



## Efficacy of Video Recorded Instruction and PowerPoint Presentation on Secondary School Students' Interest in Biology in Federal Capital Territory

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### Abstract

The study examined the impact of Video-Recorded Instruction (VRI) and PowerPoint Presentations (PPP) on secondary school students' interest in Biology. Guided by one research question and a null hypothesis, it utilized a quasi-experimental pretest-post-test non-equivalent group design. The sample included 120 students from a population of 28,841 first-year Biology students in the Federal Capital Territory (FCT), selected through multistage sampling. Data was collected using Biology Student Interest Inventory (BSII) and lesson plans on using VRI & PPP, validated by specialists from the University of Nigeria, Nsukka. BSII showed a reliability index of 0.79 analyzed using PPMC. Research questions were analyzed using mean and standard deviation while ANCOVA for testing the hypothesis at 0.05 significance level. Results indicated that students taught with VRI had a greater interest in Biology than those taught with PPP, recommending that VRI should be used often in schools to improve student interest in the subject.

**Keywords:** Video Recorded Instruction, PowerPoint Presentation, Interest, Biology.

### Introduction

Biology is one of the science subjects that occupy a unique position in the school curriculum and plays a vital role in developing individuals' abilities to apply scientific knowledge to everyday life in matters of personal, community health, and agriculture. Biology is an integral science subject that provides content for students' careers in Medicine, Nursing, and Pharmacy among others. To study these courses at the tertiary institutions, a credit pass and above in Biology is needed. Biology is a complex senior secondary school subject. This complexity has made many students shy away from the subject with the wrong notion that it is very voluminous and difficult to comprehend. This caused the students to lose interest in Biology, which may have resulted to poor performance in the subject. To this effect, some researchers have made effort to identify and address the possible reason for students' lack of interest in Biology. For instance, (Ahmed & Abimbola, 2019; Cimer, 2018; Agboghroma & Oyovwi, 2018; Etobro & Fabinu, 2021) found that many secondary school students perceive Biology topics as boring, abstract, and too difficult to understand and therefore suggest that a **more** innovative lesson delivery approaches be introduced to boost students interest and improve

students' understanding of the subject. Similarly, the West African Examination Council (WAEC) chief examiners' report (2019-2021) specifically pointed out that the persistent poor performance of students in Biology at the senior school certificate examination leaves one in doubt about the effectiveness of instructional material and lesson delivery approaches popularly used by the biology teachers for teaching and learning of the subject. The performance report showed that students who score C6 and above for those years were less than 40% and therefore suggest the use of more innovative instructional delivery approach that could capture the students mentally.

Despite these efforts, the problem of lack of interest among secondary school Biology students still persists. This lack of interest in the subject suggests that many students may struggle to perform well in Biology. Consequently, this may hinder their chances of gaining admission into tertiary institutions for courses that require a credit pass in Biology. Hence, to aid understanding of complex concepts found in Biology, Mayer (2019) suggested that visual and auditory representation of information could be used to capture students' and when this is done, the students will participate actively in the classroom and show

differential preference towards the subject. This can be termed as interest.

Interest is a feeling that drives one to learn more about something, capturing attention and curiosity. Interest is an emotionally oriented trait that determines the vigor of the learner in tackling educational and other activities. According to Mbamalu (2019), interest can be characterized by a situation in which one shows preference toward a certain event or action. Onyejiaku (2018) noted that interest is an important determinant of success and that a learner's success in Biology can be determined by the learner's interest in the subject. This shows that interest produces effort and a combination of interest and effort results in success.

Students' innate interest in Biology can be deepened by the use of an effective lesson-delivery approach. Okoye (2019) is of the view that biology teachers should make Biology lessons real, interesting, and enjoyable using different innovative techniques that are concerted in the use of an effective lesson delivery approach to increase students' interest. This is because interest in a subject can be a reflection of the appropriateness of the teaching approach which may lead to success. Success in Biology examinations can give students a great sense of accomplishment. Hence, there is a need to introduce an innovative teaching approach that could be used to promote students' interest. This type of innovative lesson delivery approach could be Video Recorded Instruction.

