



Effect of Multimedia Packages on Students' Achievement in Creative Arts in Upper Basic Education in Rivers State, Nigeria

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ABSTRACT

This study investigated the effect of multimedia packages on students' achievement in Creative Arts in Upper Basic Education in Rivers State, Nigeria. Three research questions and three hypotheses were set up to guide the study. Quasi-experimental research design was adopted for the study. 2,118 (2020/2021 session) Basic Education eight (JSSII) students from 13 public Junior Secondary Schools in Andoni education zone formed the population. The sample size for the study was 183 JSSII students. Creative Arts Achievement Test CAAT was used in data collection for the study. The instrument was developed by the researchers and validated by experts. CAAT was tested with Kuder Richardson (K-20) CCAAT obtained a reliability index of 0.73. Multimedia package (text-audio) was developed for group one and multimedia package audio-video was for group two. The research questions were answered using mean and standard deviation while analysis of Covariance (ANCOVA) was used to test the null hypotheses at 0.05 level of significance. The findings from this study shows that students taught Creative Arts with the use of Multimedia package (audio-video, Mean= 62.94) achieved higher than those taught with multimedia (text-audio, Mean=53.25). Multimedia packages (text-audio and audio-video) were found to be gender friendly (Mean=57.52 vs Mean= 55.14). Thus the researchers recommend that teachers should adopt multimedia audio-video package in teaching CCA.

Keywords: Multimedia Packages; Achievement; Creative Arts; Gender

INTRODUCTION

Creative Arts CA is a practical oriented subject with contains woven around painting, drawing, graphics, sculpture and ceramics etc, the approach for teaching Creative Arts has always been taught with the use of pictures, charts and all forms of images that are capable of enhancing learning. But, with wide usage of multimedia in teaching other subjects areas it became eminent that multimedia can be used in teaching Creative Arts because of its advantages in teaching several subjects (Akinoso, 2018). Moreover, there is one driving force behind the use of multimedia presentation and packages in education and it is the belief that individual differences exist among students on how well they learn from auditory, visual and verbal materials (Andresen & Brink 2013). Hence the provision of audio, audiovisual and textual version of the information in every topic became necessary and beneficial. Some other factors that stimulates the use of multimedia instruction is the belief that certain media can be used to teach more effectively than others, saves time and reduces cost (Andresen & Brink, 2013).

Multimedia has been defined in many ways, but most of the definitions agreed on the characteristic that multimedia contain texts, graphics, animations, video and sound in an integrated way and the content can be structured and presented differently (Park 2013;Incedayi 2018). Moreover, Mayer (2001) stated that an

“instructional delivery involving the use of VCD/DVD, power point or 16mm film is a multimedia presentation; hence still-pictures, text, graphics, video, and background sound are combined at the same time in order to enhance learners’ understanding of a concept” (p. 44).

Multimedia packages involves arrangement and coordination of different media such as text, still and moving images, graphics, audio and animation, where all types of information can be represented, stored, transmitted and processed digitally (Akinoso, 2018). Multimedia is also a digital combination and manipulation of text, photographs, graphics, sound, animation, and videos in delivering instruction (Vaughan 2011). Multimedia package may involve arrangement and coordination of different interactive elements such as text, video, graphics and animation in digital lessons delivery. Multimedia can be seen and defined in two major ways; one as a deliberate combination of several media such as text, audio, video, animation, graphics and others to facilitate information delivery (Babiker, 2015) Similarly Okwu, and Mbaba (2023) postulated that “Multimedia is the combination of various digital media, into cohesive interactive presentation to deliver a message to an audience through the computer” (p. 207). Drawn from the definitions above multimedia can be conceptualized as the presentation of information via a combined media such as audio, Video, text, animation and others for the purpose of enhancing effective information storage and delivery.

There are several studies on the use of multimedia in lessons delivery across science, arts, humanities etc. One of the studies that examined the effect of computer-based multimedia presentation on senior secondary students’ achievement in Agricultural science was carried out by Olori and Igbosamu (2016) the findings showed that computer-based multimedia presentation has high efficacy over conventional classroom lesson presentation. Shah and Khan (2015) examined the comparative effectiveness of multimedia-aided teaching on students’ academic achievement and attitude at elementary level in teaching of science, the results indicated that multimedia aided teaching is more effective than the traditional approach. Sharma (2013) studied the effect of multimedia on students’ achievement and retention in English Language the findings shows that multimedia was capable of enhancing effective learning and retention among students. These studies and many others have determined the efficacy of multimedia in different subject areas, yet there are no sufficient studies carried out to determine the effect of the different multimedia interactive elements on students’ performance in Creative Arts, hence the need for this study.

