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EFFECT OF VIDEO CLIP ON JUNIOR SECONDARY TWO STUDENTS' MOTIVATION IN BASIC SCIENCE AND TECHNOLOGY IN JOS-NORTH, PLATEAU STATE, NIGERIA

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ABSTRACT

The study investigated the effect of video clip on junior secondary two (JSS2) students' motivation in Basic Science and Technology in Jos-north, Plateau State, Nigeria. Two research questions were answered and two hypotheses tested at 0.05 level of significance. The study employed quasi-experimental research design**.** It specifically made use of the non-randomized pre-test post-test non-equivalent control group design. The population for the study includes 1,648 JSS2 Basic Science and Technology students, drawn from 22 public schools in Jos-North, Plateau State. The sample of the study comprised 72 students, drawn from two schools. One school 32 students from represented the control group) and the other school had 40 students which represented the experimental group. The instrument for data collection was the Basic Science Motivation Questionnaire (BSMQ)**,** comprising 30 items, scored on a 4-point Likert scale. The reliability coefficient of the instrument stood at 0.78. Mean and standard deviations were used to analyze data for answering the research questions. Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. Findings of the study showed among others, that the use of video clips in teaching Basic Science and Technology improves the motivation of JSS2 students in Jos North, Plateau State, although male students exhibited slightly higher motivation levels than their female counterparts when taught using video clip. The study also found that there was no significant difference in the motivation level between male and female students in Basic Science and technology in JSS2 students in Jos-North. The study recommended among others, teachers should be trained on how to effectively use video clip in classroom instruction to maximize student engagement and improve learning outcomes, and government policy needs to encourage schools to use video clip in teaching science and science-related subjects.

Key words: Effect Motivation Video clip

INTRODUCTION

The incidence of COVID-19 has inevitably led to a drastic transition towards on-line classes, resulting in an urgent demand for in-depth research on effective ways to conduct and deliver on-line education to the public. For on-line classes conducted via video clip lectures, visual stimulation along with media-rich audio is a major advantage (Fleming, 2019).

Wide-spread use of digital learning environments has facilitated the integration of a diverse range of video materials into course and program curriculum. Although earlier forms of videos, such as film and television, have been commonly used to enhance and support learning for decades (Yousef, Chatti & Schroeder, 2014). In recent years the higher education sector has witnessed a surge in student access to videos, such expansion has

been powered by the relative ease of video production (e.g., voice over PowerPoint) with accessible ready-to use tools, institutionally available recording studios, and streaming media platforms, such as YouTube (Mirriahi & Vigentini, 2017). Further, video is becoming the main method of content delivery in online education (Hansch, Hillers, McConachie, Newman, Schildhauer & Schmidt, 2015).

Video Clip are versatile educational resources encompassing lectures, demonstrations, and tutorials, accessible through digital platforms like websites and learning management systems (Haleem, Javaid, Qadri & Suman, 2022). These videos offer a spectrum of content tailored for diverse learning needs, providing supplementary material and engaging visual aids that complement traditional educational methods. In Sub-Saharan Africa, the educational landscape faces a pressing ting rapidly evolving technologies into classroom teaching (Phillips, 2015). Despite video's potential as a sensory learning medium fostering comprehension and retention, institutions encounter hurdles in harnessing its benefits effectively, resulting in underutilization in most educational settings in the region.

Basic Science and Technology aims to equip students with a foundational understanding of scientific concepts and methods, promoting scientific literacy and preparing them for more specialized science subjects at higher educational levels. It also encourages students to appreciate the relevance of science in their daily lives and understand the impact of science on society and the environment. The availability of Video Clip allows educators to present information in a visual and engaging manner, enabling students to grasp concepts that may otherwise be difficult to comprehend through traditional methods alone. These videos can feature animations, simulations, experiments, and real-life applications, providing a multi-sensory experience that caters to various learning styles (Tanis, 2020).

While Video Clip offer pedagogical advantages, they impact on students' motivation. Motivation is the internal drive or incentive that encourages students to actively engage with the video content and pursue a deeper understanding of Basic Science and Technology concepts. It represents the enthusiasm, curiosity and interests that students feel, when presented with these educational resources, which ultimately stimulates their willingness to learn and explore the subject matter. In Jos-North Local Government Area, junior secondary students' achievement in Basic Science and Technology over the years has not been encouraging. One key factor responsible for this is the low motivation of students which may also result from the type of teaching method employed by teachers. This method, the traditional lecture method, is teacher-centred, and not student-centred.

