



Effect of 3 Dimensional Innovative Instructional Visuals on Performances of Senior Secondary Students Visual Arts in Africa Schools- Case Study IFO, Ogun State Nigeria

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ABSTRACT Art is a dynamic subject and mostly built on 3 dimensional forms in lower stage and fades to 2 dimensional form while advancing to the higher stage. Therefore, the research investigated the influence of gender and ability levels on the performance of students' taught with 3 dimensional innovative instructional visual. The quasi-experimental type of design, that is, the pre-test, post-test, non-randomized, non-equivalent control group of the design was in use for the study. Research sample was drawn from five randomly selected visual offering students' senior secondary schools of each quarter of the town. The selected random samples for the study were gender grouped with the use of Visual Arts and Creative Arts Performance Test, and 3 Dimensional Innovative Instructional Package instrument. Visual Arts and Creative Arts Performance Test was pilot tested for reliability using the test-retest method of three weeks interval and Pearson Product Correlation analysis revealed a reliability coefficient value of 0.77. The four questions and two hypotheses were tested using Analysis of Covariance. Findings indicated that the students taught 3 Dimensional Innovative Instructional were not significantly superior over those taught without. Based on the findings, it was recommended that, 3 Dimensional Innovative Instruction should be encouraged in teaching Visual Arts. It was recommended that 3 Dimensional Innovative Instructional Package should be developed for teaching Visual Arts topics in the Nigerian Schools

INTRODUCTION

Art is a peculiar subject that studies human being in his communication within the culture and the degree of his appreciation to preserve the culture. Art is generally accepted as an individual medium of expression which provides power to demonstrate aesthetic, awareness, and emotional, usual development through perceptual and creative activities. In essence, Smith and McGannon (2018) submitted that art is purely of individual product and expressions which exhibits through skills in diverse form. Arts is major subject taught globally in schools and colleges. It has relevance as the universal language of communication, identification, and beautification. Art is visual and non - visual. Visual arts are visible products while non - visual arts are categorized as lively artistic or imaginative that are targeted to the public through entertainment. Visual arts can further be grouped to fine arts and applied arts in the curriculum but are optional to Cultural and Creative Arts for

Junior School within the scope of National Examination Council (NECO), the recognized authoritative examination body in Nigeria British Educational and Communication Technology Agency, 2003 (Odewumi and Okonkwo 2017).

Visual is paramount to eyes, the wheel on which visual arts are built. The 3 Dimensional instructional visuals are concrete objects with the attribute of length, width and height (Lewis 2008; Martinez-Conde and Macknik 2016). A visual resource generally makes teaching meaningful and effective. It is majorly credited to sustaining attention and motivating learners when judiciously used to introduce, deliver and conclude instructional content delivery (Taiwo and Oamen 2018).

However, the visuals: size, shape, texture, colour and position of object are obviously important as this conforms to stimulate learners' senses. In addition, previous studies on 3 Dimensional noted that it is a sequence developed on intention, in the creative world of sketches, designs and development of visuals (Vyas et al.

2013). It also manifests in AutoCAD drawing and designing and are of quality to 3 Dimensional group of visual, that are also utilized for designing, modelling and construction of vehicles and structures in engineering studies and sciences (Van de Kamp et al. 2015). Architecture manipulates 3 Dimensional in designing, constructing and drawing to elicit perfect structures and landscapes (Akboy-Ilk 2017). Artists utilise 3 Dimensional to constructs basic geometric shapes, lines and abstract forms for drawings, creating designs, but mostly silence in non-literary arts (Hornby 2004; Designmodo 2012). Fashion designers also use 3 Dimensional features to compliment the designed outfit and patterns on regalia, the combination 3 Dimensional geometrical forms and patterns of different colours on the surface of manufactured garments (Kim and Cho 2007; Cho 2007; Agaç and Sakarya 2015).

Review of Literature

Fundamental design of 3 Dimensional basic shapes of visuals are a product on which the camera, moving and still image foundations were laid on photography (Quarles and Davis 2017). The virtual environment has provided an opportunities for evolutionary design of 3 Dimensional structures technologically. Computer graphics designs evolve geometry and modification of visuals in 3 Dimensional artistry of great metaphors (Novotny et al. 2019).

