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Impact of YouTube Based Instruction on Students' Achievement and Retention in School Workshop Management in Colleges of Education in North-central, Nigeria

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Abstract:

The study determined the impact of YouTube based instruction on students' academic achievement and retention in school workshop management in Colleges of Education in North-Central, Nigeria. Two research questions were raised to guide the study and two hypotheses were formulated and tested at .5 level of significant. The study adopted pretest-posttest non-equivalent control group design of quasi-experimental study. The population of this study comprised of all the 318 Nigerian Certificate in Education (NCE) III building technology students in the study area. The sample size of the study was 217 students selected using Simple Random Sampling (SRS). The instrument used to collect data for this study is School Workshop Management Achievement and Retention Tests (SWMART). The reliability coefficient value of SWMART, was determined as 0.78 using Pearson Product Moment Correlation (PPMC). The study employed the use of mean to answer the research questions and Analysis of Covariance (ANCOVA) to test the hypotheses at significant level of 0.05. Findings revealed among others that, the students taught school workshop management using YouTube based instruction obtained higher achievement and retention mean scores than the students taught with lecture method. The study recommended among others that, administrator of colleges of education should encourage the use of YouTube based instruction among lecturers to enhanced students' achievement and retention in school workshop management.

Keywords: School workshop management, YouTube based instruction, achievement and retention

1. Introduction

School workshop management is a compulsory one credit unit technical course with course code: TED 326 offered by Building Technology Education students during second semester in NCE III. According to FGN (2012), the aim of school workshop management is to equip students with the requisite knowledge and skills in workshop practices. School workshop management is very important in preparing students to be self-employed after graduation. Halliru and Muhyideen (2018) noted that, the aim of school workshop management is far from being achieved as the examination records in the course show persistently low student's academic achievement. Academic achievement literally means a measure of the ability of students to gain or reach a set goal through effort and skills. Students' achievement connotes academic performance in school subject as symbolized by a score or mark on achievement test. Kareem (2015) stated that, academic achievement of colleges of education students in school workshop management is declined due to massive failure recorded in the course. The decline achievement threatens the realization of the stated aim of the course. According to Azih and Nwosu (2018), the low academic achievement in technical courses such as school workshop management is attributed to low level retention of knowledge.

Retention of knowledge is the ability of an individual to reproduce valuable knowledge after a period of time. According to Adamu (2016), retention of knowledge is the repeat performance by a learner of the behaviour earlier acquired, elicited after an interval of time. Furthermore, Boyle *et al.* (2013) posited that, the students' low retention in learning is responsible for the low academic achievement in school workshop management. Nevertheless, low retention of knowledge among students is influenced by the predominately instructional techniques utilized in teaching such as lecture method of teaching. Lecture method is the most commonly used method of teaching in which the teacher function as a role resources in classroom instruction. Akinboye (2013) revealed that, lecture method of teaching is predominantly used for instructional delivery in Nigerian schools including colleges of education. Okon (2018) noted that, lecture method of teaching is not challenging enough to meet the needs of the technology education students. The use of lecture method in teaching school workshop management could be partly responsible for students' low achievement and retention of

knowledge. Hence, there is need to explore the use of educational platforms capable of enhancing students' academic achievement such as YouTube based instruction.

YouTube based instruction could also be seen as a type of instruction that allow students to download, watch and share instructional videos related to the course contents. Jones and Cuthrell (2011) stated that, YouTube based instruction can be used directly in or outside the classroom as part of the teaching process. Jarrett (2010) noted that, the benefits of YouTube based instruction in education include; allowing students to use modern technology to study a course, connecting students to large source of instructional videos, facilitating an interaction between students and students, students and teachers and students and contents as well as allowing teachers become facilitators in the learning process, while the students become more independent and are actively involved in the learning process. Shea and Sherer (2011) points out that, active involvement of students in the learning process enhances academic achievement. Hence, this study seeks to investigate the impact of YouTube based instruction on students' achievement and retention in school workshop management in Colleges of Education in North-Central, Nigeria.

