

# Effect of Visual Instructional Materials on Students' Performance in Building Technology of Technical Colleges in Niger State

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**Abstract:** - This study examines the effect of visual instructional material on Academic Performance of Building technology Students in Technical Colleges in Niger State. The study adopted a quasi – experimental design involving pre-test post-test control group class. Two research questions and hypotheses were drawn for the study. The population of the study is all TC II students in Technical Colleges in Niger State. Two intact classes were used as the sample of the study. Building technology performance test was developed and validated. Data collected were analyzed using t-test statistic using 0.05 level of significance. The study conclude that visual instructional material enhanced the academic performance of Building technology Students, and that shows that Female Students Performance better than Male Students after exposure to instruction all video . Recommendations were made that the use of instructional should be encouraged for basic Building technology Teachers, professional organization such as National Board for Technical Education (NBTE) should organize seminar, workshops and conferences. Federal and State Ministry of Education should sponsor basic Building technology teachers for refresher training on design, selection and utilization of visual instructional material The study concluded that effective use in visual instructional material improve students understanding of Building technology.

**Keywords:** Visual instructional material, students, technical colleges, Building technology, performance

## I. INTRODUCTION

Technical Colleges are vocational centres. Technical Colleges according to Ede *et al.* (2010) are institutions where vocational subjects are offered by students in order to acquire skills. Nwachukwu *et al.* (2014) asserted that Technical Colleges are institutions where students are trained by teachers in specific vocational areas to acquire relevant knowledge, skills and attitudes under the guidance of the school, for employment in related occupations. Okoro (2013) ascertained that Technical Colleges are regarded as the principal vocational institutions in Nigeria that give full vocational training intended to prepare students for entry into various occupations. Ezeji (2014) hinted that the aim of establishing Technical Colleges is to produce graduates with saleable skills. In order to achieve the objectives of establishing Technical Colleges, Ezeji (2014) further stressed that it requires laboratory settings as a unique learning environment in which the learners may experiment, test,

construct, disassemble, repair, design, create, imagine and study. Nigerian Technical Colleges, according to the report of Federal Government of Nigeria (2013), train students in technical and vocational courses such as: auto mechanics, plumbing and pipe fitting, electrical installation and maintenance practice, carpentry and joinery, Building technology, metal fabrication and block/bricklaying and concreting among others. These vocational courses are taught by teachers who are pedagogically certified qualified as technical teachers to teach the technical courses (Boyi, 2013).

Building technology is one of the technical education courses in colleges of education in Nigeria designed to equip students with the technical methods, skills, processes, techniques, needed for the design, construction and maintenance of buildings. According to National Commission for Colleges of Education (NCCE), (2012), the aim of building technology in colleges of education is to produce teachers with the technical and instruction competencies to practice in educational field to impact knowledge, skills and attitude to learners as well as to practice in construction industry as technicians. Anaele and Okoro (2014) noted that, the achievement of building technology aim depends on several factors including students' ability to rapidly learn quickly with the used of latest technology.

The rapid changes in technology have necessitated the need to equip technical college students with workplace basic and thinking skills which will make them flexible and adaptable to the present and envisaged future changes. Technology, the world over is dynamic and work organizations are getting increasingly flexible, process-based and multi-tasking. This apparently is to suit demands of the prevalent knowledge society and ample use of innovations and inventions in work places and changes in the organization of work (Ogwo and Oranu, 2016). In this context, there is need for educational institutions to adjust their curriculum to accommodate changes in work places so as to produce students with work place basic skills required to thrive in the 21<sup>st</sup> century knowledge-based economy and society (Boyle, Duffy & Dunleavy, 2011).The use of instructional materials such as visual instructional materials as a medium of instruction in

learning environment will go along away to prepare students for technical and instruction competencies to practice.

Visual instructional materials are those teaching materials used by the teachers while teaching and which make teaching clearer and easier for the students to understand. Such visual instructional materials include, graphic aids: display boards: 3-d-aids: printed materials and activity aids. The visual instructional materials are one of the technical and vocational education curriculum materials that the teacher of Building technology uses in achieving its objectives. These visual instructional materials are indispensable tools in teaching learning process of Building technology. The Building technology teacher uses these things to help students in their learning (Yusuf, 2012). Visual instructional materials are inexpensive to use and relatively less sophisticated as compared to audio-visually. Visual instructional materials strengthen understanding, motivate and sustain students academic achievement, especially abstract processes which one can envision in their mind. For instance, if a student can see models or activity aid or an animation of the abstract process, they will learn more easily than just abstract.

Student academic performance can be seen as how students perform in school or the level of attainment in an examination or in acquiring some skills. Hence, the success of a learner is generally determined by the academic performance in the subject taken. According to Cambridge University Reporter (2013), academic performance is frequently defined in term of examination performance. The students' performance is his ability to do something (Fachano and Malongo, 2015). This ability is evaluated by the marks and grades that the students obtain in a test or examination which is done at the end of a topic, school term or year or education cycle. The scores and grades that a student obtains measures the degree of his performance. Student academic performance is a critical determining factor for student to exploit areas of discipline in the field of technical education. Academic performance is also applicable to prepare students for occupation and for further studies in technical education.