The world is a global village of 3 Dimensional virtual forms, network technologies and computing powers are developed towards 3 Dimensional Internet where users react to electronic media in the 3 Dimensional environments for both students and teachers (Goyanes et al. 2016).

More so, 3 Dimensional features in educational processes. Studies have established that 3 Dimensional are more useful globally for creating instructional visuals which are used in traditional classrooms and distance learning setups. 3 Dimensional also promotes learning in virtual worlds and offers a unique environment for both the learners and instructor to solve the problem of distance instruction (Reisoglu et al. 2017). In essence, 3 Dimensional is an educational ideal used in computer-based programmes, empha-

sised and utilised in all educational disciplines to elicit positive response (Laurillard 2013).

Hence, the adoption of avatars in 3 Dimensional offers margins of educational text-based. In addition, computer-mediated communication create an avenue to display in real-time, nonverbal and interpersonal communication cues such as gestures and sensitive states in 3 dimensional (Wynia 2017). On gender and 3 Dimensional, it was established that very few women are in computer science programming studies and engineering due to the fear of 3 Dimensional computer-generated invention (Goldman and Penner 2016). Studies revealed that girls or women (boys or men) engaging in the playing 3 Dimensional games and that Female 3 Dimensional game players were of slower in action than the male counterpart players (Akana et al. 2016).

3 Dimensional video games are collaborative as well as exploratory for gender but female act of shying frighten them away from engaging in such playing with the opposite sex (Rido et al. 2016; Heeter and Winn 2008). Previous studies portrayed 3 Dimensional games, as a larger sphere of gender and technology know-how (Nahyun and Hana 2017). The gender physique figures of a man structured in 3 Dimensional facial expressions, generally possess a larger amount of asymmetry for male than female (Wu et al. 2016). The largest temples of 3 Dimensional deities of male and females' statues in sitting position, of clay medium and painted from different leaves were found at Nako (Li et al. 2017).

Although the system of instruction in Nigeria is dominated mainly by the instructor while the learners are passive, this practice could be boring after a while. In the arts sector, the 3 Dimensional features prominently in all the Visual arts curriculum in Nigeria but little is used in educating learners, this may be because of constraint of time, availability of appropriate materials and knowledgeable hand. The extent of which the 3 Dimensional instructions can enhance instructional delivery particularly in the visual arts in Nigeria is still unknown. This study investigated the effect of 3 Dimensional instructions on the performance of senior secondary school students in Visual Art. It also examined gender influence on the performances of students taught using 3 Dimensional instructions.

Research Questions

The following questions were raised to guide the study:

1. What is the effect of 3 Dimensional on the students' academic performance of Visual arts?
2. What is the effect of 3 Dimensional on the male and female students' academic performances of Visual arts?
3. What is the difference in the performances of students taught using 3 Dimensional innovative instructional visual and those taught with conventional learning strategy.
4. What is the difference in the mean scores performance of girls and boys taught Visual arts with 3 Dimensional innovative instructional visual.

Research Hypotheses

These hypotheses were tested at 0.05 levels of significance:

1. There is no significant difference in the performance of students taught using 3 Dimensional Innovative Instructional Visual and those taught with Conventional Learning Strategy.
2. There is no significant difference in the performance of male and female students taught using 3 Dimensional Innovative Instructional Visual.

METHODOLOGY

The research design employed for this study was a quasi-experimental type of the pre-test, post-test, not-randomized, control group design. The design is a 2x2 factorial design. The sample, in order to eliminate bias and to have a fairly representative sample size for the study, two techniques of sampling were used: purposive and simple random sampling techniques. A hundred students were chosen and five schools were randomly selected from the Local Government in Ifo. Twenty students of which twelve were boys and eight were girls, were chosen from each selected schools. On the whole, there were 60 boys and 40 girls. A purposive sampling technique was used to divide the sample into two groups (3 dimensional and conventional

groups). The selection of the schools were based on the following criteria: a mixed school, visual oriented school and presenting students for both NECO WASSCE for the past five years, availability of art personnel, art studio, and a mini hall with electricity.

