

Form As A Visual Element In Computer-Aided Designed Instructional Materials And Students' Performance In Fine Arts In Private Secondary Schools In Akwa Ibom State Of Nigeria

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Abstract: This study sets out to determine the effect of form in Computer- Aided designed instructional materials on students' academic performance in fine arts in private secondary schools in Akwa Ibom State. A simple random sample of 60 SS II fine arts students from two private secondary schools was used for the study. These two schools were purposively selected from five private secondary schools that offer fine arts at SS II class. The non randomized control group pre-test-post-test experimental design was used in carrying out the study. One research instrument named, Student Performance Test in Fine Arts (SPTFA) was used in gathering data. The analysis of data involved the use of descriptive statistics of mean, standard deviation and analysis of covariance (ANCOVA). The result obtained from the analysis showed that students taught using Computer-Aided designed (CAD) instructional materials performed significantly better than those taught without using any (CAD) instructional materials. Form showed high significance. It was therefore recommended among other things that computer graphics should be effectively used in the preparation of instructional materials because of its significant effect on the students' performances in fine arts. It was suggested that the proprietors of the private secondary schools in Akwa Ibom State should establish Desktop publishing unit for the development of quality print instructional materials.

Keywords: Form, computer graphics, computer-aided design (CAD), instructional materials, students' performance.

I. INTRODUCTION

In a learning environment, a sound instructional method is a veritable tool in obtaining and maintaining good educational standard. In any educational system, instruction is aimed at enhancing the performance of learners. Koskenniemi (1981) described instructional method as systematic modes or styles in organizing or realizing the actual instructional processes in order to reach the objectives concerned.

In fine arts as in any other discipline, various instructional methods and approaches are used by teachers to make the subject matter clearer and better understood by the learners. Teachers and educators have always been interested in finding methods which will enhance learning. This has engendered several researches in the area of methods of teaching fine arts.

A few of these researchers on methods of teaching fine arts include Ekwere (2005) and Uti (2006).

“The utilization of visual elements of arts namely: line, space, value, texture, colour, shape either singularly or combined in computer graphic design has a forceful appeal to the emotions of people who perceive them” (Jirousek, 1995:34). Learners who are exposed to learning through the use of these visual elements would likely be motivated to achieve more in their learning and consequently their performance than those who may have been taught fine arts without using these elements (Rieber, 1990).

Visuals are seen to contribute to effective classroom performance, no wonder Mackenzie (2005) affirms that visuals enhance classroom performance and also add professional solutions to classroom teaching and learning problems. According to UNESCO (2002), improving the

quality of education through the diversification of contents and methods and promoting experimentation, innovation, diffusion and sharing of information and best practices are UNESCO's strategic objectives in education.

A closer look at the present trend in our secondary schools reveals the deplorable state of instructional delivery. The use of instructional materials for lessons is observed to be inadequate (Ekwere, 2005).

Proffit (1996) observes that the difficulty commonly encountered in the preparation of print instructional materials is the preparation of the artwork. Proffit reveals that the reason for such difficulty and poor artistic rendition is as a result of the abuse of the visual design tools, which include, colour, lines, shape, space, texture and value. He affirms that the use and misuse of colour in instructional visuals can have impact on students' performance. The same may be applied to other visual tools if not properly used. As observed by this researcher in many instructional charts, produced by quack designers even in their attempt to use computer graphics, such materials are weak in strength of communication because of the limited knowledge of the designer in the proper use of the visual tools, which are seen to be unguided by the basic principles of design.

Form is derived from the combination of point, line and shape. Mbelu (2005) describes shape and form as either geometric shapes are such like circles, triangle and squares, which are normally man made, that all these shapes tend to be precise and regular, while organic forms include crystals, honey combs and snow flakes. Organic forms are most often seen as naturally occurring, which are irregular and more informal than geometric shapes. In order words, a shape with a three dimensional character of length, width and depth is simply a form. Mbelu (2005) states the uses of shapes (form) in a design as follows:

- ✓ To achieve order, harmony and variety.
- ✓ To create the illusion of space, volume and mass on the surface of the picture plane in pictorial art.
- ✓ To extend the observer's (learner's) attention or interest span.

With the use of "CorelDraw" computer software, the above stated functions of forms by Mbelu are graphically realized with desired precision, accuracy and exactness without the use of any manual graphic effort. This study investigated the utilization of forms in Computer-Aided designed (CAD) instructional and students' performance in fine arts in private secondary schools in Akwa Ibom State.

