

Effect of Animation Teaching Strategy on Secondary School Students' Achievement, Retention and Interest in Climate Change in Lokoja, Kogi State

Aiyedun, Tope Gloria

Department of Science and Environmental Education, Faculty of Education, University of Abuja, Abuja, Nigeria

ABSTRACT

The study examined the effect of animation teaching strategy on secondary school students' achievement, retention and interest in climate change in Lokoja, Kogi State. Three objectives and three research questions were raised and answered, and three null hypotheses were tested. A non-randomized pre-test post-test quasi-experimental design was adopted for the study. The population covered all public Senior Secondary School, year three (SSS 3) science students in Lokoja, Kogi State. Two intact classes which are made up of one hundred and thirty (130) students were sampled. The instruments for data collection are Environmental Education Concept Achievement Test (EECAT), Environmental Education Concept Retention Test (EECRT) and Environmental Education Concept Interest Scale (EECAS) respectively. Statistical tools used include percentages, mean (\bar{x}) and standard deviations to answer the research questions while Analysis of Covariance (ANCOVA) was used to analyze the research hypotheses at a significance level 0.05 (5%). Findings of the study revealed that animation teaching was viable in upgrading students' achievement, retention and interest in climate change. The paper recommended among others that teachers should teach Environmental Education infused concepts with animations.

KEYWORDS: Animation, Climate change, Environmental Education, Achievement, Retention, and Interest

INTRODUCTION

At the sustainable development summit on 25th September, 2015, the United Nation Member States adopted the 2030 agenda for sustainable development which incorporated sets of 17 sustainable goals. The major concentration of these goals is to end poverty, fight inequality and injustice and tackle climate change by 2030 (Ishaya, 2017). UNDP (2010) report showed that the level of awareness about climate change is rather low in Nigeria and, if measures are not taken, would wreak havoc on the daily lives of its citizens. The report showed that the awareness of climate change is a bit high at the federal level but drops at the state and local government levels where knowledge is highly needed. These levels encompass the people who own and cultivate farmlands. Olorunfemi (2010) asserted that the most significant obstacle to reducing the impact of climate change in Nigeria is lack of awareness and knowledge. For this reason, knowledge in Environmental Education must be taken seriously and to the grassroots.

Secondary education plays a vital role in providing suitable preparation in the academic achievement and performance of students for further education and training (Katcha & Ndagi, 2012). Environmental Education concepts such as climate change are multidisciplinary and are for the most part injected in some science and social science subjects (Biology, Geography, Chemistry, Agricultural Science, among

How to cite this paper: Aiyedun, Tope Gloria "Effect of Animation Teaching Strategy on Secondary School Students' Achievement, Retention and Interest in Climate Change in Lokoja, Kogi State" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-4 | Issue-3, April 2020, pp.944-949, URL: www.ijtsrd.com/papers/ijtsrd30740.pdf



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others) in Senior Secondary Schools. Climate change is an environmental education concept that is infused in secondary school Biology, Agricultural Science and Geography curriculum, among others (Ekpo, 2016).

The National Policy on Education, 2014 noted that in order to fully realize the goals of education in Nigeria and gain from its contribution to the national economy, government shall take necessary measures to ensure that teaching shall be practical, activity-based, experiential, and Information Technology (IT) supported. Researchers (Lawal, 2007; Katcha & Babagana 2019) found that the persistent low achievement, retention and interest of concept is attributed to teachers' teaching strategies among others. Thus, teaching strategies used by teachers in teaching-learning process have significantly influenced learners' learning outcomes. Atadoga and Onaolapo (2008) stated that, teaching strategies adopted by teachers at all levels of education in imparting knowledge and skills to the learners are determined by teachers' innovative abilities, topic to be taught, learners' age, available resources and classroom environment. In this regard Iravani and Delfechresh (2011) affirmed that for effective learning to take place, the conventional teaching in the classroom using black board should be supplemented with Animation teaching strategy.

For the past two decades, the most prominent feature of the technology-based learning environment has become animation (Musa et al., 2015). Musa further remarked that instructive animation is an animation created to be utilized in homerooms, on instructive TV programs, and in different settings where individuals need to give data to people of all ages in a clear, accessible and informative way. Utilization of animations has been firmly energized as a creative, useful and students-centered alternative to the traditional learning approaches in many countries. Animation are much better at representing ideas which involve changes over time because of its ability in creative/imaginary thinking, therefore concretizing abstract temporal ideas (Rias & Zaman, 2011).