Research Instruments

Research Instrument used for this study was 3 Dimensional Innovative Instructional Package, and the test instruments Creative Arts Performance Test (CAPT). The treatment instrument, 3 Dimensional Package, was developed by the researchers, with the assistance of an experienced graphic artist. It was a package form with different art media on half imperial white cardboard. It was scan and convert to slides without wordings, the instructor voice would be heard during presentation of the projected visuals. The visual package lasted for eight hours, containing six lessons structured into modules.

The topics of the package was based on the rudiment of Visual arts the element and the principles of arts: Lines, basic shapes, perspectives, all were from the Senior Secondary Visual Arts curriculum in Nigeria. The 3 Dimensional Package passed through, senior fine and applied arts lecturers and experienced Visual Arts teacher and a professor of fine arts for face and content validity. The test instrument, "Visual Arts Test (VAT)" was made up of 20 items multiple-choice objective test with five option each, selected from validated National Examination Council Visual arts question papers.

The Creative Arts Test was given to measure the performances of students in both the experimental and control groups for both the pre-test (covariate) and post-test. For the experiment group, the researcher teaches the lesson after school hours with 3 Dimensional packages. The researcher and researcher team teach the traditional group with the appropriate instructional materials. The Analysis of covariance (ANCOVA) statistic was used to calculate the student's pre-test and post-test scores of each student.

Procedure for Data Collection

All the groups (experimental and control groups) were subjected to the Visual Arts Test as pre-test, after which the students in the experi-

mental group were exposed to 3 Dimensional innovative instructional package through the researcher, while the control group students were exposed to the conventional teaching method on the same content used for experimental groups.

They were taught using conventional classroom format with appropriate instructional materials which lasted for six weeks. After the treatment, the two groups were exposed to the Creative Arts Performance Test which had been rearranged as a post-test.

Research Question 1

What is the effect of 3 Dimensional on the students’ academic performance of Visual arts?

The mean and standard deviation scores of students, on 3 Dimensional innovative instructional package and those taught with conventional learning strategy was used to answer this question as shown in Table 1.

Table 1 shows the pre-test mean scores of 7.80 and standard deviation of 1.71 for students taught using conventional learning strategy and pre - test mean scores of 8.30 and standard deviation of 1.35 for those taught with 3 Dimensional innovative instructional visual.

Research Question 2

What is the effect of 3 Dimensional on male and female students’ academic performance of Visual arts? The mean and standard deviation scores of male and female 3 Dimensional innovative instructional package and those taught with conventional learning strategy was used to answer this question as shown in Table 2.

Table 2 shows the pre-test mean scores of 8.00 and standard deviation of 1.44 for male students taught using conventional learning strategy and pre - test mean scores of 8.10 and standard deviation of 1.74 for female taught with 3 Dimensional innovative instructional package.

RESULTS

Hypothesis 1

There is no significant difference in the performance of students taught using 3 Dimensional innovative instructional package and those taught with conventional learning strategy.

To test this hypothesis, Analysis of covariance (ANCOVA) static was used to compare the mean scores of students in 3 Dimensional Innovative Instructional Package and those taught with Conventional Learning Strategy with the pre-test scores serving as covariates. The result is as reflected in Table 3.

From Table 3 it can be seen that the calculated F value of .674 is not significant because the significant value of .416 is more than 0.05 alpha level. This result implies that there is no significant difference between the post-test mean scores of the 3 Dimensional innovative instructional package and those taught with conventional learning strategy, therefore null hypothesis one is thereby not rejected.

Hypothesis 2

There is no significant difference in the performance of male and female students taught using 3 Dimensional Innovative Instructional Package.

