effective method of instruction of ecology concepts in Biology becomes imperative. An interactive strategy that can be used for improving this present trend of poor achievement and retention may be the use of Video Clip Instructional Strategy (VCIS). Based on the above, this research work investigated the effects of Video Clip Instructional Strategy in teaching Ecology concepts in relation to achievement and retention of secondary school Biology students in Abuja, Nigeria.

Objective of the Study

This Study investigated the effects of video clip instructional strategy on students' achievement and retention in ecology in Abuja, Nigeria. The specific objectives were to:

1. Determine the achievement of students taught Ecology using Video Clip instructional strategy and Conventional method.
2. Find out the effect of Video Clip instructional strategy on the achievement of male and female students in Ecology.
3. Investigate the retention of students taught Ecology using Video Clip

instructional strategy and Conventional method.

4. Find out the effect of Video Clip instructional strategy on the retention of male and female students in Ecology.

Research Questions

To achieve the stated objectives of the study, the following research questions were asked to guide the study:

1. What are the mean achievement scores of students taught Ecology using Video Clip instructional strategy and those taught using Conventional Method?
2. What are the mean achievement scores of Male and female students taught Ecology using Video Clip instructional strategy?
3. What are the mean retention scores of students taught Ecology using Video Clip instructional strategy and those taught using Conventional Method?
4. What are the mean retention scores of male and female students taught Ecology using Video clip instructional strategy?

Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance

- Ho₁: There is no significant difference in the mean achievement scores of students taught ecology using video clip instructional strategy and those exposed to Conventional Method.
- Ho₂: There is no significant difference in the mean achievement scores of male and female students taught ecology using video clip instructional strategy.
- Ho₃: There is no significant difference in the mean retention scores of students taught ecology using video clip instructional strategy and those exposed to Conventional Method.
- Ho₄: There is no significant difference in the mean retention scores of male and female students taught ecology using video clip instructional strategy.

Methodology

This study adopted quasi-experimental research design of pre-test, post-test and nonrandomized control group. The population for this study comprised all senior secondary school one biology students (SS 1) of 2024/2025 academic session in Abuja, Nigeria. Purposive random sampling and

Results

Research Question One: What are the mean achievement scores of students taught Ecology using Video Clip instructional strategy and those taught using Conventional Method?

Simple random sampling techniques was use for selection of the 145 SS 1 students of which 80 for experimental group (39 male and 41 female) and 65 control group (35 male and 30 female) as sample for the study.

Ecology Achievement Test (EAT) and Ecology Retention Test (ERT) were the instrument for the study. EAT and ERT items consist of 30 multiple choice questions. The instruments were validated by three experts and found reliable for the study with the reliability index of 0.98 (EAT) respectively. Research assistant was trained on how to use video clip instructional strategy in teaching ecology while the control group used the lecture method of instruction. Pre-test was conducted and treatment lasted for 4 weeks for experimental and control groups simultaneously. Experimental group were taught ecology using video clip instructional strategy while control group were taught using conventional method. Post-test and post-posttest was administered and the data generated were subjected to descriptive statistics of mean and standard deviation to answer research questions while inferential statistics of ANCOVA was used to test the null hypotheses at 0.05 level of significance.

Table 1: Mean and Standard Deviation of Achievement Scores of Students Taught Ecology Using Video Clip Instructional Strategies and Conventional Method

Teaching Method	Types of Tests	N	Mean	Std. Div.
Video Clip	Pre-Test	80	11.68	2.01
	Post-Test	80	24.88	2.28
Conventional	Pre-test	65	12.74	2.84
	Post-Test	65	15.06	3.96

Table 1 shows the pre-test and post-test mean achievement scores and standard deviation of students taught ecology using video clip instructional strategies are (N= 80, M= 11.68, SD = 2.01) and (N= 80, M= 24.88, SD = 2.28) and pre-test and post-test mean achievement scores and standard deviation of students taught ecology using Conventional method are (N= 65, M= 12.74, SD = 2.84) and (N = 65, M= 15.06, SD = 3.96) respectively.

Null Hypothesis One: There is no significant difference in the mean achievement scores of students taught Ecology using video clip. The test for this hypothesis is presented in Table 2.

Table 2: Results of ANCOVA on Achievement Scores of Students' Taught Ecology Using Video Clip Instructional Strategies and those Taught Using Conventional Method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	9372.088 ^a	3	3124.029	195.418	0.000	0.700
Intercept	5012.362	1	5012.362	313.540	0.000	0.555
Preachiev	14.916	1	14.916	0.933	0.335	0.004
Methods	9275.180	1	4637.590	290.097	0.000	0.698
Error	4012.578	142	15.986			
Total	168538.000	145				
Corrected Total	13384.667	144				

a. R Squared = 0.700 (Adjusted R Squared = 0.697)

Table 2 shows a significant difference in the mean achievement scores of students exposed to Video Clip Instructional Strategy and Conventional Groups. The value of $F_{(1, 142)} = 290.097$ was obtained with associated exact probability value of 0.000. Since the associated probability 0.000 is less than 0.05 level of significance, the null hypothesis four is hereby rejected. The results implied that,

the Video Clip Instructional Strategy produced a significant effect on the post-test achievement scores of students' when covariate effect (pre-test) is controlled. Hence, there is a significant difference among the two groups of Video Clip Instructional Strategy and Conventional Method.