Gender has been found to be a significant factor in students' motivation. While certain studies found that male students are easily and better motivated to learn school subjects, other studies found that female students are easily and better motivated. Yet in other studies no significant difference existed in students' motivation towards science and technology subjects between the sexes (Klapproth, Krolak-Schwerdt, Glock, Martin, & Böhmer, 2013; PISA, 2013).

The poor achievement of students in Basic science as a result of poor motivation has consequences if the trend is not attended to. The consequence of this downward trend is a potential continuation of knowledge gaps among Nigerian youth in Jos North. Students may lack the necessary understanding of the background of science subject. This deficiency could hinder their ability to participate effectively in science and science-related subjects like Biology, Physics and Chemistry (Luo 2022).

OBJECTIVES OF THE STUDY

The objectives of the study are to:

1. determine the pre-test and post-test motivation mean scores of JSS2 students in Basic Science and Technology in the experimental and control groups.
2. find out the post-test motivation mean scores of JSS2 students in the experimental group based on gender.

RESEARCH QUESTIONS

The following research questions guided the study:

1. What are the pre-test and post-test motivation mean scores of JSS2 students in Basic Science and Technology in the experimental and control groups?
2. What are the post-test motivation mean scores of JSS2 students in Basic Science and Technology in the experimental group based on gender?

HYPOTHESES

The following null hypotheses were stated and tested at 0.05 level of significance:

1. There is no significant difference in the pre-test and post-test motivation mean scores of JSS2 students in Basic Science and Technology in the experimental and control groups.
2. There is no significant difference in the post-test motivation mean scores of JSS2 students in Basic Science and Technology in the experimental groups based on gender.

REVIEW OF RELEVANT LITERATURE

Over the past two decades, video-based instruction has gradually gained acceptance as an alternative and supplement to traditional classroom teaching in Sub-Saharan African countries like Ghana, particularly in tertiary education institutions. These videos afford students the flexibility to navigate content at their own pace, enabling personalized learning experiences. Their accessibility allows learning from anywhere with an internet connection, facilitating deeper understanding and knowledge retention (Karppinen, 2015).

Video Clip incorporate multimedia elements like graphics and simulations, thereby enhancing engagement and comprehension. They ensure consistent content delivery, serving as valuable supplements to live sessions and reinforcing fundamental concepts covered in class. Moreover, educators leverage the time saved through Video Clip to engage students in discussions, interactive activities, and personalized support, enriching the overall learning experience (Rahm & Reed, 2017). The impact of Video Clip in education extends beyond geographical boundaries, catering to diverse learning styles and preferences. However, maintaining the quality, accuracy, and relevance of these educational resources remains pivotal to their effectiveness and alignment with educational objectives and student needs (Abid, Mohd, & Rajiv, 2022)

Science and technology interplay with the society to bring about sustainable development before, during and after the post COVID-19 era. Nations that are considered to be developed and largely considered as civilized have achieved that status through purposeful scientific education of their citizens (Bolarin, 2011). This includes Basic

Science and Technology Basic Science and Technology has been made mandatory as a subject for all Nigerian children at the basic education level. Basic Science and Technology is aimed at enabling the child who is exposed to it to acquire the specific science process skills such as observing, organizing information acquired, generalizing on the basis of acquired information, predicting as a result of generalization and designing experiment to check predictions (Federal Republic of Nigeria, FRN, 2014). The Basic Science concepts are organized into themes to avoid duplication of contents and unnecessary repetition of topics in the different science disciplines, it therefore arouses curiosity and develops scientific attitudes and skills in students. This is to help children to develop reflective thinking and good habits which are needed for scientific method and successful future life (Agogo & Ode, 2011).

Achievement serves as a crucial benchmark within education, encapsulating the realisation of both short-term and long-term educational objectives (Ingersoll & Wainer, 2014). Metrics like grade point average (GPA) or standardised tests like the Scholastic Assessment Test (SAT) play a pivotal role in determining access to higher education, acting as gatekeepers for further learning (Awodun, 2021). They delineate individuals' eligibility for pursuing advanced education, thereby establishing a critical link to higher learning opportunities. Evaluation methods for academic achievement primarily align with the outcomes attained at the culmination of an educational journey. Ensuring the reliability and validation of assessments is paramount, especially with standardised tests that must adhere to national norms to ensure fairness and consistency over time (Ingersoll & Wainer, 2014).