The view expressed by Bada, et al. (2012) was with the end goal that, animated films give extra data and give external help for mental recreations along these lines, permitting the student to perform a higher measure of subjective handling. Generally, computer animation is useful in facilitating teaching and learning of science and environmental education concepts. According to Katcha (2010), classroom best practices in science concepts should be subjected to hands on activities which are better processed in cognitive structure. Therefore, with animation teaching strategy, students could have well processed information in the cognitive structure.

Kylie (2012) noted that animations could be seen as a basic form of class entertainment which could pick the interest of all age groups, whether adult, teenager or a kid. Similarly, Akor (2011) noted that the use of animation in the classroom is to engage the interest of the students, motivating them to learn and increasing independent and personal responsibility for education, higher thinking skills and creative in problem solving. Furthermore, Iravani and Delfechresh (2011) stressed that the flexibility of learning through animation allows a wider range of stimuli thus increasing the students' engagement in learning which consequently translate into increase in level of students' academic achievement, interest and retention which is the priority of any educational system. Gupta and Lata (2014) discovered that animation led to the improvement in students' achievement in science better than conventional lecture method. Thus, Ogundokun and Adeyemo (2010) added that low academic achievement is related to the decline in the availability of teaching resources in schools.

Yegoh et al. (2016) stated that academic achievement and its predictors (retention and interest) have been an important topic of study for educational researchers and policymakers for many decades. Ajaja (2007) noted that the reason why students may find some ecological topics such as flood, difficult could be due to the persistent use of Conventional Teaching Method (CTM) as against the recommended discovery/inquiry approaches which are student-activity centred. Adeyemi (2008) noted that when students are always exposed to practical lesson with good quality teachers and quality teaching methods, they will obviously find most of these ecological concepts less difficult to comprehend.

It has also been argued that gender is one of the factors that influence students' academic achievement at Senior Secondary School level (Eze, 2007). While Omajuwa (2011) stated on the contrary that gender has no influence on

students' academic achievement in schools. Sousa (2011) added that academic retention and interest are essential for a long term memory to retain learning in such a way that it can locate, identify, and retrieve it accurately in the future.

Onojerena and Ogedegbe (2016) therefore suggested that awareness of climate change through quality education and practical training is necessary, particularly in areas prone to frequent environmental hazards which are the low land areas or within new settlements. They recommended that the subtopics of climate change should include the following: causes, consequences and safety measures to prevent the problems.

Therefore, there is a need to examine some innovative teaching strategy such as animation to strengthen students' academic achievement, retention and interest on climate change in senior secondary schools in Kogi State.

Statement of the Problem

Researchers in their numerous works in Nigeria have shown that the predominant method of instruction used by secondary school teachers is the conventional teaching method. Yet, students still encounter difficulties in understanding certain Environmental Education concepts infused in Biology, Chemistry, Physics, English Language, Geography, among others and are also unable to extend the knowledge of ideas to fix issues outside the classroom. Coupled with this, it was reported that 49.98% of all candidates who sat for the May/June 2019, failed grossly in some Environmental Education concepts in Nigeria secondary schools. In this category were 389,655 males and 396,361 females, representing 47.32% and 52.92% respectively. It was also reported that 19,781 candidates who sat for Geography examination and 3,851 or 19.46 per cent passed at credit level (WAEC Chief Examiner's Report, 2019). Probably, the mass failure may be attributed to many reasons of which could be traceable to the predominant use of the conventional teaching method? Therefore, there is the need to try whether the use of animation teaching strategy may improve students' performance in learning Environmental Education concepts.

Purpose of the Study

The purpose of the study is to investigate the effect of animation as a teaching strategy on secondary school students' achievement, retention and interest in climate change in Kogi State. Specifically, the objectives of the study are to:

1. determine the differences in the mean achievement scores of students taught climate change with animation strategy and those taught with Conventional Teaching Method (CTM);
2. determine the differences in the mean retention scores of students taught climate change with animation strategy and those taught with CTM;
3. determine the differences in the mean interest scores of students taught climate change with animation strategy and those taught with CTM;

Research Questions

The research will be guided by the following research questions:

1. Is there any difference in the mean achievement scores of students taught climate change with animation

strategy and those taught with Conventional Teaching Method (CTM)?

2. Is there any difference in the mean retention scores of students taught climate change with animation strategy and those taught with CTM?
3. Is there any difference in the mean interest scores of students taught climate change with animation strategy and those taught with CTM?

Hypotheses

The following null hypotheses are formulated for testing at 0.05 level of significance.

- Ho1.** There is no significant difference in the mean achievement scores of students taught with animation strategy and those taught with CTM.
- Ho2.** There is no significant difference in the mean retention scores of students taught with animation strategy and those taught with CTM.
- Ho3.** There is no significant difference in the mean interest scores of students taught with animation strategy and those taught with CTM.