Gender difference has been identified as a variable that influences learning. Tong and Klecun (2012) observed that gender issues are related to a variety of activities and abilities in a multimedia environment. According to the authors, gender differences do not influence the developments in multimedia technology. Okwo and Mbaba (2023) also studied the efficacy of multimedia elements on students’ learning abilities, the results shows that high ability learners performed better across the two experimental groups. Thus, multimedia could not influence the type of multimedia used. But, multimedia technology developments cause identifiable gender differences. This difference has influenced learning and achievement of students though the influence has not been consistent in favour of male or female. Balogun (2013) reported that gender has significant influence on achievement of students when multimedia packages are used in teaching. But other studies reported that gender does not influence learning outcome in a multimedia lessons (Abidoye 2015). This situation therefore sustains the curiosity of researchers on this subject, making it necessary for the need to understand how achievement is influenced by gender in Creative Arts with the use of multimedia packages.

The use of multimedia packages can enhance students’ learning processes according to their abilities and preferences. Students can work according to their pace as they want, and reducing embarrassment concerning their learning outcomes (Incedayi, 2018). The use of multimedia can be tailored to the students’ differences in interests, social and cultural backgrounds, learning preferences and rates. Finally, multimedia is able to influence students ability when appropriate media elements are used under an appropriate learning condition and to the appropriate grade.

There are several multimedia packages used in teaching different subjects and topics, lot of it has been find to be effective. However, one multimedia package may be good for a particular subject area or grade and be ineffective when used for some other level or subject area. This challenge raised the curiosity to

determine the effectiveness of multimedia elements before usage in teaching any given subject and grade. Despite the quest to use multimedia packages in teaching Creative Arts the efficacy of the different multimedia elements such as text-audio, audio-video or animation and many others in CA classes has not been determined hence it is not clear if students' achievement would improve when used. It is not also clear if the use of multimedia shall be gender friendly or otherwise, these issues triggered the need to investigate effect of multimedia packages on students' achievement in Creative Arts.

Objectives of the Study

The objective of this study was to determine the effect of multimedia packages on students' achievement in CA in Upper Basic Schools. Specifically, the study determined the:

- 1) effect of Multimedia packages (text-audio and audio -video) on students' mean achievement scores in CA;
- 2) effect of multimedia packages on the mean achievement scores of male and female students in CA;
- 3) the interaction effect of multimedia packages and gender on students achievement in CA;

Research Questions

The following research questions were posed to guide the study:

- 1) What is the effect of Multimedia packages (text-audio and audio-video) on students' mean achievement?
- 2) What is the effect of multimedia packages (text-audio and audio-video) on the mean achievement scores of male and female students in CA?
- 3) What is the interaction effect of multimedia packages and gender on students achievement in CA;

Hypotheses

The following null hypotheses were posed for this study:

HO₁. There is no significant difference between the mean achievement scores of students taught CA using Multimedia package (text-audio) and those taught using audio-video;

HO₂ There is no significant difference in the mean achievement scores of male and female students taught CA with the use of multimedia packages;

HO₃ There is no significant interaction effects of multimedia packages and gender on students' mean achievement scores in CA.

METHODOLOGY

The research design adopted for this study is a quasi-experimental with pre-test and post-test. It is a type of enquiry that include management of independent variable as the treatment or intervention; and randomization of subject with respect to treatment conditions (Kothari, 2011).

The population for this study is 2,118 (2018/2019 session) JSSII students (1,107 male and 1,011 females) from 13 public Junior Secondary Schools in Andoni education zone, River State. Purposive sampling was adopted to select schools that have facilities such as television set, generator, computers, DVD set, projectors from the 13 Junior Secondary Schools in Andoni education zone. Simple random sampling was used to sample two schools from the five schools that met the requirement. There were two intact classes each in the two sampled schools. 183 JSS II students (99 males, 84 females) in the two sampled schools were used for the study. 62 students from 183 sampled students have high ability and 121 are low ability students. The two sampled schools were randomly assigned to treatment conditions using simple random sampling technique.

The test instrument used for collecting data in this study was Creative Arts Achievement Test (CAAT). CAAT was developed by the researchers in line with the selected CA content for JSS II curriculum. CAAT comprises of 40 multiple choice test items. CAAT was given face and construct validity by two experts in Creative Arts, a specialist in Educational Technology from the Department of Arts Education and a specialist in Measurement and Evaluation (Department of Science Education), University of Nigeria Nsukka. The treatment instruments comprised of multimedia (text-audio package) for experimental group one (audio-video package) for experimental group two. These multimedia packages were prepared by the researchers; both packages consist of instructions on the following: (i) Colour and colour mixing

(ii) Art design (iii) Craft. Both digital text-audio and audio-video packages were also validated and presented in the classroom through multimedia projector.