The impact of gender roles on academic achievement is evident across different stages of education. Early childhood patterns exhibit gender-typical behaviours influenced by societal norms. Primary education sees varying competencies, with girls excelling in language subjects while boys outperform in mathematics and sciences (Hadjar & Buchmann, 2016). In highly stratified educational systems, boys are more likely to be placed in lower secondary school tracks, affecting their future prospects and careers (Klapproth & Schaltz, 2013). However, the authors held that when academic performance is considered, the differences in educational tracking decisions diminish, indicating that gender isn't the sole determining factor.

METHODOLOGY

The design of the study was the quasi-experimental research design. It specifically employed the non-randomized pre-test post-test non-equivalent control group design. Quasi-experimental designs are often engaged in a research of this nature for their applicability in natural settings and the ability to address real-world educational challenges. The population for the study includes 1,648 JSS2 Basic Science and Technology students, drawn from 22 public schools in Jos-North, Plateau State. The sample of the study comprised 72 students, drawn from two schools. The sample was made up of 32 students from Government Secondary School Jos Jarawa (representing the control group) and 40 students from Government Secondary School Jishe (representing experimental group). The instrument for data collection was the Basic Science and Technology Motivation Questionnaire (BSMQ)**,** comprising **30 items** scored on a 4-point Likert scale**.** The reliability coefficient of the instrument stood at 0.78. Mean scores and standard deviations were used to analyze data for answering the research questions. Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance.

RESULTS

Research Question One: What are the pre-test and post-test motivation mean scores of JSS2 students in Basic Science and Technology in the experimental and control groups?

The data in Table 1 provide the answer to this research question.

Table 1

Pre-test and Post-test Motivation Mean Scores of JSS II Students in the Experimental and Control Group.

Group		Pre-test		Post-test			
	N	Mean	SD	Mean	SD	$\overline{x}_G$	$\overline{x}_G$- difference
Experimental	40	52.90	6.42	92.93	8.62	40.03	34.06
Control	32	51.69	5.43	57.66	5.02	5.97	

Key

$\overline{x}_G$ = Mean Gain

$\overline{x}_G$- Difference = Mean Gain difference

Table 1 presents the pre-test and post-test motivation mean scores of JSS2 students in Basic Science and Technology in the experimental and control groups. From the result, in the experimental group the post-test mean score ($\overline{x}$ =92.93, SD = 8.62) is higher than the pre-test mean score ($\overline{x}$=52.90, SD =6.42) with a mean gain of 40.03, indicating that there was an increase in the motivation of students after treatment. As for the control group, the mean score was 51.69 and a standard deviation of 5.43 at the pre-test. However, in the post-test the mean score of students increased to 57.66 with standard deviation of 5.02. The mean gain of 5.97 has been recorded in the control group, with a mean gain of 40.03 for experimental group. The mean gain difference is 34.06 in favour of the experimental group. This shows that the use of video clips in teaching Basic Science and Technology improves the motivation of Junior Secondary Two students in Jos North, Plateau State.

Research Question Two: What are the post-test motivation mean scores of JSS2 students in Basic Science and Technology in the experimental group based on gender?

In Table 2, data are presented in answer to research question two.

Table 2

Post-Test Motivation Mean Scores of Male and Female Students in the Experimental group

Group	Gender	N	$\overline{x}$	SD	$\overline{x}$- difference
Experiment	Male	21	93.62	9.38	1.03
	Female	19	92.59	8.39	

Table 2 illustrates the post-test motivation mean scores of male and female students in Basic Science and Technology within the experimental group. It shows that male students had a post-test motivation mean score of 93.62 with a standard deviation of 9.38, while female students had a slightly lower mean score of 92.59 with a standard deviation of 8.39. This results in a mean difference of 1.03. Finding indicates that male students exhibited slightly higher motivation levels than their female counterparts in Basic Science and Technology when taught using video clip.

Hypothesis One: There is no significant difference in the pre-test and post-test motivation mean scores of JSS2 students in Basic Science and Technology in the experimental and control groups.

The data in Table 3 were used to test hypothesis one.

Table 3: ANCOVA Result on Post-test Motivation Mean Scores of Experimental and Control Groups

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	109.645a	2	54.822	.112	.894	.003
Intercept	23297.889	1	23297.889	47.558	.000	.408
Covariate	82.082	1	82.082	.168	.684	.002
GROUPS	11.308	1	11.308	.023	.880	.000
Error	33801.855	69	489.882			
Total	282424.000	72				
Corrected Total	33911.500	71				

a. R Squared = .003 (Adjusted R Squared = .0026)
b. Computed using alpha = .05

In Table 3 an Analysis of Covariance (ANCOVA) was conducted to determine if a significant difference exists in the pre-test and post-test motivation mean score of students towards Basic Science and Technology in the experimental and control groups. The table shows that $F(1,69) = .023$, $p < 0.05$, since the p-value of 0.880 is greater than 0.05 level of significance, the null hypothesis was retained, indicating that there was no significant effect of motivation on students towards Basic Science and Technology. The result further reveals an adjusted R squared value of .0026, which means that .3% of the variation in the dependent variable which is motivation is explained by variation in the treatment, while the remaining is due to other factors not included in this study. The result shows that there is

no significant difference in the pre-test and post-test motivation mean scores of students in Basic Science and Technology in the experimental and control groups.

