



Animated Graphics and Students' Performances in Fine Arts in Public Secondary Schools In Uyo, Nigeria

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Abstract

The use of instructional materials in content delivery is to facilitate the comprehension of the subject matter. In Akwa Ibom State of Nigeria, the prevalent instructional materials in schools have been principally static graphics: using animated graphics instead can enhance easy understanding. This research investigated the relative effectiveness of animated graphics compared with static graphics on students' performances in Fine Arts in public secondary schools in Uyo, Akwa Ibom State of Nigeria. To achieve the objectives of the study two research questions and two research hypotheses were formulated to guide the study. The study was a quasi-experimental research, and non-randomized pre-test/post-test control group design was used. The sample consisted of 86 Senior Secondary Two (SS 2) Fine Arts students (56 male and 30 female) in two intact Fine Arts classes in two randomly selected secondary schools in the study area. Researcher-developed instrument tagged: Performance Test on Fine Art (PTFA) with a reliability index of .76, was used to collect data for the study. Data generated were analyzed using independent t-test and Analysis of Covariance (ANCOVA). From the results of data analysis it was observed that animated graphics facilitates students' understanding of concepts in Fine Arts better than static graphics; and that gender is not a significant predictor of students' performances in Fine Arts. Consequently, it was recommended among others that, considering the

better facilitative effect animated graphics has on students' performances in Fine Arts, all Fine Arts teachers should make effective use of this instructional media in teaching the subject.

Key words: *Animated graphics, static graphics, students' performances in Fine Arts*

Introduction and Background to the Study

The use of instructional materials in content delivery during classroom instructions is to enhance the comprehension of the subject matter. In Akwa Ibom State of Nigeria, the prevalent instructional materials in schools have been principally static graphics such as charts, graphs and pictures. It is intended that using animations in place of static graphics will eradicate the need for such markings as arrows which characterize static graphics, thus making displays simpler, clearer, and more naturally understood. These presentations, it is expected, will make the content easier for the students and enhance their learning. Animations designed for educational purposes are produced specifically to foster learning. Thus, the use of animated visuals in content deliveries will be beneficial in the teaching of subjects that demonstrate processes and procedures such as Fine Arts.

Unlike static pictures, animations express sequential change directly, instead of indirectly using supporting markings and motion lines. As a result, the learner will be spared the rigour of mental animation, which is, having to interpret the ancillary markings and trying to deduce the changes that they abridge. When learners are given static pictures that are meant to represent dynamic subject matter, they are faced with the cognitive burden of having to mentally animate the content. Animation, certainly, provides a sure means to capture and maintain students' interest in the classroom, given that many people grew up watching animations on television and in movies. Based on the foregoing, therefore, this paper examines the educational relevance of using animated visuals as instructional material, and attempts to demonstrate its effectiveness, or otherwise, in the teaching of Fine Arts in secondary schools in Akwa Ibom State, Nigeria.

Theoretically, using animated visuals as instructional materials in teaching Fine Arts in secondary schools in Akwa Ibom State, Nigeria, can produce positive results. This reasoning relates to both the affective and cognitive characteristics of animation. There appears to be an unspeakable but intrinsic attractiveness and entertainment value of animations, which is why the animated movie industry makes huge success out of this. Animations are a highly motivating form of presentation with the capacity to attract and sustain attention. However, this is subject to empirical research that seeks to identify the specific conditions associated with the relevant assumptions or theories.

Review of Related Literature

It has become necessarily helpful to deal with animation as instructional material in secondary schools by introducing some aspects of the work of Richard Lowe who has made series of studies on educational animation. Explaining dynamic concepts in traditional media such as pictures, charts or still slides is always very difficult. Thus, animations seem to have the advantage of delivering better representations of these concepts. Lowe (2004) observes that “when students are given static pictures that are meant to represent dynamic subject matter, they are faced with the cognitive burden of having to mentally animate the content”. In his study *Learning with Animations: Lessons from Static Graphics*, he notes that “dynamic depictions of complex subject matter are especially challenging for learners lacking background knowledge in the depicted domain” Lowe (2007). Well-designed animations, nonetheless, can eliminate this burden so that learner thinking processes are eased and can be devoted to educationally valuable activities such as the development of understanding.

The conundrum in the claims about the advantage of animation over static graphics is by reason of a variety of arguments for the educational potential of animations being advanced in terms of their superiority over static graphics as a tool for learning. However, animations have the potential to serve both affective and cognitive functions, as observed by Lowe (2004). He further notes that in its appeal to the affective domain, animation often portrays activities that are humorous, spectacular or bizarre, and may facilitate comprehension; they attract attention, engage the learner and sustain motivation. In the cognitive domain, animations are intended to support the cognitive processes that ultimately result in an understanding of the subject matter.

Animations seem ideally suited to the teaching of Fine Arts which entail processes and procedures because they can clearly depict sequential changes. When used to present dynamic content, animations can reflect both the changes in position (translation), and the changes in form (transformation) that are fundamental to learning this type of subject matter (Lowe, 2007).