II. STATEMENT OF THE PROBLEM

Uzoagba (2000) and Wangboje (1982) observe that there is poor performance of students in fine arts in public examinations. Many researchers blame the poor performances on inadequate teaching by teachers, which includes ineffective use of instructional media. Researches are done in the utilization of instructional media to improve learning, but the utilization of instructional computer graphic design is not given much emphasis, especially, regarding the effective application of the elements of design in visual communication strategies. Therefore, this study examined the effect of the

utilization of form as a design element in Computer-Aided designed instructional materials on student's performance in fine arts.

PURPOSE OF THE STUDY

The purpose of this study was to determine the effect of the utilization of form in Computer-Aided designed instructional material on students' performance in fine arts in private secondary schools in Akwa Ibom State.

RESEARCH QUESTION

One research question was raised to guide the study.

Is there any effect in utilization of form in Computer-Aided designed instructional material on students' performance in fine arts in private secondary schools?

HYPOTHESIS

One hypothesis was formulated to give direction to the study.

There is no significant effect of the utilization of form in Computer-Aided designed instructional material on students' performance in fine arts in private secondary schools.

III. METHODS

The study made use of the non randomized control group pre-test –post –test experimental design. The pre-test –post-test experimental design was used to help in examining the effects of the use of line as a visual element in Computer-Aided designed instructional materials on students' performance in fine arts. Intact classes were used for the experiment.

POPULATION

The population for this study consisted of all the (SS.11) fine arts students in the private secondary schools in Akwa Ibom State.

SAMPLE AND SAMPLING TECHNIQUE

A sample size of 60 (SS 11) fine arts students in private secondary schools was used for the study. From the 46 private schools that offer fine arts, 21 schools are provided with good arts studios; equipped with 'Donkeys', art materials and media, sizeable classrooms and qualified art teachers. Out of the 21 well-equipped private secondary schools, five schools offer fine arts at the (SS.11) class. From these five schools, which satisfied the above criteria, two were randomly selected by the use of balloting to represent the experimental and the control schools.

A sampled size of 30 (SS.11) fine arts students of one school served as the experimental class and another sampled size of 30 (SS.11) fine arts students of the other school served as the control class, which were selected for use in the study

through random assignment, that gave the total of the above sample size, which was used for the study.

INSTRUMENTATION

One research instrument was developed and used for the study. The instrument constituted the Student's Performance Test in fine arts (SPTFA). This researcher designed instrument was used to examine the effect of form as a design element in the Computer-Aided designed instructional material on wall chart to enhance students' performance in fine arts. It consisted of 20 multiple choice objective items.

RELIABILITY OF THE INSTRUMENT

The measure of consistency of SPTFA was established using the test – retest reliability method with a time lag of two weeks. The test of the instrument was carried out in SS. II class of a school, which was not among the schools used for the study. Equivalent study sample of 30 SS. II students of the school was used for the test. The Pearson product moment correlation coefficient was applied on the scores. The essence of the testing was to find out how the respondents would react to the SPTFA instrument. The reliability co-efficient obtained was 0.87; an indication that the reliability of the instrument was high enough to justify the use of the research instrument.

IV. DEVELOPMENT OF INSTRUCTIONAL MATERIAL

WALL CHART: A wall chart was designed by the use of computer graphics, showing shapes and forms and how they function on a common background of sap green colour. The cool sap green background of the chart was chosen to give rest to the eyes.

The chart conveyed Computer Aided illustrated forms and labeling of the different types of forms on this visually conducive background. The background was designed with two flat colours to ensure the effectiveness of contrast, visual arrest, excitement, simplicity and sustained interest.

The design was done through the combined use of CorelDraw and Photoshop computer softwares. It was neatly rendered to give impression of realism to maintain motivational appeal by constantly refreshing the lessons' level of novelty and curiosity as observed by (Surber and Leeder, 1988).

The design of the chart was printed through a colour printer on A3 size art paper, which was made permanent. The chart was used for instructions on the use, and effectiveness of form as a design element, which was treated in the lesson. (See appendix).

INSTRUMENT ADMINISTRATION

Two intact classes were required in the two selected private secondary schools. There was an intact class for the experimental group in one school and another intact class for the control in the other school. There was pre-testing for the two groups. The control group was not treated, but the experimental group was treated with the graphics material.

The researcher taught and was assisted by two SS.II fine arts teachers in the two schools who distributed and collected all test scripts from the students.

These lessons were taught using computer designed instructional material –wall chart. A double period of 90 minutes lesson on form as an element of design was given to the students for a period of one week after which questions were asked based on the lesson taught. The lesson was taught for the specified period. The answers to the essay test questions provided the necessary data for analysis.