Hypothesis Two: There is no significant difference in the post-test motivation mean scores of JSS2 students in Basic Science and Technology in the experimental groups based on gender.

The data presented in Table were used to test hypothesis four.

Table 4: ANCOVA Result on Effect of Gender on Motivation of Students in the Experimental Group

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	9.908[a]	2	4.954	.102	.903	.005
Intercept	14368.279	1	14368.279	296.651	.000	.889
VAR00008	7.059	1	7.059	.146	.705	.004
Gender	8.198	1	8.198	.169	.683	.005
Error	1792.092	37	48.435			
Total	238962.000	40				
Corrected Total	1802.000	39				

R Squared = .005 (Adjusted R Squared = .038)

In Table 4, Analysis of Covariance (ANCOVA) was conducted to determine if there is a significant effect of gender on motivation of the boys and girls in Basic Science and Technology after exposure to treatment. Table 4 shows that the main effect of gender $F(1,37) = .146$, $p > 0.05$, since the p-value of .683 is greater than 0.05 level of significance, the null hypothesis was retained, indicating that there was no significant effect of gender on the motivation of students towards Basic Science and Technology after exposure to treatment. The result further reveals an adjusted R squared value of .038 which means that 3.8% of the variation in the dependent variable which is motivation to Basic Science and Technology is explained by gender while the remaining is due to other factors not included in this study. Therefore, there is no significant difference in the motivation level between male and female students in Basic Science and technology in JSS2 students in Jos-North.

FINDINGS

The analysis of the data collected yielded the following findings:

1. The use of video clips in teaching Basic Science and Technology improves the motivation of Junior Secondary Two students in Jos North, Plateau State.
2. Male students exhibited slightly higher motivation levels than their female counterparts in Basic Science and Technology when taught using video clip.
3. There is no significant difference in the pre-test and post-test motivation mean scores of students in Basic Science and Technology in the experimental and control groups.
4. Therefore, there is no significant difference in the motivation level between male and female students in Basic Science and technology in JSS2 students in Jos-North.

DISCUSSION

The study found that after exposure to treatment JSS2 students' motivation in Basic Science and Technology improved. This finding agrees with Maina's (2020) study which found that both male and female students in intervention group taught with video instruction were found to be motivated. Equally, the study by Thaddeus, Alabi, Falode and Aniah (2020) found that majority of students had high level of motivation with the use of gamification online learning. Findings from the study by Muhammed, Nsofor, Falode and Usman (2020) revealed further that Computer Simulation Instructional Package (CSIP) has an enhanced effect on the motivation of pupils towards learning; it makes the teaching to be inclusive and cooperative. However, the study found that male students exhibited slightly higher motivation levels than their female counterparts in Basic Science and Technology when taught using video clip. Again, the hypothesis tested demonstrated how there was no significant difference in the motivation level between male and female JSS2 students in Basic Science and Technology in Jos-North. This finding agrees with the work of Singh and Chacko (2024) which found no gender differences in the levels of achievement motivation of students.

CONCLUSION AND RECOMMENDATIONS

Based on the findings, the following conclusion is drawn: The use of video clips in teaching Basic Science and Technology has the tendency to improve the motivation of JSS2 students in Jos North, Plateau State. However, male students are likely to exhibit slightly higher motivation levels in Basic Science and Technology when taught using video clip. It is also concluded that there is no significant difference than their female counterparts in the pre-test and post-test motivation mean scores of students in Basic Science and Technology in the experimental and control groups. Based on gender, video clips instructional strategy has no effect on the motivation of JSS2 students in Basic Science and Technology. Consequently, the study makes the following recommendations:

1. Educational interventions in Basic Science and Technology should be designed to be gender-neutral, ensuring equal opportunities for both male and female students.
2. Teachers should be trained on how to effectively use video clips in classroom instruction to maximize student engagement and improve learning outcomes.
3. Policy-makers should encourage schools to integrate video-based instructional methods into their curriculum to enhance student learning experiences in STEM subjects.

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