Statement of the Problem

In Akwa Ibom State, Nigeria, the prevalent instructional materials in schools have been principally static graphics such as charts, graphs and pictures. It is difficult to explain dynamic concepts with traditional media such as pictures, charts or still slides. This has resulted in persistent students' poor performance in Fine Arts; and declining enrolment in the subject both at the secondary and tertiary levels of education in the State. Animations are a highly motivating form of presentation with the capacity to attract and sustain attention. However, this is subject to empirical research. This study aimed at providing empirical data on the relative effectiveness of animated graphics compared with static graphics.

Objectives of the Study

The objectives of this study are to:

1. Compare the performances of Senior Secondary Two (SS 2) students in Fine Arts when taught using animated graphics and when taught using static graphics.
2. Determine the effects of animated and static graphics on Senior Secondary Two (SS 2) students' performances on Fine Arts based on gender.

Research Questions

The following research questions were raised to guide the study:

1. What differences exist between the mean scores of Senior Secondary Two (SS 2) students in Fine Arts when taught using animated graphics and when taught using static graphics?
2. How does gender differentiate Senior Secondary Two (SS 2) students' performances in Fine Arts when taught using animated graphics and when taught using static graphic?

Research Hypotheses

The following research hypotheses were tested at .05 level of significance:

1. There is no significant difference between the mean scores of Senior Secondary Two (SS 2) students in Fine Arts when taught using animated graphics and when taught using static graphics.
2. There is no significant difference between the mean scores of male and female Senior Secondary Two (SS 2) students in Fine Arts when taught using animated graphics and when taught using static graphics.

Methodology

Design of the Study

This was a quasi experimental study and non-randomized pre-test-post-test control group design was used. This design was considered appropriate since the students were used in their intact class setting. Structurally the design is represented as follows:

E: $O_1 \times O_2$

C: $O_1 \cdot O_2$

Where: E = Experimental Group (taught-using Animated graphics)

C = Control group (taught using Static graphics)

O_1 = Pre-test measurements

Population of the Study

The population of the study consisted of all the 1,860 Senior Secondary Two students in public secondary schools in Uyo Local Government, Akwa Ibom State, Nigeria, who enrolled in the second term of the 2014/2015 academic session (State Secondary Education Board, Uyo, 2015).

Sample and Sampling Technique

The sample of the study consisted of 86 Senior Secondary Two (SS 2) students (56 male and 30 female) in two intact Fine Arts classes in two randomly selected secondary schools from among the fifteen (15) secondary schools offering the subject at the secondary schools level in the State.

Instrumentation

A researcher-developed instrument tagged *Performance Test on Fine Art* (PTFA) was used to collect data for the study. PTFA was a twenty-five (25) item; 4-option multiple-choice objective test developed to measure the students' understanding of the concept investigated. The test was used for pre-test measurement and its reshuffled version (items rearranged in reverse order) was used for post-test measurement.

For face and content validity, the objectives of the study and the draft of the instrument which contained 40 items were submitted to three independent assessors (two experts in Fine Arts and one expert in educational measurement and evaluation, all of the University of Uyo, Uyo) to check for content coverage, appropriateness of the items and clarity of language used considering the academic level of the students. Based on their suggestions some of the items were either dropped or restructured, thus bringing the number in the final form of the instrument to twenty-five.

The reliability of the instrument was determined using test-retest procedure using twenty Fine Arts students in a school not selected for

the main study as trial test sample. The scores obtained were correlated using Pearson Product Moment Correlation index. The result gave a reliability index of .76, indicating a high positive correlation between the two test results. Hence, the instrument was considered good enough to measure the intended events with consistency.

Research Procedure

After obtaining permission from the management of the selected schools to use their schools for the study, the researcher met with the subject teachers of the selected classes and requested their help as research assistants. Thereafter, he took one week to train them on how to use the researchers' instructional packages developed for the purpose to teach their respective groups. The assignment of the selected schools as experimental and control groups was done by simple random sampling technique. Following the training of the research assistants, PTFA was administered to the groups as pre-test before the commencement of classroom investigation. The experimental group was taught using computer animated graphics and the control group was taught using the conventional static graphics - textbooks, charts, graphs and other related materials. The two groups were made to undergo eight (8) weeks of intensive class work. At the end of the eighth week the reshuffled PTFA was administered to the two groups as post-test. Scores generated from the two tests were collated and analyzed by the researcher using independent t-test and Analysis of Covariance (ANCOVA). The two research questions raised were answered using mean scores: hypothesis one was tested using independent t-test and hypothesis two was tested using Analysis of Covariance (ANCOVA).

Results

Research Question One: What differences exist between the mean scores of Senior Secondary Two (SS 2) students in Fine Arts when taught using animated graphics and when taught using static graphics?