1.1. Statement of the Research Problem

School workshop management is aimed at equipping building technology education students with the knowledge and skills on effective workshop practices. To ensure that students learn the contents of school workshop management, Governments at both States and federal level have made provision for several inputs that include, building structures, well designed and developed curriculum as well as teaching staff. Unfortunately, despite these efforts by the Governments, one may be constrained to contend that, the achievement of the aim is defeated as results of the continuous poor achievement and declining interest of students in studying school workshop management is revealed. Supporting this claim, Azih and Nwosu (2018) reported that, the achievement of students in school workshop management is generally low in examinations due to the overcrowding of students in classes, lack of time to perform enrichment and beneficial activities, use of traditional lecture methods of teaching that do not take into account the needs of students, their interests, their tendencies and their desires as well as the absence of technology. Okon (2018) equally noted that, lecture method of teaching that is mostly used by colleges of education lecturers is not challenging enough to meet the needs of the BTE students.

In a quest to address these shortcomings, there is an urgent need for educational strategies to keep up with the contemporary times, along with teaching methods that develop students' abilities in learning school workshop management and to overcome the traditional ways of bridging the gap between the requirements of the current age and the students' aspirations. Hence, the utilization of educative platforms capable of enhancing students' academic achievement and retention in school workshop management becomes paramount. Thus, the researcher determined the impact of YouTube based instruction on students' academic achievement and retention in school workshop management in Colleges of Education in North-Central, Nigeria.

1.2. Aim and Objectives of the Study

The study aimed to determine the impact of YouTube based instruction on students' achievement and retention in school workshop management in Colleges of Education in North-Central, Nigeria. Specifically, the objectives of the study were to determine the impact of:

- YouTube based instruction on students' academic achievement in school workshop management
- YouTube based instruction on students' retention in school workshop management

1.3. Research Questions

The following research question were raised to guide the study:

- What is the impact of YouTube based instruction on students' academic achievement in school workshop management?
- What is the impact of YouTube based instruction on students' retention in school workshop management?

1.4. Hypotheses

The following null hypotheses were formulated and to be tested at .05 level of significant:

- HO₁: There is no significant difference between the mean achievement scores of students taught school workshop management using YouTube based instruction and those taught using lecture methods.
- HO₂: There is no significant difference between the mean retention scores of students taught school workshop management using YouTube based instruction and those taught using lecture methods.

1.5. Cognitive Theory of Multimedia Learning

Cognitive theory of multimedia learning propounded by Richard & Roxana in (2005) identifies and explains the basic principles of how learners process multimedia information. The theory asserted that people learn more deeply from words and pictures than from words alone, which referred to as the multimedia principle. The theory further pointed out that, in multi-media learning the learner engages in three important cognitive processes namely: selecting, organizing and integrating. Selecting is applied to incoming verbal and visual information to yield a text base and image base respectively; organizing is applied to the word base to create a verbally-based model of the to-be explained system and is applied to the image based to create a visually-based model of the to-be explained system. Lastly, integrating occurs when learners build connections between corresponding events verbally and visually. The cognitive theory of multimedia learning provided

basis for the researcher in developing YouTube video instructional package to enhance learning outcomes of NCE III Building Technology students in school workshop management.

1.6. Constructivism Theory of Learning

Constructivism theory is credited to Emmanuel Kant as the father of constructivist by some researchers while others suggested that constructivism can be traced to Socrates. Constructivism is a theory or set of interrelated doctrines and philosophies about learning in which learners construct their own knowledge out of their own experiences. Constructivism suggests that knowledge is not passively received either through the senses or any means of communication by learners, but is actively constructed by them. Rather than passive absorbers of information, learners are viewed as actively engaged in meaning-making, activating prior knowledge to bear or fit with new situations, and if warranted, adopting such knowledge structures. Therefore, the study adopted constructivism learning theory because it is the root of YouTube based instruction.

1.7. YouTube Based Instruction

In YouTube based instruction, video is considered as the central point for learning which provide supportive learning environments that offers students with various forms of authentic, complex, and contextualized learning experiences (Hasselbring & Moore, 2016). The YouTube video serves as the focal point for initiating generative thinking and various interactions that arouse student's interest (Riethet *al.*, 2013). Video instruction can provide a rich sensory of information (visual and audio) which arouse and stimulates student's interest in learning. Video is especially useful as an instructional anchor because it allows students to view and discuss circumstances and subjects that were previously inaccessible and abstract to them (Haynie, 2013).