Research Question Two: What are the mean achievement scores of male and female students taught Ecology using Video clip instructional strategy?

Table 3: Mean and Standard Deviation of Achievement Scores of Male and Female Students' Taught Ecology Using Video Clip Instructional Strategy

Gender	Type of Test	N	Mean	Std. Div
Male	Pre-test	39	11.41	2.01
	Post-test	39	24.79	2.38
Female	Pre-test	41	11.93	2.00
	Post-test	41	24.95	2.21

Table 3 reveals the results of pre-test and post-test mean and standard deviation of achievement scores of male students' taught Ecology using Video Clip Instructional Strategy are (N = 39, M = 11.41, SD = 2.01) and (N = 39, M = 24.79, SD = 2.38), while

pre-test and post-test mean and standard deviation of achievement scores of female students' taught ecology using Video Clip instructional Strategy are (N = 41, M = 11.93, SD = 2.00) and (N = 41, M = 24.95, SD = 2.21) respectively.

Null Hypothesis Two: There is no significant difference in the mean achievement scores of male and female students taught Ecology using video clip instructional strategy. The test for this hypothesis is presented in Table 4.

Table 4: Results of ANCOVA on Achievement Scores of Male and Female Students' Taught Ecology Using Video Clip Instructional Strategy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	30.517 ^a	2	15.258	3.090	0.051	0.074
Intercept	1014.387	1	1014.387	205.421	0.000	0.727
Pretestachie	30.028	1	30.028	6.081	0.016	0.073
Gendervedioclip	0.000	1	0.000	0.000	0.995	0.000
Error	380.233	77	4.938			
Total	49912.000	80				
Corrected Total	410.750	79				

a. R Squared = 0.074 (Adjusted R Squared = 0.050)

Table 4 reveals that, there is no significant difference in the mean achievement scores of male and female students exposed to Video clip instructional strategy. The value of $F_{(1, 77)} = 0.000$ is obtained with associated exact probability value of 0.995 which is greater

than 0.05 level of significance, the null hypothesis is retained. The result implied that, male and female students achieved a par when taught Ecology using Video Clip Instructional Strategy

Research Question Three: What are the mean retention scores of students taught Ecology using video clip instructional strategy and those taught using conventional method?

Table 5: Mean and Standard Deviation of Retention Scores of Students' Taught Ecology Using Video Clip Instructional Strategies and Conventional Method

Teaching Method	Types of Tests	N	Mean	Std. Div.
Video Clip	Post-Test	80	24.88	2.28
	Post Post-Test	80	27.79	1.38
Conventional	Post-test	65	15.06	3.96
	Post Post-Test	65	16.06	2.77

Table 5 shows the post-test and post post-test mean retention scores and standard deviation of students taught ecology using video clip instructional strategies are (N= 80, M= 24.88, SD = 2.28) and (N= 80, M= 27.79, SD = 1.38) and post-test and post post-test mean achievement scores and standard deviation of students taught ecology using Conventional method are (N= 65, M= 15.06, SD = 3.96) and (N = 65, M= 16.06, SD = 2.77) respectively.

Null Hypothesis Three: There is no significant difference in the mean retention scores of students taught Ecology using video clip instructional strategy and those taught using conventional method.

The test for this hypothesis is presented in Table 6.

Table 6: Results of ANCOVA on Retention Scores Students' Taught Ecology Using Video Clip Instructional Strategies and Conventional Method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	7953.522 ^a	3	2651.174	460.162	0.000	0.846
Intercept	3678.201	1	3678.201	638.422	0.000	0.718
Posttestretention	0.023	1	0.023	0.004	0.950	0.000
Methods	3774.081	1	1887.040	327.532	0.000	0.723
Error	1446.110	142	5.761			
Total	150482.000	145				
Corrected Total	9399.631	144				

a. R Squared = 0.846 (Adjusted R Squared = 0.844)

Table 6 reveals that, there is significant difference in the mean retention scores of students exposed to Video Clip, Field Trip Instructional Strategies. The value of $F_{(1, 142)} = 327.532$ was obtained with associated exact probability value of 0.000. Since the associated probability value of 0.000 is less

than 0.05 level of significance, null hypothesis seven is rejected. The result implied that, there is significant difference when taught Ecology using Video Clip Instructional Strategies and Conventional Method.

Research Question Four: What are the mean retention scores of male and female students taught Ecology using video clip instructional strategy?

