THE EFFECT OF USE OF 3LCD PROJECTOR IN TEACHING METALWORK LATHE MACHINE TOOL OPERATION ON STUDENTS ACADEMIC ACHIEVEMENT IN FEDERAL SCIENCE TECHNICAL COLLEGE, TUNGBO, BAYELSA STATE.

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ABSTRACT

The study looked into the effect of 3LD projector in teaching Metalwork lathe machine tool operation on students' academic achievement in federal science technical college, Tungbo, Bayelsa State. One research question and hypothesis were used for the study. The study is limited to students in NTC11 in mechanical technology in Federal Science Technical College, Tungbo, Bayelsa State. It is also limited to the use of conventional lecture method and the use of 3LCD projector. The researcher adopted randomised pre-test and post-test control group design. Random sampling technique was used to randomly assign students to experimental group E and control group C. Experimental group E students consist of 6 students while control group C students consist of 5 students. The instrument for data collection was metalwork lathe turning tool achievement test [MWLTTAT] instrument. Twenty test items were identified and selected from the machine tools operation content which includes surfacing of metals, chamfering techniques, positioning of work piece on a lathe and arrangement of cutting tools on tool post. These topics are contained in the NABTEB syllabus .Mean and standard deviation was used to analyse the research question, while t-test was used to analyse the hypothesis at 0.05 level of significance. Result of research question 1 showed that students learning metalwork lathe machine tool with 3LCD projector performed better than students taught with the conventional lecture method. The study also showed that 3LCD projector was more effective than the conventional lecture method in bringing about more students academic achievement in metalwork lathe machine tool operation. The difference in academic achievement between those taught with 3LCD projector and those taught using conventional lecture method was found to be significant at 0.05 level of significance. Finally, it was recommended that the curriculum for teacher training programme in Nigeria should be reform to inculcate the use of 3LCD projector on

teaching metalwork lathe machine tool operations in our technical institution. Technical educators should be trained on the use of 3LCD projectors in the workshops.

KEY WORDS: *3LCD Projector, conventional lecture method, metalwork machine tool operation, and achievement Test.*

INTRODUCTION

Lathe is an ancient tool, dating at least to ancient Egypt and known to be used in Assyria and ancient Greece. The lathe was very important to the industrial revolution. It is known as the mother machine tools, as it was the first machines that lead to the invention of machine tools. During the industrial revolution, mechanized power generated by water wheels or steam engines was transmitted to the lathe via line shafting, allowing faster and easier work. The different categories of lathe machines are woodworking lathe, patternmaker's, metalworking lathe, cue lathe, glass-working lathe, metal spinning lathes, ornamental turning lathe, reducing lathe, rotary lathe, watch maker's lathes and transcription lathes.

Most mechanical technology department in technical schools learn turning operations with lathe machines. Technical Schools in Nigeria offer some training in machine shop operations. The challenge lies on non-availability of workshop materials and teaching methodology. Olatunde [2012] stated that most technical and vocational colleges in Nigeria are under-equipped or ill-equipped in terms of workshops and laboratories facilities. He further stated that this inadequacy in the number of workshops laboratories with ill-equipped facilities has been responsible for insufficient acquisition of skills for candidates to scale through in NABTEB certificate examinations and to become certified craftsmen. Aside the non-availability of insufficient equipments in the schools, the teaching method employed in teaching also influence student academic achievement. Raymond and Hassan [2007] stated that the declining performance of students in technical education may be attributed to the abstract nature of teaching methods adopted by teachers.

Different educational technologies have been introduced to improve teaching and learning exercise in schools. Some of such educational technologies are projectors, slides, documentary videos, interactive white board and so on. Projector is commonly used in teaching and learning in some technical schools in the world. A common type of projector used in classroom teaching is the 3LCD projector.

The 3-dimentional Liquid Cristal Display [3LCD] projector contains an advanced technology that splits the light from the projector lamp, into three beams using mirrors. Each beam passes through a different LCD panel, one with a red, one with a green, one with a blue filter. The three color images are combined using a prism of diachronic glass, creating a full- colour image consisting of millions of colors. CSINAN [2013] stated that using LCD projectors provides educators to reach students multiple approaches in learning. Thus students enjoy seeing, hearing and interacting with technology rather than simply reading a textbook or listening to a lecture. There is therefore the need to introduce 3LCD projector to see its effect on students' academic achievement.