Table 1: Pre-test and Post-test Mean and Standard Deviation Scores by Treatment Groups

Treatment Groups	n	Pre-test		Post-test		Mean Difference
		Mean	Std. Dev.	Mean	Std. Dev.	
Animated Graphics	44	25.34	12.36	60.07	11.70	34.73
Static Graphics	42	24.05	11.11	54.29	9.85	30.24

The post-test-pre-test mean difference of 34.73 and 30.24 for students in animated graphics and static graphics groups, respectively, show that students in computer animated graphics group performed better than their counterparts in static graphics group.

Research Hypothesis One: There is no significant difference between the mean scores of Senior Secondary Two (SS 2) students in Fine Arts when taught using animated graphics and when taught using static graphics.

Table 2: Independent t-test summary of post test scores by treatment groups

Treatment Groups	n	Mean	Std. Dev.	df	t-cal	Sig. (2-tailed)
Animated Graphics	44	60.07	11.703	84	2.47	.015
Static Graphics	42	54.29	9.851			

The results in Table 2 a calculated t-value of 2.47 and a calculated probability level of .015 at df 84. The calculated probability level of .015 is less than .05 alpha in which the decision is based indicating that the observed mean difference was statistically significant, hence, null hypothesis one was rejected.

Research Question Two: How does gender differentiate Senior Secondary Two (SS 2) students' performances in Fine Arts when taught using animated graphics and when taught using static graphic?

Table 3: Pre-test and Post-test mean and standard deviation scores by treatment groups and gender

Treatment Groups	Gender	n	Pre-test		Post-test		Mean Difference
			Mean	Std. Dev.	Mean	Std. Dev.	
Animated Graphics	Male	24	28.96	9.67	64.08	9.00	35.12
	Female	20	21.00	12.36	55.25	12.92	34.25
Static Graphics	Male	32	26.72	10.60	55.16	10.12	28.44
	Female	10	21.50	8.32	51.50	6.84	30.00

The post-test-pre-test mean difference of 35.12 and 34.25 for male and female students in animated graphics and groups, respectively; and 28.44 and 30.00 for male and female students, respectively, in static graphics group show that both male and female students in computer animated graphics group performed better than their counterparts in static graphics group.

Research Hypotheses Two: There is no significant difference between the mean scores of male and female Senior Secondary Two (SS 2) students in Fine Arts when taught using animated graphics and when taught using static graphics.

Table 4: Analysis of Covariance (ANCOVA) summary of post test scores by treatment groups and gender

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Pretest (Covariate)	3643.87	1	3643.87	56.00	.00
Treatment	279.64	1	279.64	4.30	.04
Gender	3.14	1	3.14	.05	.83
Treatment * Gender	228.05	1	228.05	3.51	.07
Error	5270.43	81	65.07	-	-
Corrected Total	10585.87	85	-	-	-

In Table 4 the calculated F-value of 4.30 for the effect of instructional materials used and its corresponding probability level of .04 at df 1, 83 (which is less than .05 alpha in which the decision is based) indicate that the observed mean differences in students' performances were statistically significant, thereby affirming the earlier observation in Table 2. However, the calculated F-value of .05 for the effect of gender and its corresponding probability level of .83 at df 1, 83 (which is greater than .05 alpha in which the decision is based) indicate that the effect of gender on the students' performances in Fine Arts when taught using animated graphics and when taught using static graphics was not statistically significant, hence, null hypothesis two was upheld.

Summary of Findings

From the results in Tables 1-4 it has been observed that the instructional materials used exerted statistically significant effect on the students' performances in Fine Arts in favour of animated graphics. However, there was no statistically significant effect of gender on the students'

performances in Fine Arts when taught using animated graphics and when taught using static graphics.

Discussion and Conclusion

The observed statistically significant effect of instructional materials used on the students' performances in Fine Arts in favour of animated graphics indicates the greater potential of animated graphics in facilitating learners' concept attainment in the area of Fine Arts compared with static graphics. The observation is explained in terms of animations ability to express sequential changes directly, instead of indirectly using supporting markings and motion lines. As a result, the learners are spared the rigour of mental animation of having to interpret the ancillary markings and trying to deduce the changes that they abridge. The finding corroborates the observation by Nyah (2014) that computer graphics facilitate students' understanding of concepts in Fine Arts better than static graphics.

With respect to gender effect on the students' performances in Fine Arts given the instructional materials used the results showed no statistically significant difference. That is, the effect of gender was the same at all levels of treatment and vice versa. In other words, gender is not a significant predictor of students' performances in Fine Arts.

Conclusion

Consequent upon the findings of this study, it is concluded that animated graphics facilitates learners' concept attainment in Fine Arts better than static graphics; and that gender is not a significant predictor of students' performances in Fine Arts.

Recommendations

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

1. In view of the better facilitative effect Computer animated graphics have on students' performances in Fine Arts compared with static graphics, it is hereby recommended that all Fine Arts teachers make effective use of this instructional media in teaching the subject.
2. To ensure effective implementation of this approach, it is hereby recommended that the government and other stakeholders in the education sector equip the schools with necessary facilities like

computer units and appropriate software packages.

3. It is also recommended that the government and other stakeholders in the education sector organize regular workshops for teachers on the use of computer-aided instructional packages for enhancing classroom instructions.

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