Therefore, in measuring students' academic performance in Building technology as a school subject, various activities are undertaken within and outside the classrooms. Such tasks as assignment, test, examination, practical and fieldwork. Independent examining bodies such as National Business for (NABTEB) have also emerged to validate the assessment of student academic performance in Building technology. These examination bodies measure students' academic performance.

Gender issues and academic performance has become a very important issue among researchers, some studies are in view that boys perform better than girls and vice versa. Females and males could do well in Building technology if exposed to similar conditions (Nsofor, 2011). According to this view, gender difference has little or influence on students' performance in Building technology. Essentially, performance by learners depend more on personal effort. This implies that high performance could be traced to the individual's efforts. It

is against this background that the research finds it necessary to investigate whether or not visual instructional material could improve the academic performance and consequently better students coming of the subject.

#### *Statement of the Problem*

The foundation for the use of visual instructional material was brought out of the problems faced by teacher of Building technology in their teaching and making of students note, test and examinations which is being administered on them .thus this research intends to find a solution for these problems and to fill the gaps. These problems have created in Niger State technical colleges. Among the factors contributing towards declining of student's performance is Building technology in technical colleges are as follows: Lack of qualified Building technology teachers to teach the subject, Inadequate training of Building technology teachers, poor and inadequate instructional materials in teaching Building technology, Outdated or conventional methods of teaching Building technology and Inadequate funding or supplying of invented instructional machine to aid teachers of Building technology delivery.

The effect of all these problems enumerated above are clearly manifested in producing high wastage inform of students to lose interest in taking Building technology as a subject, therefore, it is anticipated that educational technology professionals could be used to solve some of these problems. This is because application of educational technology approach to instruction shifts emphasis on teaching and learning from conventional talk and chalk to system and instructional materials approach (visual instructional material). In order to enhance the performance of students in Building technology.

#### *Purpose of the Study*

1. Examine difference between academic performance of students taught Building technology with visual instructional material and those visual instructional material in Niger State technical colleges.
2. Examine whether visual instructional material has any gender influence on the academic performance of Building technology students in Niger State technical colleges.

#### *Research Questions*

1. Will there any difference between the academic performance of the group taught with visual instructional material from those taught without visual instructional material.
2. Does gender influence the performance of student taught with visual instructional material in Niger State technical colleges?

#### *Research Hypotheses*

H<sub>01</sub>: There is no significant difference in the academic performance between the group taught using visual

instructional material and those taught without the use of visual instructional material.

Ho<sub>2</sub>: There is no significant difference in the mean achievement score of males and females students exposed to visual instructional material.

## II. METHODOLOGY

Quasi experimental design was used for this study, quasi experimental research design involving pretest - posttest control design. The population of the study is 860 TC II students in Niger State Technical Colleges. Stratified random sampling was used to select two technical colleges in Niger State which are Government Technical College, Minna and Government Technical College, Suleja. The instrument used for this study was Building technology Achievement Test (BTAT) which was developed by the researcher to collect the needed information. It is multiple choice objective types of (20) questions. The test was administered to study subject both in the control and the experimental group before and after the experimental treatment to evaluate the students' performance. The content of the Building technology Achievement Test was validated by two experts in the department of Industrial and Technology Education, Federal University of Technology, Minna to ascertain its validity. Pilot testing was conducted to ascertain the feasibility and reliability co-efficient of the test instruments through a trial run. Government Technical College, Kontagora was used for this purpose. The intact class of TC II students studying Building technology. Building Technology Achievement Test (BTAT) was administered to the subjects. To find out the reliability of the instrument the test-retest reliability co-efficient was adopted, based on Pearson Product Moment Coefficient (PPMC). Analysis of the scores obtained from the pilot testing of the Building Technology Achievement Test (BTAT), established the reliability coefficient for the test instrument at 0.87. The researcher personally handled the demonstration of teaching and application of instrument (pre-test and posttest of all the groups) with the help of research assistants, after two weeks and four week of teaching, the score obtained formed the data for testing the hypothesis. The data collected for the study was used to answer the research questions and to test the hypotheses. Mean and standard deviation was used to answer research questions while-t-test statistics used to test the hypotheses using Statistical Package for Social Science (SPSS). The rejection or non-rejection region of the stated hypotheses was set at 0.05 level of significance.

## III. RESULTS

*Research Question 1:* Will there be any difference between the academic performance of the group taught with visual instructional material from those taught without visual instructional material?

