



VIDEO INSTRUCTIONAL PACKAGE AND ITS EFFECT ON SECONDARY SCHOOL STUDENTS' INTEREST IN BIOLOGY CONCEPTS IN MAKURDI METROPOLIS, BENUE STATE



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Abstract: This study was designed to determine the use of Video Instructional Package (VIP) and its effect on secondary school students' interest in Biology concepts in Makurdi Metropolis, Benue State. Two research questions were asked and two hypotheses were formulated and tested. The study adopted a quasi-experimental design of non-randomized pretest-posttest control group type. The population of the study is 2,100 while the sample of 138 SS2 students was drawn from four secondary schools using the multistage sampling technique. In each of the schools, intact classes were randomly assigned to VIP and lecture method. Biology Interest Inventory (BII) was used for the collection of data, validated by five experts, trial-tested, and used for the study. The reliability of BII was determined using Cronbach Alpha and the coefficient obtained was 0.92. Descriptive statistics of mean and standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the research hypotheses at 0.05 alpha level of significance. The findings of this study revealed no significant difference in the interest rating scores of students taught Biology using VIP and those taught using lecture method. Furthermore, there was no significant difference in the interest of male and female students taught using VIP. It was therefore recommended that Biology teachers in secondary schools should adopt the use of VIP for teaching Biology.

Key words: Video and Interest, Secondary School Students, Benue State, Biology Concept

Introduction

Biology is a life science that deals with the living world (Umar, 2011). It is a study of life and the growth of organisms and their organization, purpose, practices, and how they interrelate with each other and with their surroundings. The study of Biology equips individuals with knowledge of themselves and other living organisms and the collaboration between them and the non-living things; such knowledge is used to improve the life of the individual. The knowledge of Biology also equips individuals with skills such as problem-solving, communication, critical thinking, and objective reasoning ability to prepare them for workplace and self-sustainability in the world economy (FRN in Sakiyo *et al*, 2018). Biology is a core subject in Nigeria secondary schools that is introduced to students at senior secondary school level as an introductory ground for human development, where career abilities are prepared, potentials thrilled. It is also a prerequisite for many fields of learning like biochemistry, pharmacy, nursing, agriculture, forestry, biotechnology, and many other areas (Umoke & Nwafor, 2014).

Despite the position of Biology and its attendant prominence to science and technology as a roadmap to nation-building, it is worrisome to note that Biology students still acquire low achievement in Biology in both internal and external examinations. This poor academic achievement can be seen in the result of the senior secondary certificate examination (SSCE) conducted by the West African examination council (WAEC) it was shown that very few numbers of students achieve better in Biology examination compared with other subjects (Ogundiwin *et al*, 2015).

This situation is particularly discouraging when we realize that the achievement of our nation in science and technology depends to a great extent on the mastery of the essential aspect of Biology as a branch of science, (Umoke

& Nwafor, 2014). The source of the poor achievement in Biology could have been linked to several factors among which include; overloaded Biology curriculum, lack of instructional materials for the teaching of Biology, lack of qualified Biology teachers, the nature of some topics in Biology, Biology teachers teaching strategy, lack of interest and motivation on the part of the students among others. (Nwagbo, 2009; Cimer 2012; Abidoeye & Oguniyi, 2012; Sharma, 2013).

The need to know the reason for the low academic achievement of Biology students has been the concern of many researchers for some decades now. The use of poor instructional strategies for the teaching and learning of Biology is the main cause of student failure in Biology. (Ahmed & Abimbola, 2011; Umar, 2011; Oladejo, Olosunde, Ojebisi & Isola, 2011; Wanbugu, Chaneigwo, & Ndiritu, 2013; Manalanga & Awelani, 2014).

Notwithstanding, the teaching of Biology with innovative strategies can be used to overcome learning difficulties and to eradicate misconceptions in Biology, and make Biology learning more effective (Cimer, 2012). Therefore, it is high time teachers of Biology diverge in the methods/strategies used to teach Biology, so that students would be able to learn more, recall more, and apply what they learn in society. The obvious visible change is the incorporation and the dissemination of technology into the teaching and learning of Biology.