Pre-testing with 20 multiple questions was carried out on the control and the experimental groups. Post-testing with 20 multiple questions was also carried out on the two groups. Each item of the test scored five marks for each correct answer, which was based on a total score of 100%. These scores were thereafter used in determining the effect of the treatment on students' performances.

DATA ANALYSIS

The data obtained involved the use of descriptive statistics of means, standard deviation and analysis of variance (ANCOVA) in answering the research question and in testing the only research hypothesis.

V. RESULTS

Analysis of the effect of utilization of form in Computer-aided designed instructional material.

Variables	Experimental Group				Control Group				Post Test		
	x	SD	x	SD	x	SD	x	SD	Post test Gain		
Use of Form	30	6.33	2.90	10.95	2.60		6.00	3.32	8.10	2.60	3.85

Table 1: Means and standard deviation scores of experimental and control groups for utilization of form as a design element

The result presented in Table 1 shows that for the utilization of form; the means of the post test scores for the experimental group was higher than the means of the post test for the control group. This means that, students who were taught utilization of form using Computer-Aided designed instructional materials performed better than those taught without such materials. The post test achievement gains showed that the gain of the utilization of form in experimental group is 3.85.

Source of Variance	Sum of square	DF	Mean squares	F	Significance of F
Corrected model	176.745	2	88.373	19.505	.000
Pretest	135.078	1	135.078	29.813	.000
Treatment	33.827	1	33.827	7.466	.008
Error	258.255	57	4.531		
Total	5850.000	60			
Corrected Total	435.000	59			

F- value for form in CAD instructional material is significant at DF 1,57 at P<.05 alpha.

Table 2: Analysis of Covariance of the effect of utilization of form in Computer-Aided designed instructional materials on students' academic performance in fine arts in private secondary schools

Based on this result, the null hypothesis of no significant effect of the utilization of form in Computer- Aided designed instructional materials on students' academic performance in fine arts in private secondary schools was rejected, while the alternate hypothesis is retained. Therefore, there is a significant effect of the utilization of form in Computer-Aided designed instructional materials on students' academic performance in private secondary schools. The result as presented in Table 1, showed that students taught using Computer - Aided designed instructional materials (Experimental group) with a mean of ($x= 10.95$) performed significantly better than those taught without such materials (control group) with a mean of ($x= 8.10$).

VI. CONCLUSION

The result of this finding as summarized in Table 2 reveals that there is a significant effect in utilization of form in Computer-Aided instructional materials on students' academic performances in fine arts in private secondary schools. The experimental group performed better with a mean score of ($x=10.95$) and a standard deviation of (2.60) compared to the mean score of ($x=8.10$) and a standard deviation of (2.60) of the control group.

This better performance by the students of experimental group may be attributed to the fact that of all the elements of design, the utilization of form gives the three dimensional visual interpretation of depth, width and length. This three dimensional effect of form is empowered by the joint actions of value and shape. When value is placed over shape it becomes form because of the emphasized character of realism. With the use of form in a line drawing, the object is converted to a realistic image.

The result of this finding is in affirmation with Tannenbaum (2007) that realistic images may motivate students more than line diagrams. Based on this findings the researcher also agrees with Myatt and Carter (1979) and Spaulding (1955) report that students appreciate more realistic images and detailed pictures. But the findings of this study failed to agree with Dwyer (1978) that simple line drawings are often considered better learning aids than realistic visuals.

Furthermore, since computer graphics now offer capabilities to produce high quality realistic images in instructional materials that could enhance students' performances, Buzan (1993) welcomes the increasing development of machines that allow for the linkage and manipulation of words and images together.

VII. RECOMMENDATIONS

From the findings of this study, the following recommendations are made:

- ✓ The use of Computer graphics should be encouraged in the preparation of instructional materials because of its overall significant effect on the academic performance of

students in fine arts in private secondary schools in Akwa Ibom State.

- ✓ Because of the challenges for an improved educational quality at this level the proprietors of private secondary schools in Akwa Ibom State should establish Desktop publishing unit for development of quality Computer-Aided designed Instructional materials for the teaching of fine arts and other subjects as well. In this case professional graphic artists should be recruited in the Desktop publishing units of these schools to develop the print instructional materials, based on their knowledge of proper utilization of the visual elements.
- ✓ Discovering the high significant effect of form on students performances, the instructional designers should convert more shapes to forms where necessary to capture the three dimensional realism of an image which will further minimize confusion and maximize the recognition of learners for better performances.

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