1.8. Students' Achievement

Several studies shown that, YouTube video-based instruction has the potential of serving as more effective teaching-learning platform than others. According to Beck, King & Marshall (2017), video format promotes learning by supporting student's cognitive processing and improvement of detailed mental representations in several ways which consequently improve the achievements of students. YouTube video is very useful as an instructional support platform because it allows students to view and discuss situations and subjects earlier unreachable and nonrepresentational to them (Haynie, 2013). From academic achievement perspective, the YouTube video offers representative stories or episodes to engage students in problem solving situations. However, Riethet *al.* (2013) posited that video-based contexts also help teachers and students to share the common experiences. This shared experience promotes communication with a higher level of interaction that promotes academic achievements of students. Brad (2010) indicated positive impacts of students' centred instruction (YouTube based instruction) on academic achievement. Moreover, Shyu (2017) specifically revealed that, YouTube based instruction helped students to understand what they learned through the improvement of problem-solving skills which lead to improved academic achievement.

1.9. Students' Retention

In YouTube based instruction, the student's participation or interaction with the YouTube video provide an interactive learning environment which has a direct positive relationship with student's cognitive processes and a tendency to improve students' construction of knowledge and transfer of learning. This suggests that, interacting with YouTube based instruction can be effective as an instructional platform to enhance student's retention of knowledge (Simeon, 2018). According to Bottge, Rueda, Serlin, Hung & Kwon (2017) students in science and technology courses such as school workshop management retained what they had learned in several weeks after instruction, when exposed to YouTube based instruction. Nevertheless, Choi and Johnson (2015) revealed that the video-based instruction is more memorable than the traditional text-based instruction. Retention of knowledge increases by using video cases and linking them with the course content (Jonassen, Peck & Wilson, 2009).

2. Methodology

The study adopted pretest-posttest non-equivalent control group design of quasi-experimental study was adopted for the study. The design is most suitable for the study since pre-selection and randomization of groups is often difficult in a school setting, intact classes were used to avoid disruption of normal classes. The study was conducted in North-Central, Nigeria. The North central States of Nigeria comprise Niger, Kogi, Benue, Kwara, Plateau and Nasarawa States. The population of this study comprised of all the 318 Nigerian Certificate in Education (NCE) III building technology students. The sample size of study was 217 students comprising of 50 from Federal College of Education, Pankshin, 62 from Nasarawa State College of Education, Akwanga, 65 from Niger State College of Education, Minna and 40 from Kogi State College of Education, Ankpa. Simple Random Sampling (SRS) technique was used in selecting and assigning Nasarawa State College of Education, Akwanga, and Niger State College of Education, Minna to the experimental groups while Federal College of Education, Pankshin and Kogi State College of Education, Ankpa to the control groups.

The instrument used to collect data for this study is School Workshop Management Achievement and Retention Tests (SWMART). The SWMART consists of 50 multiple choice items with four points response options of A, B, C and D respectively, developed by the researcher. However, the research also developed six set of YouTube videos in-line with the contents of school workshop management used by students in the experimental group. The SWMART was subjected to face and content validation by three experts that include two in Building Technology Education option, Department of

Industrial and Technology Education, Federal University of Technology Minna, Nigeria and one in the Department of Building Technology Education, Niger State College of Education, Minna, Nigeria. The reliability coefficient value of SWMART, was determined as 0.78 using Pearson Product Moment Correlation (PPMC). The study employed the used of descriptive and inferential statistics to analyze the data. Descriptive statistics using mean was used to answer the research questions and inferential statistics using Analysis of Covariance (ANCOVA) to test the hypotheses at significant level of 0.05. Group with higher mean value were taken to have performed better in achievement or retention test or showing much interest in school workshop management. The null hypotheses were rejected since significant of F calculated was less than 0.05. All statistical calculations were conducted using Statistical Package for Social Science (SPSS) version 25.