**Table 1:** Mean and Standard Deviation of the experimental and control group at pretest and post-test level

Groups	N	Pre-test Mean	Post-test Mean	Mean gain	Pre-test SD	Post-test SD
Experimental	40	6.70	10.80	4.10	1.98	1.57
Control	40	8.07	8.55	0.48	1.19	1.20

In Table 1, pre-test mean is 6.70, experimental group and the standard deviation for pre-test is 1.98 for the experimental group while control group has the mean score of 8.07 and standard deviation of 1.19 meaning that mean score for control group is higher than mean score of experimental group in the pre-test. But after the administration of the visual instructional material. The mean score of experimental group is 10.80 and the standard deviation is 1.35; while the mean score for control group after testing is 8.55 and standard deviation is 1.20, which means that the mean score of experimental group became higher, that means there is effect of visual instructional material in the academic performance of Building technology students.

*Research Question 2:* Does gender influence the performance of students taught with visual instructional material and those taught without visual instructional material?

**Table 2:** Mean and standard Deviation of male and female students in control group

Groups	N	Pre-test Mean	Post-test Mean	Mean gain	Pre-test SD	Post-test SD
Male	20	7.70	8.40	0.70	1.34	1.35
Female	20	8.45	8.70	0.25	0.87	1.03

Table 2 shows that the mean score for male in the pre-test is 7.70 while standard deviation for male pre-test is 1.34 and the mean gain is 0.70. Consequently, the post-test control group for male is 8.40 and standard deviation is 1.03, mean gain 0.25. So, it shows that there is effect in the use of visual instructional material.

### *Hypotheses Testing*

*Hypothesis 1:* There is no significant difference in the academic performance between group taught using visual instructional material and those group taught without visual instructional material.

**Table 3:** comparison of the mean scores of the experimental group and control group

Groups	N	Mean	SD	SE	df	tcal	P-Value
All Control Posttest	40	8.55	1.20	0.19	78	7.20	0.000
All Experimental Posttest	40	10.80	1.57	0.25			

Table 4.1.1 the experimental group taught using video instruction had higher mean score ( $x = 10.80 + 1.57$ ), then the control group taught using conventional method ( $x = 8.55 \pm 1.20$ ), which revealed statistically significant difference,  $t(78) = 7.20, p = 0.000$ .

*Hypothesis 2:* There is no significant difference in the mean achievement score of males and female students exposed to visual instructional material.

**Table 4:** Comparison of the post-test mean achievement scores of male and female in the experimental group

Groups	N	Mean	SD	SE	Df	t-cal	P-Value
Male Experimental Post-test	20	10.30	1.53	0.34	38	2.10	0.043
Female Experimental Post-test	20	11.30	1.49	0.33			

The result of the analysis shown in Table 4, the mean achievement scores of females experimental group is 11.30 and that of the males mean achievement score is calculated t-value 2.10 at p-value of 0.00, that means we reject the null hypothesis and conclude that there is significant difference in mean achievement score between male and female students taught using visual instructional material. A critical look at the table reveals that the females mean achievement score is higher than the male which implies that visual instructional material has more effect on the mean achievement score of female students. This further shows that gender has effect on the use of visual instructional material in the learning process.

#### IV. DISCUSSION

The result of the study revealed that there is significant difference in academic performance of students between control and experimental prior to the use of visual instructional material it also revealed that there is significant difference in academic performance of the control and experimental group after the use of the visual instructional material. Which is in line with the findings of (Eshiet, 2012). They discovered that the use of visual instructional material in teaching Building technology subjects influence the students' academic performance. Also they affirmed that they are effective in teaching owing to their ability to capture and hold attention as well as provide direct interaction of students with what is learnt. The use of visual instructional material is effective and resulted to more learning in short time and make the students retain what is learnt. Visual instructional material provide experience not easily obtained through other media, contribute to the efficiency and variety of learning.

The position and impression of Newby *et al.* (2016) about instructional materials that they complement or play supportive role in teaching in the bid to bring about adequate implementation of the curriculum it is in these circumstances that the result of hypothesis two shows that there is significant difference in the academic performance of the group taught using instruction video and the group taught without visual

instructional material. Furthermore, the study also shows that the use of visual instructional material have greater influence in the academic performance of female students than male students, because females pay more attention in watching films than the males, so that serves as an advantage to the female students, that is why the mean achievement scores of females is more than that of the male students which concludes that there is gender effect on the use of visual instructional material.

#### V. CONCLUSION

The following conclusion can be deduced from the outcome of this research study:

1. The use of visual instructional material in teaching and learning process enhanced the academic performance of students in Building technology classes.
2. Female students performed academically better than their male counterpart after exposure to visual instructional material.

#### VI. RECOMMENDATIONS

1. The use of visual instructional material for teaching should be encouraged among teachers of Building technology in technical colleges to enhance effective academic performance of their students.
2. Professionals and research organizations such as National Board for Technical Education (NBTE) and The Nigerian Educational and research Development Council (NERDC) to carry out seminars, workshops and conferences and should incorporate topics on the use of visual instructional material in Building technology.
3. The Federal and State Ministry of Education should sponsor basic Building technology teachers for refresher training on design, selection and utilization of visual instructional material.

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