Table 7: Mean and Standard Deviation of Retention Scores of Male and Female Students' Taught Ecology Using Video Clip Instructional Strategy

Gender	Type of Test	N	Mean	Std. Div
Male	Post-test	39	24.79	2.38
	Post Post-test	39	27.82	1.41
Female	Post-test	41	24.95	2.21
	Post Post-test	41	27.76	1.37

Table 7 reveals the results of post-test and post post-test mean and standard deviation of retention scores of male students' taught Ecology using Video Clip Instructional Strategy are (N = 39, M = 24.79, SD = 2.38) and (N = 39, M = 27.82, SD = 1.41), while

pre-test and post-test mean and standard deviation of retention scores of female students' taught ecology using Video Clip instructional Strategy are (N = 41, M = 24.95, SD = 2.21) and (N = 41, M = 27.76, SD = 1.37) respectively.

Null Hypothesis Four: There is no significant difference in mean retention scores of male and female students taught Ecology using video clip instructional strategy. The test for this hypothesis is presented in Table 8.

Table 8: Results of ANCOVA on Retention Scores of Students' Taught Ecology Using Video Clip Instructional Strategy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1.721 ^a	2	0.861	0.443	0.644	0.011
Intercept	566.927	1	566.927	291.671	0.000	0.791
Posttestvedioclip	1.638	1	1.638	0.843	0.361	0.011
Gendervedioclip	0.059	1	0.059	0.862	0.032	0.000
Error	149.666	77	1.944			
Total	61923.000	80				
Corrected Total	151.388	79				

a. R Squared = 0.011 (Adjusted R Squared = -0.014)

Table 8 reveals that; there is significant difference in the mean retention scores of students exposed to Video Clip Instructional Strategies. The value of $F_{(1, 77)} = 0.862$ was obtained with associated exact probability value of 0.032. Since the associated

probability value of 0.032 is less than 0.05 level of significance, null hypothesis is rejected. The result implied that, there is significant difference when taught Ecology using Video Clip Instructional Strategy.

Discussion of Findings

The findings of this study revealed the effects of Video Clip instructional Strategy in enhancing teaching and learning of Ecology concepts in Biology.

The results revealed a significant difference between the achievement of students in Video Clip Instructional Strategy and Conventional Method in Favor of Video Clip Instructional Strategies. The findings on students' achievement in Video Clip Instructional Strategy compared to those using conventional method group are in agreement with the earlier findings of

Adamu (2022); Ekpo and Ehi (2022); Egwu and Okigbo (2021); Awosa, Ogunlada and Atobatele (2023) who found out that, students taught ecology and other science subjects using Video Clip Instructional Strategy achieved higher than those taught using Conventional Methods.

The results also revealed that, there is no significant difference in achievement of male and female students in the experimental groups. This finding is in agreement with the findings of Akinwumi and Okebukola (2023); and Okebukola and Akinwumi (2022), who jointly opined that, gender has

no significant difference in the achievement of students in ecology but in disagreement with the findings of Nwankwo and Okoro (2024); Ajayi and Okoye (2023); Okoro and Eze (2022), who reported that gender has significant effects on students' achievement. Male students' achievement did not differ from their female counterparts when exposed to Video Clip Instructional Strategy.

The results revealed a significant difference between the retention of students in Video Clip Instructional Strategy and Conventional Method in Favor of Video Clip Instructional Strategies. The findings on students' retention in Video Clip Instructional Strategy compared to those using conventional method group are in agreement with the earlier findings of Tukura (2022); Ekpo and Ehi (2022); Egwu and Okigbo (2021); Awosa, Ogunlada and Atobatele (2023) who found out that, students taught ecology and other science subjects using Video Clip Instructional Strategy achieved higher than those taught using Conventional Method.

The results also revealed that, there is significant difference in retention of male and female students in the strategies. This finding is in agreement with the findings of Muhammad and Ibrahim (2022); Ajayi and Alabi (2020); and Okebukola and Akinwumi (2022), who jointly opined that, gender has no significant in the retention of students in ecology but in disagreement with the

findings of Nwankwo and Okoro (2024); Zuniyi and Antip (2022); Ajayi and Okoye (2023); Okoro and Eze (2022), who reported that gender has significant effects on students' retention. Male students' retention did not differ from their female counterparts when exposed to Video Clip Instructional Strategy.

Conclusion

The findings of this study indicate that Video Clip instructional strategy enhance students Ecology achievement and retention better than conventional method. There was no gender difference between the achievement and retention of male and female students taught ecology using video clip instructional strategy.

Recommendations

The following recommendations are made based on the findings of the study:

1. Biology teacher should be encouraged to adopt Video Clip Instructional Strategy in teaching Ecology.
2. Students should be encouraged on the use Video Clip Instructional Strategy in heterogeneous (male and female) groups so as to help reduce gender gap.
3. Biology teachers should be trained on how to employ the use of Video Clip

Instructional Strategies to teach Ecology and Biology in general.

4. Seminars, Conferences, and workshops be organized for Biology

teachers to update their knowledge on the use Video Clip Instructional Strategies by FCDA Abuja.

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