Methodology

The study employed a non-randomized pre-test post-test quasi-experimental design. The population of the study covered all public Senior Secondary School, year three (SSS

3) science students offering Geography in Lokoja, Kogi State. Two intact classes which are made up of one hundred and thirty (130) students were used in the study from two coeducational public senior secondary schools which were purposively selected because both schools have been in existence for more than ten years, likewise both schools have well experienced and qualified teachers. The instruments were validated by experts. The reliability index of 0.97 and 0.70 were obtained using Split-half and Cronbach's Alpha method for the Environmental Education Concept Achievement Test (EECAT) and Environmental Education Concept Interest Scale (EECAS) respectively. Both descriptive and inferential statistics was used to analyze the data (pre-test and post-test script scores of SS3 students) collected from the study. These statistical tools include percentages, means (\bar{x}) and standard deviations to answer the research questions while Analysis of Covariance (ANCOVA) was used to analyze the research hypotheses at a significance level 0.05 (5%) confidence level. Analysis of Covariance (ANCOVA) was considered appropriate because it helped to eliminate the unwanted variance from the dependent variable as well as reduce the error term. Secondly, ANCOVA also helped to test the interaction effects on continuous dependent variables that may exist during baseline pretest scores.

Analyses and Result

Research Question One:

Is there any difference in the mean achievement scores of students taught climate change with animation strategy and those taught with Conventional Teaching Method (CTM)?

Table 1: Descriptive Statistics Showing Groups' Achievement in the Post-test

Descriptive Statistics			
Groups	Mean (\bar{x})	Std. Deviation	N
Control	5.5797	1.85826	63
Experimental	24.0870	2.55377	67

Source: Research Survey 2020

Results in table 1 indicated that students in the Control group had a mean score of 5.58 with a standard deviation of 1.86, while those in the Experimental group had mean score of 24.09 with a standard deviation of 2.55. In other words, participants in the Experimental group had a higher mean scores (in terms of achievement) than their counterparts in the Control group.

Research Question Two:

Is there any difference in the mean retention scores of students taught climate change with animation strategy and those taught with CTM?

Table 2: Descriptive Statistics Showing Groups' Retention in the Post post-test

Descriptive Statistics			
Groups	Mean (\bar{x})	Std. Deviation	N
Control	24.8696	3.50557	63
Experimental	24.0870	3.61158	67

Source: Research Survey 2020

Results in table 2 indicated that students in the Control group had a Mean score of 24.87 with a standard deviation of 3.51, while those in the Experimental group had mean score of 24.09 with a standard deviation of 3.61. In other words, both participants are in close range. However, the Control group is slightly higher in Mean scores and Std. D. (in terms of retention) than the Experimental group.

Research Question Three:

Is there any difference in the mean interest scores of students taught climate change with animation strategy and those taught with CTM?

Table 3: Descriptive Statistics Showing Group 1 Interest Animation Teaching Strategy

S/N	Items	Mean (\bar{x})	Std. Deviation	Decision
1	I like environmental education concepts in geography because its lessons are very exciting and explicit	3.6970	.46669	Agreed
2	I like environmental education concepts in geography because its concepts are clear, related to everyday life	3.7576	.43519	Agreed
3	I enjoy environmental education concepts in geography because it guides me in decision - making and in problem solving	3.3030	.76994	Agreed
4	I always take problems in geography to my teachers	2.9697	.91804	Agreed
5	I will perform better in Environmental Education topics like climate change compared to other topics	3.2727	.97701	Agreed
6	Environmental Education topics such as climate change are abstract and unrelated to scientific investigation	2.4242	1.17341	Disagree
7	The methods and materials used for teaching environmental education concepts in geography are fascinating	3.1818	.72692	Disagree
8	Language used in teaching environmental education concepts in geography is simple to understand	3.4848	.97215	Agreed
9	Animated video package makes environmental education concepts in geography lessons more practical	2.8182	.84611	Agreed
10	Conventional teaching Method of instruction encourages me to learn environmental education concepts in geography	2.9697	.21153	Agreed
11	Learning environmental education concepts with Animated video is boring, difficult and not interesting	3.5758	.70844	Agreed
12	Learning environmental education concepts with Animated video is interesting and enjoyable	3.4848	.61853	Agreed
13	I look forward to more lessons on environmental education concepts	3.4545	.56408	Agreed
14	A job as an environmental educationist would be interesting	3.6364	.54876	Agreed
15	Environmental educationist are always interested in making life better for man	3.5758	.50189	Agreed
16	Environmental hobbies should be encouraged after school activities because of its interesting nature	3.2121	.64988	Agreed
17	Environmental educationist are as fit, healthy and thrilling	3.6061	.82687	Agreed
18	Environmental education creates awareness on ecological problems such as flood	3.3636	.69903	Agreed
19	Reading environmental education textbooks is quite interesting	3.5455	.56408	Agreed
20	Watching films about nature is thrilling	2.8182	.84611	Agreed