PURPOSE OF THE STUDY

The aim of this study is to;

1. Determine the difference in post-test academic achievement of students taught metalwork lathe machine tool operation using 3LCD projector and student taught using conventional lecture method in Federal Science Technical College, Tungbo, Bayelsa State.

SIGNIFICANCE OF THE STUDY

The study will be of benefit to the students and the teachers.
For the students the process of learning metalwork machine tool will be easier as they will be exposed to more pictures and sound. This will make learning more meaning full and attractive.

For teachers, the process of delivering instruction on metalwork lathe machining will be easier. This will be achieved as every items and diagram will be exposed on the screen making it easier to illustrate diagrams.

SCOPE OF THE STUDY

The study is limited to students in NTC11 in mechanical technology in Federal Science Technical College, Tungbo, Bayelsa State. It is also limited to the use of conventional lecture method and the use of 3LCD projector.

RESEARCH QUESTIONS

The researcher adopted the following research question;

1. What is the difference in post-test academic achievement of students taught metalwork lathe machine tool operation using 3LCD projector and student taught using conventional lecture method in Federal Science Technical College, Tungbo, Bayelsa State.

HYPOTHESIS

The null hypothesis was tested at 0.05 level of significance.

1. There is no significant difference in post-test academic achievement of students taught metalwork lathe machine tool operation using 3LCD projector and student taught using conventional lecture method in Federal Science Technical College, Tungbo, Bayelsa State.

METHODS

RESEARCH DESIGN

The researcher adopted randomised pre-test and post-test control group design. The researcher used this design because subjects were randomly assigned to two groups [i.e. experimental group E and control group C]. Moorhead [2013] stated that the advantage here is the randomization, so that any differences that appear in the post-test should be the result of the experimental variables rather than possible difference between the two groups. Below is the table1 for the design.

TABLE 1: ***RANDOMISED PRE-TEST AND POST-TEST CONTROL GROUP DESIGN***

Groups	Pre- Test	Treatment	Post-Test
Experimental group E	O_1	X	O_2
Control group C	O_1		O_2

Where;

O_1----------Represents pre-test scores of students taught metalwork lathe machine tool using 3LCD and those taught using conventional lecture method.
O_2----------Represents post –test scores of students taught metalwork lathe machine tool using 3LCD and those taught using conventional lecture method.
X----------Represents treatment for experimental group E taught metalwork lathe machine tool using 3LCD projector.

Experimental group E students are taught metalwork lathe machine tool with 3LCD projector. While Control group C students are taught metalwork lathe machine tool with conventional lecture method.

SAMPLE AND SAMPLING TECHNIQUE

Random sampling technique was used to randomly assign students to experimental group E and control group C. Experimental group E students consist of 6 students while control group C students consist of 5 students. They are all students from NTC11 in Federal Science Technical College Tungbo, Bayelsa State.

INSTRUMENT FOR DATA COLLECTION

The instrument for data collection was metalwork lathe turning tool achievement test [MWLTTAT] instrument. Twenty test items were identified and selected from the machine tools operation content which includes surfacing of metals, chamfering technique, positioning of work piece on a lathe and arrangement of cutting tools on tool post. These topics are contained in the NABTEB syllabus. A table of specification was prepared to guide the development of MWLTTAT items. The test blue print was further sub-divided into content dimension contained in the unit taught in the study while the ability process dimension was sub-divided into knowledge [15%], comprehension [20%], application [15%], analysis [10%] and evaluation [30%].

Two experts from mechanical technology department in Federal and Science technical college Ahoada, validated the instruments. The research question, purpose of the study and Twenty five [25] MWLTTAT items were subjected to face and content validity. They checked the content of the instrument against NABTEB syllabus on machine tool operation and they observed that the test instrument actually complied with the language of the study. Finally, after validation process by the experts, twenty [20] test items were finally approved in the MWLTTAT instrument to be used for the study.

Test re-test procedure was used to determine the reliability of the test instrument. MWLTTAT items were distributed to five students in Geli Engineering training institute. After two weeks interval another test items were given to the same set of students. The scores obtained from both tests were computed using Pearson product moment correlation coefficient. The reliability was finally calculated to be 0.94 which was considered adequate for the study.