2.1. Experimental Procedures

The study was conducted in nine weeks' period during which, six topics in school workshop management were covered. The study involved four stages which include administration of pre-test, treatment, post-test and retention test:

- The pre-test was administered to all the students involved in the study in the first week of the research exercise before both groups are subjected to treatment.
- The students in the experimental group were exposed to YouTube based instruction and the students in the control group were taught using lecture method. The treatment process lasted for a period of six weeks.
- After the treatment process, the posttest was administered to all the students in the seventh week to ascertain their mean academic achievement in school workshop management.
- Two weeks after the administration of posttest, a retention test was administered to all the students to determine their mean retention scores in school workshop management.

3. Results

3.1. Research Question 1

What is the impact of YouTube based instruction on student's academic achievement in school workshop management?

		Pre-test	Post-test	
Group	N	Mean	Mean	Mean Gain
Experimental	127	10.93	42.17	31.24
Control	90	11.00	30.27	19.27

Table 1: Mean of Pre-test and Post-test Scores of Students Taught Using YouTube based Instruction and Those Taught with Lecture Method in School Workshop Management Achievement Test

Table 1 shows that the experimental group had a mean score of 10.93 in the pre-test and a mean score of 42.17 in the post-test with a pre-test, post-test mean gain in experimental group to be 31.24. The control group had a mean score of 11.00 in the pre-test and a post-test mean of 30.27 with a pre-test, post-test mean gain of 19.27. With this result, YouTube based instruction is effective than the lecture method in enhancing the academic achievement of students in school workshop management.

3.2. Research Question 2

What is the impact of YouTube based instruction on student's retention in school workshop management?

		Pre-test	Retention-test	
Group	N	Mean	Mean	Mean Gain
Experimental	127	10.93	35.74	24.81
Control	90	11.00	20.62	9.62

Table 2: Mean of Pre-test and Retention Test Scores of Students Taught Using YouTube based Instruction and Those Taught with Lecture Method in School Workshop Management Retention Test

Table 2 shows that the experimental group had a mean score of 10.93 in the pre-test and retention mean score of 36.60 in the retention test with a pre-test, retention test mean gain in experimental group to be 24.81. The control group had a mean score of 11.00 in the pre-test and a retention mean score of 20.76 with a pre-test retention test mean gain of 9.62. With this result, YouTube based instruction is effective than the lecture method in enhancing student's retention of knowledge in school workshop management.

3.2.1. Hypothesis One

H₀₁: There is no significant difference between the mean achievement scores of students taught school workshop management using YouTube based instruction and those taught using lecture methods.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	3918.69 ^a	2	1959.35	27.20	.00
Intercept	4640.42	1	4640.42	64.41	.00
Pretest	43.33	1	43.33	.60	.44
Group	3763.40	1	3763.40	52.24	.00*
Error	12751.86	214	72.04		
Total	223325.00	217			
Corrected Total	16670.55	216			

Table 3: Summary of Analysis of Covariance (ANCOVA) for Test of Significant Difference between the Achievements Mean Scores of Students Taught School Workshop Management Using YouTube Based Instruction and Those Taught with Lecture Method

A. R Squared = .235 (Adjusted R Squared = .226)

*Significant (F Less Than .05)

Table 3 shows the F calculated value for the groups is 52.24 with a significant of F at .00 which is less than .05. The results indicated that there is a statistically significant difference between the achievement mean scores of students taught school workshop management using YouTube based instruction and those taught with lecture method. Therefore, the null hypothesis stated was rejected.

3.2.2. Hypothesis Two

- H₀₂: There is no significant difference between the mean retention scores of students taught school workshop management using YouTube based instruction and those taught using lecture methods

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	9703.39 ^a	2	4851.69	150.02	.00
Intercept	3032.127	1	3032.127	93.78	.00
Pretest	31.45	1	31.45	.98	.33
Group	9480.84	1	9480.84	293.16	.00*
Error	5724.28	214	32.34		
Total	140195.00	217			
Corrected Total	15427.66	216			

Table 4: Summary of Analysis of Covariance (ANCOVA) for Test of Significant Difference between the Retention Mean Scores of Students Taught School Workshop Management Using YouTube Based Instruction and Those Taught with Lecture Method

A. R Squared = .648 (Adjusted R Squared = .644)

*Significance (F Less Than .05)

Table 4 shows the F calculated value for the groups is 293.16 with a significant of F at .000 which is less than 0.05. The results indicated that, there was statistically significant differences between the retention mean scores of students taught school workshop management using YouTube based instruction and those taught with lecture method. Therefore, the null hypothesis stated was rejected.