Table 1: The mean and standard deviation scores of students taught with 3 dimensional innovative instructional package and those with conventional strategy

<i>Variable</i>	<i>N</i>	<i>Pre-test mean</i>	<i>Post-test mean</i>	<i>Pre std. deviation</i>	<i>Post std. deviation</i>
Group 1	50	7.80	13.72	1.71	2.15
Group 2	50	8.30	13.30	1.35	2.01

Table 2: The mean and standard deviation of male and female 3 dimensional innovative instructional package and those with conventional strategy

<i>Variable</i>	<i>N</i>	<i>Pre-test mean</i>	<i>Post-test mean</i>	<i>Pre std. deviation</i>	<i>Post std. deviation</i>
Male	60	8.00	13.35	1.44	1.90
Female	40	8.10	13.75	1.74	2.30

Table 3: Analysis of covariance (ANCOVA) on the post-test scores of students in the experimental and control groups

<i>Source</i>	<i>Type III sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
Corrected Model	9.474 ^a	2	4.737	2.937	.063
Intercept	22.234	1	22.234	13.785	.001
post1	8.509	1	8.509	5.276	.026
pre1	1.088	1	1.088	.674	.416
Error	75.806	47	1.613		
Total	3190.000	50			
Corrected Total	85.280	49			

This hypothesis was tested with the Analysis of covariance (ANCOVA) static was used to compare the mean scores of male and students in 3 Dimensional innovative instructional package and conventional learning strategy (stratified into male and female) with the pre-test scores serving as covariates. The result is as reflected in Table 4.

From Table 4 it was indicated that the calculated F value of 1708 is not significant because the significant value of .199 is greater than 0.05 alpha levels. The result implies that there is no significant difference between post-test mean scores of male and female students that is male students did not differ significantly from the female score when both were taught with 3 Dimensional Innovative Instructional Package. Therefore, the null hypotheses are accepted.

DISCUSSION

Based on hypothesis one, the result of the analysis of covariance (ANCOVA) on the performance of students taught Visual Arts using 3 Dimensional innovative instructional visual and those taught with conventional learning strategy indicated no significant difference. The findings are in line with the findings of Huang and

Lin (2017) and Van de Kamp et al. (2015) whose studies revealed the potential fields of artistic and creative applications on 3 Dimensional object and arts are prominent in production of instructional materials.

The finding is in contradiction from the earlier findings of Qiu et al. (2017) on 3 Dimensional and the virtual world of computers. In hypothesis two, the result of the analysis of covariance (ANCOVA) showed no significant gender difference on 3 Dimensional innovative instructional visual. This agreed with Wahab et al.'s (2016) conclusion based on the review of their studies on 3 Dimensional computer and gender. It also contradicts the study of Ranjan et al. (2017) and Liao and Dong (2017) on gender and 3 Dimensional.

CONCLUSION

From the result of the study it can deduced that using the 3 Dimensional Innovative Instructional Package has been positive and effective in teaching Creative Arts than the conventional learning Strategy. It helped provided an empirical basis for maximizing classroom teaching and learning of creative Arts. In addition 3 Dimensional innovative instructional package has proved platform for both gender male and fe-

Table 4: Analysis of covariance (ANCOVA) on the post-test scores of male and female students in the 3 Dimensional Innovative Instructional Package learning strategy and conventional strategy

<i>Source</i>	<i>Type III sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
Corrected Model	2.254 ^a	2	1.127	.890	.419
Intercept	47.763	1	47.763	37.724	.000
male2	.026	1	.026	.021	.887
fem2	2.163	1	2.163	1.708	.199
Error	46.846	37	1.266		
Total	3042.000	40			
Corrected Total	49.100	39			

male students to study at their own pace. In the same vein, gender was not a factor that could annul the positive effect of the use of 3 Dimensional Innovative Instructional Package as it bridges the gap between male and female students and hence a Conventional Learning Strategy. Lastly, it was evident from the research work that the groups taught with 3 Dimensional Innovative Instructional Package performed significantly higher than those taught using.

RECOMMENDATIONS

It can be deduced that the use of 3 Dimensional Innovative Instructional Package enhances the performance of all students irrespective of gender. Thus, the dream of utilizing media driven curriculum is achievable if properly planned. The use of 3 Dimensional instruction could be encouraged in teaching difficult topic in Visual Art. Educational technologists could be encouraged to develop 3 Dimensional instruction packages on topic outlined for students in secondary schools art.

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