PROCEDURE FOR TREATMENT FOR EXPERIMENTAL GROUP

The following procedures were observed in the treatment;

1. The researcher obtains permission from the school authority to use their students for the study.
2. The researcher appointed and briefed a research assistant that is ICT literate on how to teach metalwork lathe turning tool with 3LCD projector following the prepared lesson plan.
3. A pre-test on MWLTTAT items were given to students in experiment group E and control group C. Theirs score were collected and recorded.
4. The lesson lasted for two weeks. Surfacing of metals and chamfering technique were taught for double period of 90 minutes in the first week. While positioning of work piece on a lathe and arrangement of cutting tools on tool post were taught for another 90 minutes in the second week.
5. Students ask questions as diagrams were displayed on the 3LCD projector at the end of each session. Finally a post-test was administered to both experimental and control group. Their post –test scores were collected and recorded.

METHOD OF DATA COLLECTION

The scores obtained by the students in the pre-test were collected, recorded and kept. The pre- test was carried out to check their previous knowledge. At the end of the experiment, post-test scores were collected and recorded. The post –test scores were converted into simple percentages.

METHOD OF DATA ANALYSIS

Mean and standard deviation were used to analyse the research question. The difference in mean was used to determine the effect of treatment. T-test was used to analyse the hypothesis at 0.05 level of significance.

RESULTS

RESEARCH QUESTION 1

What is the difference in post-test academic achievement of students taught metalwork lathe machine tool operation using 3LCD projector and student taught using conventional lecture method in Federal Science Technical College, Tungbo, Bayelsa State?

TABLE 2: ***MEAN AND STANDARD DEVIATION POST-TEST SCORES OF STUDENTS TAUGHT METALWORK LATHE MACHINE TOOL OPERATION AND STUDENT TAUGHT WITH CONVENTIONAL LECTURE METHOD.***

Group	PRE-TEST MEAN	POST-TEST MEAN	STANDARD DEVIATION OF POST – TEST	DIFFERENCE IN POST-TEST MEAN
Experimental group E taught with 3LCD projector.	42.2	70.5	8.02	17.3
Control group C taught with conventional lecture method.	47.0	53.2	11.0	

Table 2 Shows that the mean pre-test of students in experimental and control group are 42.2 and 47.0 respectively. The mean post-test scores and standard deviation of students in experimental group E and control group C is 70.5; 8.02 and 53.2; 11.0 respectively. From the difference in post-test mean scores, it appears that students in the experimental group scored higher than those in the control group with a mean difference of 17.3.

TABLE3: ANALYSIS OF T-TEST OF STUDENTS TAUGHT METALWORK LATHE MACHINE TOOL OPERATION.

GROUP	TEACHING METHOD	POST-TEST MEAN	STANDARD DEVIATION	N	df	T-CAL.	T-TAB.	DECISION
Experimental group E	3LCD Teaching aid	81.8	16.5	6	9	20.97	2.262	Reject
Control group C	Conventional lecture	53.2	11.0	5				

From the table 3, critical t value at 0.05 level of significance and 9 degree of freedom is 2.262. Since critical t- value [2.262] is less than the computed t- value [20.97] the hypothesis is significant at 0.05 level of significance. On these bases the null hypothesis was rejected.

DISCUSSION OF FINDINGS

Result of research question 1 showed that students learning metalwork lathe machine tool with 3LCD projector performed better than students taught with the conventional lecture method. This may be as a result of the introduction of educational technology in teaching and learning process. CSINAN, [2013] stated that using LCD projectors provides educators to reach students with multiple approaches and students can participate in real-time interactive activities to promote the development of critical thinking skill. Also, it was revealed that there was significant difference in the post- test mean of students taught metalwork lathe machine tool operation with 3LCD projector and those taught with the conventional lecture method at 0.05 level of significance.

CONCLUTION AND RECOMMENDATION

The study has shown that 3LCD has significant effect on students' achievement in learning metalwork lathe machine tool operation. The study showed that 3LCD projector was more effective than the conventional lecture method in bringing about more students academic achievement in metalwork lathe machine tool operation. The difference in academic achievement between those taught with 3LCD projector and those taught using conventional lecture method was found to be significant at 0.05 level of significance.

Therefore, the curriculum for teacher training programme in Nigeria should be reform to inculcate the use of 3LCD projector on teaching metalwork lathe machine tool operations in our technical institution. Technical educators should be trained on the use of 3LCD projectors in the workshops.

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