Video Recorded Instruction (VRI) is a lesson delivery approach that conveys information through two simultaneous sensory channels (aural and visual). VRI is a motion-based audio-visual model which can provide verbal and pictorial representation of information using multiple presentation modes such as verbal and pictorial representation (Mayer, 2018). Cruse (2019) stated that teachers have recognized the power of audio-visual materials in capturing the attention of learners, increasing their motivation, and enhancing their learning experience. Hence, VRI may be used to achieve various teaching and learning objectives as it offers a sensory learning environment that allows learners to understand more and retain information better (Fern, 2019).

Power Point Presentation (PPP) is a program developed by Microsoft that allows users to create, edit, and present slideshows. PPP is a static visual model widely used for creating visually appealing presentations for various purposes such as academic lectures and classroom lesson delivery. PPP lesson delivery allows the users to manipulate text, pictures,

models, and other graphical elements with great creative flexibility. PPP can display an effect on a computer screen, overhead projections, and transparencies (Information Technology Services, 2016). Students can observe, explore, and take notes through the slide handout feature. Highlighted features can be used to focus the attention of the students during the lesson. Martha (2017), emphasized that PPP can enhance the effectiveness of classroom lessons by highlighting the key points, displaying learning objectives, and presenting information to students. PPP can be an effective lesson delivery as it will help the teachers to refine their materials, capture students' interest, increase attention span as well as retain eye contact (Elizabeth, 2021).

Despite the capabilities of VRI and PPP lesson delivery approaches, there are still features that differentiate the approaches from each other. For example, VRI typically involves a continuous stream of audio and visual content, often featuring an instructor delivering a lesson while PPP consists of a series of slides containing text, images, and multimedia elements which may be accompanied by spoken narration. VRI is generally less interactive as learners typically watch the video passively without the ability to interact with the content whereas PPP can incorporate interactive elements such as hyperlinks, clickable buttons, and animations allowing viewers to engage with the material to some extent (Renninger, Hidi, & Krapp 2017). Irrespective of the differences between VRI and PPP, both approaches may be used to enhance students' interest, especially in Biology. Biology teachers should consider students' interests as a key factor in achieving academic success and thus should be intentional when choosing a lesson delivery approach since the goal of teaching and learning is to achieve success and that interest influences success (Renninger & Hidi, 2016). The above worries prompted the researcher to investigate on the Efficacy of Video Recorded Instruction and PowerPoint Presentation lesson delivery approaches on secondary school students' interest in Biology in Federal Capital Territory.

### Statement of the problem

The persistent decline in students' performance in Biology over the years indicates that students perceive Biology to be a difficult and abstract subject. This has made the students lose interest in the subject. Several researchers have made efforts to improve students' interest in the subject by suggesting different innovative teaching approaches that could be used by

Biology teachers in lesson delivery to boost students' interest. Despite these efforts, it is disheartening to note that student's interest in the subject kept declining. This ugly trend could be as a result of the inability of Biology teachers to select the appropriate innovative teaching approach that could be used to capture Biology students' mentally. Thus, with this decline of students' interest in Biology, the implication is that many students may not be able to study Biology or gain admission into tertiary institutions to study courses requiring a credit pass in Biology. The consequences of this may result in the unavailability of enough manpower for the workplace in these areas in the future.

The above worries have motivated some researchers to explore possible factors that could be responsible for students' lack of interest in Biology at the secondary school level and come up with some recommendations for the use of innovative lesson delivery approaches. One of such approaches that may be used to promote students' interest in Biology is Video Recorded Instruction(VRI) and PowerPoint Presentation(PPP). Hence, the problem of this study put in question form therefore is: what is the efficacy of VRI and PPP lesson delivery approaches on secondary school students' interest in Biology.

### Research Question

The study was guided by this research question.

1. What are the mean interest ratings of secondary school students taught Biology using Video Recorded Instruction and those taught using PowerPoint Presentations?