4. Findings of the Study

- The students taught school workshop management using YouTube based instruction obtained higher achievement mean scores than the students taught with lecture method.
- The students taught school workshop management using YouTube based instruction obtained higher retention mean scores than the students taught with lecture method.
- There is significant difference in the achievement mean scores of students taught school workshop management using YouTube based instruction and those taught with lecture method.
- There is significant difference in the retention mean scores of students taught school workshop management using YouTube based instruction and those taught with lecture method.

5. Discussion of Findings

The results presented on student's achievement mean scores in school workshop management revealed that the students taught school workshop management using YouTube based instruction obtained higher achievement mean scores than the students taught with lecture method in the school workshop management achievement test. This means that YouTube based instruction produced positive impact on student's cognitive achievement than the lecture method because the students treated with YouTube based instruction were found to perform better in achievement test. The finding is in-line with the findings of Beck, King & Marshall (2012) that revealed video format promotes learning by supporting student's cognitive processing and improvement of detailed mental representations in several ways which consequently improve the achievements of students. Similarly, the finding of this study is supported by the findings of Riethet *et al.* (2013) who posited that video-based contexts help teachers and students to share the common experiences.

The summary of Analysis of Covariance (ANCOVA) for the test of significant difference between the achievement mean scores of students taught school workshop management using YouTube based instruction and those taught with lecture method revealed a statistically significant difference. Evidently, the treatment enjoyed by the students in the experimental group is responsible for the significant difference in the achievement mean score of students between the two groups. The finding is in conformity with the findings of Adenkunle (2013) found significant difference in the achievement mean scores of student in the experimental group and the control group.

The results presented on student's retention mean scores in school workshop management revealed that the students taught school workshop management using YouTube based instruction obtained higher retention mean scores than the students taught with lecture method in the school workshop management retention test. This implies that YouTube based instruction is more effective on student's cognitive retention than the lecture method because the students taught using YouTube based instruction were found to obtain high retention mean scores in the retention test. The finding is in harmony with the findings of Sims (2018) who revealed that learning which resulted from the use of computer is more efficient in terms of effective transfer of knowledge as well as the facilitation of recall and the quality of retention. Simeon (2018) also revealed a related finding that interacting with artificial intelligence such as YouTube based instruction can be effective as an instructional strategy to enhance student's achievement and retention of knowledge.

Furthermore, the summary of Analysis of Covariance (ANCOVA) for the test of significant difference between the retention mean scores of students taught school workshop management using YouTube based instruction and those taught with lecture method shows statistically significant difference. Evidently, the treatment enjoyed by the students in the experimental group is responsible for the significant difference in the retention mean score of students between the two groups. The finding is similar with the findings of Adekunle (2013) that revealed statistical significant differences in the retention mean scores of student in the experimental group and the control group.

6. Conclusion

The results obtained revealed that cognitive achievement and retention of students were enhanced using YouTube based instruction. Consequently, YouTube based instruction has the potential to enhance learning via video applications by actively involving students in the learning process and minimizing teacher's involvement in the teaching processes. The use of YouTube based instruction has value as an instructional tool for school workshop management. Therefore, it is concluded that YouTube based instruction has positive effect on student's achievement, interest and retention in school workshop management at college of education level.

7. Recommendations

Based on the findings of the study, the following recommendations were made:

- Administrator of colleges of education should encourage the use of YouTube based instruction among lecturers to enhanced students' achievement and retention in school workshop management.
- Lecturers especially those teaching school workshop management should adopt YouTube based instruction to teach students at college of educations to enhance student's cognitive achievements and retention in school workshop management.

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