Technological ways of teaching come in many forms and are expanding rapidly in our nation and there is a push for schools to keep up with this technology. The use of technology in secondary school is becoming significant because it equips students with skills and prepares them for life in the real world (Okoyefi & Nzewi, 2012; Perry, 2013). The use of a Video Instructional Package (VIP) to teach Biology is a step of utilizing the available technology

(Perry, 2013). VIP is one of the most diversified and powerful virtual learning mediums that captures and presents information and offers a sensory learning environment that enhances learners to understand more and retain information better (Fern, Givan, & Siskind, 2011). It integrates various media such as voice, animation, data, and text for transferring the learning.

Apart from the use of VIP to enhance the achievement of students in the Biology classroom, one of the most crucial factors in learning Biology is students' interest. Interest is defined as responsiveness with a sense of concern, lively understanding of inquisitiveness, and the influence to excite or hold such attention (Kpolovie, 2010). It is also referred to as the condition of wanting to know or learn about something. Interest plays a countless role in the field of psychology as some recent research works have found that it is closely related to personality, motivation, cognition, development, emotion, vocations, aesthetics, behavior, hobbies, reasoning, and information processing (Silvia, 2009). Interest is often believed as a process that contributes to learning and achievement. Interest in Biology could be evident from the way students are attending classes regularly, copying notes and doing an assignment, paying attention in classwork, as well as taking delight in observing and exploring the environment. Agwagah, (2010) asserts that students with low interest in a subject are low achievers while those with high interest in a subject are high achievers. When students' interest increases, understanding becomes enhanced and retention ability increased (Gilakjani, 2012), therefore, students' interest in Biology could aid achievement. The study carried out by Gilakjani (2012) suggested that there is a relationship between interest and instructional strategy and also interest and achievement, and it is also possible to predict achievement and retention from interest ratings. Based on the aforementioned, the importance of students' interest in learning Biology cannot be over-emphasized in enhancing achievement.

Objective of the Study

The purpose of this study is to determine the effect of VIP on secondary school students' interest in Biology. Specifically, the study seeks to;

1. Determine whether the use of VIP will improve students' interest in Biology
2. Find out the effect of VIP on male and female students' interest ratings in Biology.

Research Questions

The following research questions were raised to guide the study:

1. What are the mean interest ratings of students taught Biology using VIP and those taught using lecture method?
2. What are the mean interest ratings of male and female students taught Biology using VIP?

Hypotheses

The following hypotheses were formulated for the study and tested at 0.05 level of significance:

1. There is no significant difference between the mean interest ratings of students taught Biology using VIP and those taught using lecture method.

2. There is no significant difference between the mean interest ratings of the male and female students taught Biology using VIP.

Methodology

A quasi-experimental design, specifically the non-equivalent control group design was employed in this study. The study was carried out in Makurdi Metropolis in Benue State. Makurdi Metropolis is situated in the North Central geo-political zone of Nigeria. The population of the study is 2,100 Senior Secondary School II (SSII) students in Makurdi Metropolis. The sample of this study is 138 SS II students. A multi-stage sampling technique was employed to select the sample for this study. Firstly, Purposive sampling was used to select four schools from the twenty-five schools. The schools were chosen based on the following criteria;

- a. They are co-educational,
- b. They have a projector that is made available for teachers' use,
- c. The students and teachers are computer literate,
- d. The willingness of the school management to permit the use of school facilities and students.

Also, the simple random sampling technique was used. Four schools were randomly picked from the secondary schools in Makurdi Metropolis. In each of the schools, an intact SS II class was used for the study. Two of these intact classes were assigned by balloting as the experimental groups and were taught using the VIP while the other which is the control groups were taught using the lecture method.