### Hypothesis

The hypothesis was tested at 0.05 significance level.

**Ho:** There is no significant difference in the mean interest rating of students taught Biology using VRI and those taught using PPP.

### Method

The study adopted a quasi-experimental pretest-post-test non-equivalent group design. The sample included 120 students from a population of 28,841 first-year Biology students in the Federal Capital Territory (FCT), selected through multistage sampling. Data collection involved the Biology Student Interest Inventory (BSII) and lesson plans on using VRI & PPP, validated by specialists from the University of Nigeria, Nsukka. The BSII showed a reliability index of 0.79 analyzed using PPMC. Research questions were analyzed using mean and standard deviation while ANCOVA for testing the hypothesis at 0.05 significance level.

### Experimental Procedure

The experiment lasted for eight (8) weeks. Week one (1) was for introduction and training of research assistant. Four regular Biology teachers of the selected schools was trained on how to use VRI and PPP lesson delivery approaches in their teaching. After the training, the teachers were assigned to each of the two experimental and treatment groups. PREBSII was administered in all the groups before treatment. The scores of the students from the pretest were recorded. Weeks 2-6 was used for administering treatment to the different groups by their regular Biology teachers at their normal lesson periods in intact classes using the two approaches respectively. After the treatment, POSTBSII were administered in the same way as the PREBSII without modification. The ratings of the pretest and posttest were analyzed to determine the effect of the treatment on the dependent variable.

### Result

**Table 1:**

***Mean and standard deviation of Lesson Delivery Approaches(LDA) on interest in secondary school Biology***

LDA	N	Pretest		Posttest		Mean Gain
		Mean	SD	Mean	SD	
VRI	60	38.93	3.058	82.82	12.42	43.89
PPP	60	36.43	2.317	66.17	7.22	29.74

**NB: VRI= Video Recorded Instruction; PPP= PowerPoint Presentation; SD= Standard Deviation**

Results in Table 1 show that students taught Biology using Video Recorded Instruction (VRI) had

pretest mean interest ratings of 38.93 with a standard deviation of 3.058 and a post-test mean interest rating

of 82.82 and a standard deviation of 12.42 while those taught using PowerPoint Presentation had pretest mean interest ratings of 36.43 with a standard deviation of 2.317 and a post-test mean interest ratings of 66.17 with a standard deviation of 7.22. The mean gain scores of 43.89 and 29.74 respectively for students taught Biology using VRI and PPP indicate that students taught Biology using VRI had higher interest rating

than their PPP counterparts. The posttest mean interest ratings of students taught Biology using VRI and PPP were greater than their respective pretest interest ratings with the VRI group having a higher mean gain. To confirm whether the differences in the mean interest ratings of students taught Biology using VRI and PPP is statistically significant, the researcher tested hypothesis one at 0.05 level of significance.

**Table 2:**

*Analysis of covariance on the efficacy of VRI and PPP and their mean interest ratings*

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared ( $\eta_p^2$ )
Corrected Model	8724.227 <sup>a</sup>	2	4362.114	43.637	.000	.427
Intercept	1441.772	1	1441.772	14.423	.000	.110
Pre-Interest	407.552	1	407.552	4.077	.046	.034
Methods	5505.216	1	5505.216	55.072	.000	.320
Error	11695.764	117	99.964			
Total	686301.000	120				
Corrected Total	20419.992	119				

a. R Squared = .427 (Adjusted R Squared = .417)

The result on Table 2 shows ANCOVA analysis of the efficacy of (VRI and PPP) on students' interest ratings in Biology. The result shows that an f-ratio of ( $F(1, 119) = 55.072, p < .05, \eta_p^2 = .320$ ) was obtained. Since the associated probability value of 0.000 is less than 0.05 set as level of significance, the null hypothesis was rejected. Thus, inference drawn is that there was a significant difference in the mean interest ratings of students taught Biology using VRI and those taught using PPP. This shows that teaching Biology using VRI lesson delivery approach proved to be more effective in enhancing students' interest. The result further showed the effect size of ( $\eta_p^2 = .320$ ), which indicates that the efficacy of the lesson delivery approach on Biology students' interest is .320. Thus, this implies that 32.0 percent variance in students' interest in Biology can be explained by the lesson delivery approach used.

