Determination of the Use of Documentary Video and Lecture Method In Teaching Four Stroke Engine in Famvar Secondary School, Port Harcourt

Emeli, Eniekenemi and Digitemie, Innocent Eteli
Department of Vocational Education,
Faculty of Education,
Nnamdi Azikiwe University,
Awka Anambra State
peaceben2013@gmail.com

ABSTRACT

Randomized pre-test and post-test control group experimental design was used in the study. Students were arranged in two groups (i.e group A and B). Group A students are five (5) in number and they were the experimental group taught with documental video in four stroke engine system. Group B students consist of five (5) students also which were taught with the traditional lecture method of four stroke engines operations. One research question and hypothesis were used for the study. The test instrument was called Four Stroke Engine Test (FSET) and treatments were given to both groups. A pilot test was conducted in New Covenant Secondary School, Port Harcourt. The reliability was calculated to be 0.91 using pearson product moment correlation coefficient. Post-test item were used to access the performance of group A and B students. ANCOVA was used to analyze the hypothesis while mean and standard deviation were used to analyze the research question. From the finding, it was revealed that the mean scored of students taught with documentary video (Group A) score higher than those taught with the traditional method. The null hypothesis which was tested at 0.05 level of significance was rejected as the F-calculated value was higher than F-tabulated value. Finally it was recommended that instructors of automobile trade should include documentary video in supporting their teaching and learning process.

Keywords*: Documentary video, audio visual materials, multimedia, lecturer method, video generation, automobile, and four stroke engine.*

INTRODUCTION

Society has entered an age where information availability flows infinitely at our finger tips. The age of multimedia and the internet presents an incredible opportunity for teachers and students around the world to access all types of information and technology instantly. Although these tools provide a wealth of resources and expediency, this convenience is creating a phenomenon of "video generations". (Eric, 1997). Visual culture is increasingly playing a larger role in our students 'upbringing and frame of reference (Brandon, 2007).

Though out the past few decades, the amount of television viewing by children has steadily risen (Brandon, 2007). Movies can be used in variety of ways. When preparing a lesson 1 film clips are great and interesting way to introduce a new subject. Movies can be used to reinforce a theme or lesson, or even become the prime mode of presentation (Eric, 1997).

Movies can play a positive role in teaching and instruction. It may help student who do not respond to traditional-chalk teaching styles relates and connect to a certain time, place, or culture sighting (Matthew, 1997). Most videos played in the class are often presented in the form of documentary (Frank, 2009). Documentary video has a critical role to play in education. The rapid advances in media technology have forced educators to deflect notions of literacy and adapt our curricula accordingly (Frank, 2009).

Documentary video is a form of audio-visual means of delivery instruction. Audio-visual material provides a rich medium for teaching and learning (JISC, 2014). Video can effectively communicate complex information to students and if used creatively, can become a powerful expressive tool (JISC, 2014).

Observation shows that most secondary school teachers apply traditional or lecture method in the transfer of knowledge to students. A lecture is a teaching method where an instructor is the central focus of information transfer. Typically, an instructor will stand before a class and present information for the students to learn.

However, the lecture method places students in passive rather than active role, which hinders learning and encourages one-way communication, (CIRTL, 2013). In secondary education, several new subjects have been introduced as trades. They include; electrical, mechanical, automobile, welding, textile, carpentry, etc. Most of these trade subjects have practical background as it will enhance students' vocational skill development.

Automobile among other trades, deals with the repair and maintenance of automobile parts. Topics such as break systems, four-stroke engine systems, body alignment, lubrication systems, etc are part of the curriculum of automobile trade. Four-stroke engine also known as four cycles is an internal combustion engine in which the piston completes four separate strokes which comprises a single thermodynamic cycle (NASA, 2008).

In the year 2006, out of 2422 candidates in NABTEB where examined in motor vehicles mechanical works and 1537 failed which is 63.4 per cent. (Kennedy 2009). The failure may be caused as a result of the method of teaching and learning this trade.

It is on this note that the researcher wants to test the application of documentary videos in teaching four-stroke engine system to see if students' performance can improve.

Significance of the study

This study will be of benefit to the students, teachers and educational institution.

For the students, the learning of four stroke engine systems will be easy as they will be exposed to live videos demonstrating and explaining the functions of the parts.

- Four teachers, less explanation will be done as students will see for themselves how the parts of the four stroke engine operate by the display of the videos.
- For educational institutions, there will be improvement in student performance in NABTEB examinations as a result of increase in understanding through the audio-visual media through the engagement of their sensory organize in learning.

Purpose of the Study

The aim of this study is to ascertain if students taught four stroke engine systems with documentary video will perform better than those taught with lecture method.

Research Questions

The research questions below guided the study.

1. What is the effect of documentary videos on student performance in four-stroke engine system?

Hypothesis

The null hypothesis below was tested at 0.05 level of significance;

1. There is no significant difference in the performance of students taught with documentary video and those taught with tradition/lecture method.