Biology Interest Inventory (BII), was used for data collection. The BII is a (32) item interest scale constructed by the researcher. The BII was used to determine the students' interest level before treatment and after the treatment. The instrument BII is a 4-point scale bearing Strongly Agree (SA) (4 points), Agree (A) (3 points), Disagree (D) (2 points), and Strongly Disagree (SD) (1 point).

The instrument was validated by five specialists, two from the Department of Science Education and one from the Department of Educational Foundations (Psychology) from the University of Agriculture Makurdi, Benue State, and two Biology teachers for face and content validity. The constructive criticisms of validators were used. A trial test was carried out on 40 SS II students. Trial testing aimed to determine the internal consistency of the items. An internal consistency reliability coefficient of 0.92 was determined for the instrument using the Cronbach alpha formula.

To effectively test the hypotheses for this study, BII was administered in each of the two schools used for the study. The researcher and the research assistants administered the pretest to all SS II Biology students in the two schools before the treatments, thereafter, the two research assistants

taught the genetic concepts. The teaching period lasted for four weeks after which a post-BII was administered. The mean and standard deviation of the student's scores in the test was used to answer the research questions, to determine the level of observed differences while the hypotheses were tested at 0.05 level of significance using analysis of covariance (ANCOVA).

Results

Research question 1: What are the mean interest ratings of students taught Biology using VIP and those taught using lecture method? The answer to this question are presented in Table 1

Table 1: Mean and Standard Deviations of Interest Ratings of Students in the Experimental and Control Group

Group	N	Pre-BII \bar{X}	S.D	Post-BII \bar{X}	S.D	Mean gain
Experimental	78	75.62	16.28	76.99	21.14	1.37
Control	60	67.08	18.98	72.72	17.06	5.64
Mean diff.				4.27		4.27
Total	138					

In Table 1, the mean interest rating scores of students in the post-BII of the experimental and control groups are 76.99 and 72.72 respectively with their standard deviations as 21.14 and 17.06. The mean difference between the interest rating scores of the experimental and control groups from the post-BII is 4.27 and the mean gain of the two groups is 4.27. It could be seen that students taught using VIP

improved on their interest in genetics more than those taught using the lecture method.

Hypothesis 1: There is no significant difference between the mean interest ratings of students taught Biology using VIP and those taught using lecture method. The result of this hypothesis is presented in Table 2

Table 2: Result of ANCOVA on Interest Rating Scores for Students Taught Biology Using VIP and Lecture Method

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	31018.848 ^a	2	15509.424	97.945	.000	.592
Intercept	2977.418	1	2977.418	18.803	.000	.122
PREECINTR	30849.114	1	30849.114	194.817	.000	.591
METHODECI	183.585	1	183.585	1.159	.284	.009
Error	21377.123	135	158.349			
Total	849788.000	138				
Corrected Total	52395.971	137				

a. R Squared = .592 (Adjusted R Squared = .586)

Table 2 presents the report on the effect of VIP on students' interest in Biology. The Table reveals $p = .284$, since $p = .284 > 0.05$, where 0.05 is the level of significance for the study. The null hypothesis that there is no significant difference in the interest rating scores attained by students

exposed to VIP and lecture method group was therefore accepted.

Research question 2: What are the mean interest ratings of male and female students taught Biology using VIP? The answer to this question are presented in Table 3

Table 3: Mean and Standard Deviations of Interest Ratings of Male and Female Students Taught Using VIP

Gender	N	Pre-BII \bar{X}	S.D	Post-BII \bar{X}	S.D	Mean gain
Male	42	75.26	16.74	78.07	22.91	2.81
Female	36	76.03	15.95	75.72	19.10	0.31
Mean diff.				2.35		2.50
Total	78					

From Table 3 above, the mean interest rating scores of male and female students in the post -BII of the experimental group are 78.07 and 75.72 respectively with their standard deviation as 22.91 and 19.10. The mean difference in the interest rating scores of male and female students in the post-BII is 2.35 and the mean gain is 2.50. The result showed that male students who were taught

Biology using VIP had a higher mean interest rating score than their female counterparts.