Scale Statistics			
Mean (\bar{x})	Variance	Std. Deviation	N of Items
65.6061	35.996	5.99968	20

Source: Research Survey 2020

Table 3 revealed the opinion of students after being expose to pretest and posttest; the 20 questionnaire items were mostly agreed upon with overall means (\bar{x}) of 65.61 and Standard deviation of 6.0. The variance was 36.0 which showed that most of the respondents agreed that Animation Teaching Strategy will help improve students’ academic achievement and retention in Environmental Education infused topics such as climate change.

Hypotheses

Ho1. There is no significant difference in the mean achievement scores of students taught with animation strategy and those taught with CTM.

Table 4: ANCOVA on Significant Difference in Mean Achievement Scores

Groups	Unstandardized Coefficients		Standardized Coefficients	T	df	Sig.	Decision
	B	Std. Error	Beta				
Experimental	24.241	.986		24.573	.027	.000	Significant
Control	-.028	.168	-.020	.164		.000	Ho Rejected

Decision Criterion: Reject Ho if $p < 0.05$

Results in table 4 shows that there was significant main effect of the treatment on the achievement scores of the students; hence, the hypothesis is rejected $p < .050$. Therefore, there is significant difference between the mean achievements score of students taught with animation teaching strategy than those taught using conventional teaching method.

Ho2. There is no significant difference in the mean retention scores of students taught with animation strategy and those taught with CTM.

Table 5: ANCOVA on Significant Difference in Mean Retention Scores

Group	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Decision
	B	Std. Error	Beta			
Control	9.999	2.216		4.512	.000	Significant Ho Rejected
Experimental	.617	.092	.636	6.746	.000	

Decision Criterion: Reject Ho if p < 0.05

Results in table 5 shows that there was significant main effect of the treatment on the retention scores of the students; hence, the hypothesis is rejected $p < .050$. Therefore, there is significant difference between the mean retention score of students taught with animation teaching strategy than those taught using conventional teaching method.

Ho3. There is no significant difference in the mean interest scores of students taught with animation strategy and those taught with CTM.

Table 5: One-tailed ANCOVA Result in Respect of Mean Interest of Experimental Group Exposed to Animation

Group	Unstandardized Coefficients		Standardized Coefficients	Cronbach's Alpha	t	Sig.	Decision
	B	Std. Error	Beta				
1 Experimental	9.999	2.216		0.685	Significant	.000	Significant Ho Rejected
	.617	.092	.636	6.746	.000		

Decision Criterion: Reject Ho if p < 0.05

Discussion, Conclusion and Recommendations

The discoveries of the study uncovered that animation teaching was viable in upgrading students' achievement, retention and interest in climate change. The utilization of animation teaching gave students more extravagant learning experience than they had when they were taught conventional method. The students had more noteworthy degree of collaboration with the learning. The students' interest in the exercises improved and they posed a ton of inquiries which portrayed their interest in the learning. The interest to learning induced their inspiration to learn. The mixes of visual and sound sensations in the learning procedure upgraded the encoding of the learning substance instructed. The students would be advised to comprehend using animation. This finding may likewise be because of the way that animation decreased the degree of deliberation and intellectual burden related with preparing. The more they acquainted themselves with the substance of the exercise, the more they recollects. This is not at all like those in the conventional method who might not have appropriately conceptualized the ideas. The discoveries of the investigation likewise indicated that despite the fact that students encouraged utilizing animation teaching strategy had higher retention than those in the conventional gathering. The utilization of animation teaching strategy diminishes the reflection in the comprehension of the ideas instructed.

Zeynep et al. (2015) noticed that, PC animations are presently being utilized to make live three dimensional pictures, mimicked recordings or movies with intuitive interface that can be utilized to instruct and learn. Today, there are different animations on different branches of knowledge accessible in animation have locales. Right now, animations identifying with the substance instructed was downloaded from various sites and coordinated into the understudies learning. The examination infers that animation teaching strategy is fundamentally compelling in upgrading understudies' achievement, retention and interest

in climate change. In light of the finding and finish of the investigation, the accompanying proposals are made:

1. Teachers should teach environmental education topics by integrating the lesson contents with animations.
2. Incentives and financial motivations ought to be given to teachers by the government and other educational stakeholders to enable them acquire personal computers (PCs) for use in the planning and development of lessons that foster animation teaching strategy.
3. Conferences and seminars on animation teaching Strategy should be organized for teachers in schools.

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