Method

The researchers used randomized pre-test and post-test control group design which there were experimental and control groups. Maxwell, (2003) stated that in experimental design, the researcher manipulates the independent variable to know its effect on the criterion variable. In this case, the documentary video is the experimental variable that will be manipulated to know its effect. It is on this note that the researcher used the experimental design.

Sample for the Study

The entire populations were used as samples. The samples consist of a total of ten (10) students from senior secondary school one in Famyar International Secondary School, Port Harcourt. They are arranged in two groups (i.e group A and B). There five students in each group. They are randomly assigned to the groups.

Instrument for Data Collection

The students were arranged in two groups i.e Group A and B. Treatment was given to experimental group A. Group B students were taught with traditional/lecture method, while group A were taught with the new method (documentary video). The students from both groups are from Famvar International Secondary School, Port Harcourt. They are all in senior secondary school one (SSI). They are of an average age bracket of fourteen (14) years.

The post-test and Pre-test instruments were developed from lesson plans and were administered to both groups before and after treatment. The test instrument was called Four Stroke engine Test (FSET).

Validation of the Instrument

The FSET instrument was validated by two experts from vocational/technical education in university of education, Iwofe, Port Harcourt. There recommendations, and corrections are noted before the final copy was produced.

Reliability of the Instrument

The reliability of the instrument was adduced through the test-retest procedure. This was done by conducting a pilot test of documentary video in four-stroke engine system on respondent in new covenant secondary school, Port Harcourt. After two weeks, the same test items were administered to the same group and the result were taken.

The scores of the first and second test where computed using Pearson product moment correlation coefficient. From the result obtained from the test item, the reliability coefficient was calculated to be 0.90 which was considered adequate for the study.

Data Collection

The researcher prepared the lesson plan in compression stroke, intake stoke, exhaust stroke and power stroke in four stroke engine system. The lesson plans were prepared side by side in lecture/traditional method and the audio-visual means (documentary video).

Data Analysis and Result

The data were analyzed using mean, standard deviation for research question and analysis of covariance (ANCOVA) for the hypothesis.

Post-Test

Table 1: Post test scores of students taught with documentary video (Audio Visual) and lecture/traditional method in four stroke engine systems

Table

Students	Documentary Video A Audio Visual Method	Lecture/Traditional Method
1	80	45
2	70	64
3	60	70
4	90	28
5	85	59
Total	**385**	**266**

Table 2: Comparison of mean and standard deviation scores of students taught with documentary video and lecture/traditional method of four stroke engine systems.

Teaching Style	Mean $\bar{x}$	Standard Deviation
Documentary	77.00	10.80
Lecture/Traditional Method	53.20	14.39

Table 2 shows that the mean scores of students taught with documentary video in four stroke engine system is x = 77.00, std = 10.80. these were higher than the mean scores of students taught with lecture/traditional method of four stroke engine systems which have mean of x = 53.20std = 14.39.

This show that student taught with documentary videos performed better than those taught with lecture/traditional method.

Table 3: Analysis of covariance of students taught with documentary videos and those taught with traditional/lecture method.

Sources of Variance	Df	Sum of Squares	Means Squares	F-cal	F-crit	Significance
Between groups	1	35,396	35,396	274.7	5.32	No
Within groups	8	1,031	128.875			
Total	**9**	**36,427**				

$$F = \frac{\frac{SSB}{dfB}}{\frac{SSW}{dfw}}, \Rightarrow F = \frac{\frac{35,396}{1}}{\frac{1,031}{8}} = \frac{35,396}{128,875} \quad F = 274.7$$

F at 0.05 level = 5.32

The table 3 shows that there is significant difference in the performances of students taught documentary video and lecture/traditional method of four stroke engine system. This is evident from the table since the F-calculated value of 274.7 is greater than the F-tabulated value of 5. .32 at 0.01 level of significance. The hypothesis was therefore rejected.

Discussion of Results

The main aim or impute of this work is to use documentary video i.e audio-visual media to create positive impact in students learning four-stroke engine system in automobile technology. The findings of research question one showed that the mean score of student's performance in documentary video (Audio visual) method was better than those taught with lecture/traditional method of four stroke engine systems. This could be as a result of the low interaction levels, and negligence by the teacher (Imtiaz, A. Syed, M.H., Masroor, A. Waqar A., 2012).

The result of the null hypothesis reveals that there is significant difference between students taught documentary video (audio-visual) and those taught traditional/lecture method. This was shown as F-calculated value was higher than f-tabulated value. This may be as a result of the use of documentary video.

Conclusion

As a result of the data analysis relating the use of documentary videos in teaching four-stroke engine system, it was concluded that the audio-visual media (documentary video) was more effective as students mean performance in the post-test scores in table 1 were above those taught with lecture/traditional method.

Recommendation

The following are the recommendations for the study;

1. Instructors of trade subject like automobile technology should include documentary video in supporting their teaching and learning process.
2. Curriculum planners should include the use of audio-visual media as part of instructional material in teaching automobile technology.

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