Hypothesis 2: There is no significant difference between the mean interest ratings of the male and female students taught Biology using VIP. The result of this hypothesis is presented in Table 4:

Table 4: Result of ANCOVA on Interest Rating Scores for Male and Female Students Taught Biology Using VIP

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	24494.848 ^a	2	12247.424	92.726	.000	.712
Intercept	115.196	1	115.196	.872	.353	.011
PREINTVIP	24387.869	1	24387.869	184.642	.000	.711
GenderINVIP	196.732	1	196.732	1.489	.226	.019
Error	9906.139	75	132.082			
Total	496709.000	78				
Corrected Total	34400.987	77				

a. R Squared = .712 (Adjusted R Squared = .704)

From Table 4, $p=.226$ since $p>0.05$, the study reveals that the null hypothesis of no significant difference between male and female students' interest is accepted. Thus, the result indicates that there is no significant difference between the interest ratings of male and female students taught Biology VIP.

Discussion of Findings

The data presented in Table 1 provided the answer to research question one. The students taught Biology using the VIP had a mean interest rating score of 76.99 while those students taught using the lecture method had a mean interest rating score of 72.72. The finding revealed that VIP and lecture methods are effective for improving students' interest in Biology, but those taught Biology using VIP has higher interest rating score compared to those taught using lecture method. The reason for the high-interest rating score of students taught Biology using VIP may be due to the video that the students are exposed to which is one of the technological ways of instruction. Videos can motivate and enhance the engagement of students thereby improving interest and meaningful learning in Biology. Researchers like Omiola *et al.*, (2012); Chinna and Dada (2013), all agreed that the use of video to instruct enhances the interest of students. Analysis of covariance was used to test hypothesis one, Table 2, revealed that a significance of 0.284 at 0.05 level of confidence was obtained. This confirmed that there is no significant difference between the mean interest scores of students taught using VIP and those taught using lecture method. This finding varies with the result of Aiyedun (2020) which indicated that there is a significant difference in the mean interest rating score of students taught with animation teaching strategy than those taught using conventional teaching method. The reason for this variance in both findings could be attributed to the differences in the nature of the schools and the quality of the teachers used for the studies.

Again, results in Table 3 showed that the males had a higher post-interest rating score of 78.07 after the treatment than the female students in the experimental group with post interest rating scores of 75.72. This result was further confirmed with the corresponding hypothesis in Table 4 and the result indicated that there is no significant difference between the male and female students' interest in Biology, this implies that the use of VIP is a gender-friendly way of teaching. Therefore, gender is not a major factor to determine interest after exposure to experiments. This is in agreement with Okolo & Oluwasegun (2020); Atsuwe, Adeniran, & Iortyom (2019) who reported that there is no significant difference in gender students' interest

ratings in their study. On the contrary, the findings conflict with the findings of Iwanger (2018); Agommuoh & Nzewi (2015) who found a significant difference in the mean interest rating scores of male and female students. This variance in both findings could be as a result of some factors like the teaching strategy, location, and individual perception.

Conclusion

Based on the findings, the following conclusion was drawn.

1. Analysis showed that there was no significant difference in the mean interest rating scores of students exposed to VIP and their counterparts using lecture method. This could be a result of the quality of the teacher used for the study.
2. Analysis of data again showed that there was no significant difference in male and female students' interest, this means that VIP is a gender-friendly way of teaching.

Recommendations

The following are the recommendations made based on the findings of this study:

1. Biology teachers should apply technological ways of teaching like the use of VIP during the lesson to enable students to learn effectively.
2. Students' gender should be taken into cognizance during teaching especially when teaching biology. The findings of this study revealed that gender was not a significant factor in the mean interest, achievement, and retention scores of students; hence, teachers should use VIP that can streamline gender differences in Biology classrooms

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