The validated instruments were trial tested on 20 JSSII students in two junior secondary schools in Opobo/Nkoro LGA (Community Secondary School Kalasunju and Government Junior Secondary School Opobo). The reliability of CAAT was computed using Kuder-Richardson (K-R20) reliability method which yielded a reliability index of 0.73, this was considered suitable for the study. CAAT was administered to both groups as pretest, after six weeks of treatments, CAAT was reshuffled and administered to the two groups as posttest and the data collected from the study were analyzed using Mean, Standard Deviation and ANCOVA. The Mean and Standard Deviation were used to answer the research questions. Analysis of Covariance (ANCOVA) with pre-test as a covariate was used to test the hypotheses formulated for the study at 0.05 level of significance.

RESULTS:

Research question 1: *What is the effect of Multimedia packages (text-audio and audio-video) on students' mean achievement?*

Table 1: Mean Achievement Scores and Standard Deviation of Students taught Creative Arts

Method	N	Pretest		Posttest		Mean Gain
		Mean	SD	Mean	SD	
Text Audio	97	31.39	8.67	53.25	7.93	21.86
Audio Video	86	32.01	9.12	62.94	9.66	30.93

Table 1 presents the pretest mean achievement scores of text-audio and audio-video groups as 31.39 with standard deviation (SD) of 8.67 and 32.01 with SD of 9.12 respectively. The posttest mean achievement scores of text-audio and audio-video groups are 53.25 with SD of 7.93 and 62.94 with SD of 9.66 respectively. The text-audio group had a mean gain of 21.86 while audio-video group had a mean gain of 30.93. The result shows that students in the audio-video group achieved higher than their counterparts in text-audio group.

Research Question 2: *What is the effect of multimedia packages (text-audio and audio-video) on the mean achievement scores of male and female students in CA?*

Table 2: Effect of Multimedia Packages on male and female students' achievement

Packages	Gender	N	Pretest		Posttest		Mean Gain
			Mean	SD	Mean	SD	
Text Audio	Male	51	30.84	8.99	52.05	7.90	21.21
	Female	46	31.99	8.35	54.58	7.83	22.59
Audio-Video	Male	48	32.75	8.18	63.33	9.62	30.58
	Female	38	31.07	10.22	62.45	9.82	31.38

Table2: Indicates that the male students in the text-audio group had a mean achievement posttest score of 52.05 with SD of 7.90 and a mean gain of 21.21 while their female counterparts in the same group had a mean of 54.58 with SD of 7.83 and a mean gain of 22.59. The male students in the audio-video group had a posttest mean of 63.33, SD of 9.62 with a mean gain of 30.58, while their female counterparts in the same group had a posttest mean score of 62.45, SD of 9.81, with a mean gain of 31.38. Since both male and female students in the audio-video (with small difference in their mean gains) outperformed their counterparts in the text-audio group, it indicates that approach and gender had no interaction effect on students' achievement in CCA. Gender did not combine with approaches used to influence students' achievement.

Research Question 3: *What is the interaction effect of multimedia packages and gender on students' achievement in CCA?*

Table 3: Interaction Effect of Approach and Gender on Students' achievement in CA in Junior Secondary Schools

Packages	Gender	N	Pretest		Posttest		Mean Gain
			Mean	SD	Mean	SD	
Text Audio	Male	51	30.84	8.99	52.05	7.90	21.21
	Female	46	31.99	8.35	54.58	7.83	22.59
Audio-Video	Male	48	32.75	8.18	63.33	9.62	30.58
	Female	38	31.07	10.22	62.45	9.82	31.38

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Hypotheses

H0₁: There is no significant difference between the mean achievement scores of students taught CA using Multimedia package (text-audio) and those taught using audio-video.

Table 4: Summary of ANCOVA for Mean Achievement Scores of Students

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision
Corrected Model	6231.067 ^a	2	3115.533	46.633	.000	
Intercept	21919.248	1	21919.248	328.084	.000	
Pretest	1944.864	1	1944.864	29.110	.000	
Method	1616.911	1	1616.911	24.202	.000	S
Error	12025.770	180	66.810			
Total	629723.040	183				
Corrected Total	18256.837	182				

a. R Squared = .341 (Adjusted R Squared = .334)

S – Significant (p < 0.05)

Table 4: shows that F- value of **24.202** is significant at **.000**. Because this probability value (**.000**) is less than 0.05 level of significance, the null hypothesis is here by rejected. Therefore, there is a significant difference in the mean achievement scores of students taught CA using Multimedia digital text-audio and those taught using digital audio-video in junior secondary schools. The difference is in favour of multimedia audio-video group.