## Discussion

The finding of the study shows that students' taught Biology using VRI had higher interest than their counterparts taught using PPP. This means that students who learned Biology through VRI showed greater interest in the subject compared to students who were taught using PPP approach. Thus, students' interest in Biology was enhanced with the use of VRI lesson delivery approach. This could be as a result of VRI

being more engaging and visually stimulating than static PPP. Besides, there was a significant difference in the mean interest ratings of students' taught Biology using VRI and those taught using PPP. This means that the way students were taught Biology using VRI and PPP led to a notable statistical change on their interest in the subject.

The above findings are in-line with the finding of some previous studies which such as Agommuoh and Nzewi (2021), studies which revealed that students interest in physics improved greatly with the use of videotape instruction (VTI). This shows that the use of appropriate pedagogy and technology in the teaching and learning of physics will drastically change the way the students learn, and in-turn influence their interest. Adedapo, Salawa and Afolabi (2017) discovered that there was significant difference in students' cognitive achievement and interest in economics, which was mostly enhanced by the VTI strategy, followed by ATS and minimally by the conventional approach. Also, Asogwa (2018) showed that students taught with PPT performed better than those taught conventionally. Balogun's (2019) study showed an attained high cognitive outcome after a six-week treatment period. Nouri and Shahid's (2017) result unveiled that PP improved students' attitude towards the instructor and class participation, though the result did not provide conclusive evidence that PP improved short-term or



long-term memory. Chinna and Dada (2019) revealed that the achievement of students in Biology improved greatly with the use of electronic instructional medium. In the same light, Lords, Travis, Magil and King (2018) discovered that students in the treatment group who were taught using constructivist approach were more interested and performed better in the subject than those in the control group who were taught using the traditional method. Trumper (2018) discovered that students' had higher interest in Biology using constructivist teaching approach. These previous findings are all in consonance with the findings of this study.

On the contrary, studies by Polk (2019), and Rotimi, Ajogbeje, and Akeju (2017) findings do not agree with that of the present study. Polk's result indicated no statistically significant differences among the approaches used (animation based on teachers' observations and PowerPoint presentation) while that of Rotimi, Ajogbeje, and Akeju revealed that there was no significant effect on the treatment on students' achievement on the learned materials. The reason for this disparity in the findings here and that of the present study could be attributed to both studies focusing on only the variable of interest using different approaches. The result on Table 2 shows ANCOVA analysis of the efficacy of (VRI and PPP) on students' interest ratings in Biology. The result shows that an f-ratio of ( $F(1, 119) = 55.072, p < .05, \eta_p^2 = .320$ ) was obtained. Since the associated probability value of 0.000 is less than 0.05 set as level of significance, the null hypothesis was rejected. Thus, inference drawn is that there was a significant difference in the mean interest ratings of students taught Biology using VRI and those taught using PPP. This shows that teaching Biology using VRI lesson delivery approach proved to be more effective in enhancing students' interest in Biology.

## Conclusion

Based on the findings of the study and discussions that follow, the following conclusion was made; students taught Biology using VRI had a higher interest than their PPP counterparts. Further analysis showed that there was a significant difference in the mean interest ratings of students taught Biology using VRI and those taught using PPP.

## Recommendations

1. The government in synergy with the Secondary School Education Board (SSEB) should

endeavor to develop long-term plans to sustain the use of VRI in secondary schools.

2. The curriculum planners should revolutionize and enshrine the use of VRI in lesson delivery into the content of instructional programs during curriculum planning, development and implementation.
3. Biology teachers should be encouraged to always create a classroom environment that values and supports the interests of all students as this can help to improve students' performance and interest in Biology.

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