H0₃: There is no significant difference in the mean achievement scores of male and female students taught CA with multimedia packages

Table 5: Summary of ANCOVA for Mean Achievement Scores of male and female Students

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision
Corrected Model	4666.350 ^a	2	2333.175	30.902	.000	
Intercept	20918.464	1	20918.464	277.056	.000	
Pretest	4648.934	1	4648.934	61.573	.000	
Gender	52.195	1	52.195	.691	.407	NS
Error	13590.486	180	75.503			
Total	629723.040	183				
Corrected Total	18256.837	182				

a. R Squared = .256 (Adjusted R Squared = .247)

NS – Not Significant ($p > 0.05$)

Table 5: shows that F-value is **.691** and has a probability value **.407**. This probability value is higher than 0.05 level of significance; the null hypothesis is accepted. Hence, there is no significant difference between the mean achievement scores of male and female students taught Creative Art using multimedia packages.

H0₃: There is no significant interaction effect of multimedia packages and gender on students' achievement in CA

Table 6: Summary of ANCOVA for Interaction Effect of Multimedia Approach and Gender on Students' Achievement

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision
Corrected Model	6378.808 ^a	4	1594.702	23.898	.000	
Intercept	21959.217	1	21959.217	329.073	.000	
Pretest	1921.704	1	1921.704	28.798	.000	
Method	1577.856	1	1577.856	23.645	.000	
Gender	51.397	1	51.397	.770	.381	
Method * Gender	86.697	1	86.697	1.299	.256	NS
Error	11878.029	178	66.730			
Total	629723.040	183				
Corrected Total	18256.837	182				

a. R Squared = .349 (Adjusted R Squared = .335)

NS – Not Significant ($p > 0.05$)

From table 6, it can be observed that F value 1.299 has a probability value of .256. The probability value is greater than 0.05 ($P > 0.05$) level of significance. Therefore, the null hypothesis is not rejected. Thus, there is no significant interaction effect of multimedia package and gender on students' achievement in CA.

DISCUSSION

The findings of this study shows that students mean achievement score in audio-video group (Mean =62.94 SD=9.66) improved considerably higher than their counterpart in text-audio (Mean = 53.25 SD=7.93). The test of hypothesis one revealed a significant difference in the mean achievement scores of the two groups in favour of audio-video group. The findings of this study is in agreement with the findings of Tukura (2015) who studied effect of developed digital video disc instruction on students achievement in social studies and find out that students in video class performed more better than those in traditional lecture classroom. The study is also in line with other studies that find out that students exposed to video instruction had greater achievement mean scores than those exposed to audio and

pictures (Adegoke, 2011 & Sharma, 2013). However, this finding is in disagreement with Valerie and John (2000) whose findings showed that there is no significant difference between interactive multimedia and the conventional teaching in students' mean achievement scores.

Findings from this study also shows a significant difference in the mean achievement scores of students with low and high ability levels taught Creative Arts in Upper Basic schools in favour of high ability across text-audio and audio-video groups. This finding stand out to show that students' ability is superior and cannot be influence by multimedia packages hence the low ability students could not outperform the high ability in all the groups. The finding of this study also reveals that female students achieved slightly higher (Mean = 58.14) than their male counterpart (Mean = 57.52). However, the test of hypothesis three shows that the difference is not significant. The implication of this is that in this study gender does not influence students' achievement in multimedia instructions. This present finding is in support of that of Owolabi and Ogoni (2013) that investigated effect of animation in multimedia teaching on academic performance of students in sciences and established no significant difference in the achievement of male and female students. The finding also confirmed the study of Udousoro (2011) whose study revealed that there is no significant difference between male and female students in the use of multimedia. The absence of significant interaction effect of multimedia packages and gender on students' mean achievement scores in this study may be attributed to the fact that multimedia packages do not provide gender differences in learning.

RECOMMENDATIONS

As a result of the findings of this study the following recommendations were forwarded:

1. Teachers should adopt multimedia audio-video package in teaching CA;
2. the use of multimedia packages in schools should be supported and encouraged among CA teachers;
3. multimedia packages are gender insensitive, based on the findings of this study, thus it should be adopted for teaching both male and female students;

CONCLUSION

Based on the findings of this study, there is an observable statistical significant difference in the achievement of audio-video instructional package as against those taught with multimedia text-audio. No significant difference was found in the mean achievement scores of male and female students. The study also revealed that there is no interaction effect of packages and gender on achievement.

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