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Evaluating the Impact of YouTube Educational Videos in Teaching Pollination Concepts among Secondary School Biology Students in Sabon Gari, Kaduna State

Lawal Saadatu Bagiwa, Najmuddeen Alhassan, Nuru Asabe Ramatu
Department of Biology,
Federal University of Education, Zaria

Abstract- This study evaluated the Impact of YouTube Educational Videos in Teaching Pollination Concepts among Biology Students in Sabon Gari. A quasi-experimental design was adopted. The population comprised of 94 students from the selected two schools with two intact classes from the study area, in which one school served as an experimental and the other served as a control group. The experimental group students were given instruction utilising YouTube while the control group students were instructed utilising the conventional method. A data collection instrument titled the Pollination Achievement Test (PAT) was employed for the study. It was validated and reliability tested by using test-retest and PPMC was used for analysis to determine 0.71 as the coefficient value. The study found that there is a significant difference in the mean scores of students taught pollination concepts using YouTube and those taught using conventional teaching methods with a t-value of 4.37 and p-value of 0.00. Also, there is no significant difference in the mean scores of both male and female students when taught pollination using YouTube with a t-value of 1.12 and p-value of 0.26.The study among others recommended use of YouTube in teaching the biology concept of pollination in secondary school should be encouraged as it is empirically established that it enhances academic performance among biology students while teaching them the concept of pollination, teachers and schools should be equipped with modern facilities and instructional packages to enable the teachers/tutors to carry out their lessons via the YouTube instructional strategy method.

Keywords- YouTube, Students' Performance

I. INTRODUCTION

YouTube can be described as a site that allows video sharing and watching online. It aids in developing digital skills essential for more than allowing students to engage as both consumers and creators of content (Pérez-García, 2024). The platform is recognized for its capacity to support informal learning, enabling users to learn at their own pace and according to their preferences (Colas-Poaro & Rotguez, 2022). YouTube also serves as a vital tool for promoting antiracist education, providing resources that enhance understanding of ethnic and racial issues, particularly in school libraries (Colás-Bravo & Quintero-Rodríguez, 2022). Research indicates that YouTube significantly boosts student motivation

and engagement, making learning more interactive and enjoyable (Dita Milala et al., 2024).

YouTube is one of the most important educational tool of our time. While YouTube offers numerous educational advantages, concerns about the reliability and quality of content persist. Users most critically evaluate sources to ensure they receive accurate and credible information, particularly in specialised fields (Mendiratta et al., 2023). The site makes available to students, teachers and qualitative research experts with a unique stock of videos that illustrate the concepts of basic qualitative research. None Atyka and Tri (2024), listed the possible uses of YouTube video-based learning in the educational process, stating that YouTube videos can lead to improved academic performance in science subjects where students demonstrated better learning outcomes when exposed to video content. YouTube has been found to improve students' academic achievement significantly. For instance, a study on environmental education revealed a mean of 40.01 in post-test scores after students were exposed to tailored YouTube videos (Ibrahim & Sylvanus, 2023).

Besides using YouTube to deliver conventional content for automotive technology education, students using YouTube-Video Embedded Instruction achieved higher scores compared to those who did not, indicating effectiveness in practical teaching contexts (Shehu et al., 2019). All of these can arouse students' interest by using YouTube on very flexible delivery to smartphones and tablet computers, laptops as well as the more traditional desktop Personal Computers (Zhou et al., 2016).

II. STATEMENT OF THE PROBLEM

The incorporation of digital resources within the educational framework, especially about scientific disciplines, has become imperative for the augmentation of student engagement and comprehension. Nevertheless, conventional pedagogical approaches in biology at secondary educational schools in Sabon Gari may restrict access to a variety of dynamic learning resources, consequently resulting in deficiencies in student understanding and interest. Although platforms such as YouTube provide an extensive array of educational materials that could enhance classroom instruction, the efficacy of these resources as pedagogical instruments remains predominantly unexamined within this specific context. Research evidence revealed that there exists a significant deficiency in structured assessments regarding whether the biology-related content on YouTube can enhance students' academic performance, facilitate a deeper understanding of intricate topics, and foster positive attitudes toward the subject of biology. Teachers may lack the necessary training to effectively integrate YouTube into teaching practices, leading to underutilization of the platform. Another problem that may hinder the use of YouTube is often lack of institutional support and policies that encourage the use of digital hub like YouTube in education. Furthermore, this study is concerned with the extent to which educators and students can effectively leverage YouTube content within the constraints of the established curriculum. Therefore, evaluating the impact of YouTube educational videos in teaching pollination concepts among secondary school biology students in Sabon Gari, Kaduna State is underscored.

Objectives of the Study

The objectives of the study are to:

- Determine the academic performance of students taught pollination concepts utilising YouTube compared to those taught using conventional teaching methods.
- Ascertain the difference in the performance of male and female students taught pollination concepts using YouTube and conventional teaching methods.

Research Questions

The following research questions were raised to guide the study:

- Does the academic performance of students taught pollination concepts using YouTube differ from those of students taught through conventional teaching methods?
- What differences exist in the academic performance of male and female students when

learning pollination concepts through YouTube?

Null Hypotheses

- **HO1:** There is no significant difference in the academic performance levels of students taught pollination using YouTube versus those taught using conventional teaching methods.
- **HO2:** There is no significant difference in the mean scores of male and female students taught pollination YouTube.

III. METHODOLOGY

A quasi-experimental design was adopted. The target population used for this study comprised all Government Secondary Schools in Sabon Gari Local Government Area of Kaduna State. At the time of this study, there are twelve Secondary Schools in the study area with a population of eighteen thousand four hundred and seventy-six (18,476) students. The study selected two schools from the study area in which students from each school served as Experimental and some from each served as control group. The experimental group students were taught using YouTube while the control group students were taught using the conventional method. In both methods, lesson plans were designed based on the method used. A design instrument called "Pollination Achievement Test (PAT" was designed, validated by science education experts and administered to fifty (50) students among the population but not sampled as a pilot study to determine the reliability of the instrument. The instrument was subjected to face and content validity by some experts in the field. The aim is to examine critically and assess the items of the instrument whether the questions were clear, precise and free from ambiguity and also whether the question match the ability of the student's level and conforms to the subject matter. Their suggestion was accepted and modification was made. Student's scripts were marked and recorded. The instruments from the pilot study were subjected to test and re-test while the result was measured using Pearson Product Moment correlation coefficient and was found to be 0.71. The study involved three main stages. At stage one: a pre-test was administered to two groups that is control and experimental groups in order to establish the entry level of the students before the beginning of the treatment.

IV. RESULT

Table 1: Summary of post-test scores and the SD of control and experimental group

Variable	N	Mean	SD	Mean Diff.
Control Group	54	31.91	13.443	
				9.90
Experimental Group	40	41.81	17.29	

In Table 1 the result revealed that students in the conventional method group have an mean performance of 31.91 and an SD of 13.44 while the YouTube format group has an average performance of 41.81 and an SD of 17.29. The mean difference between the two groups is about 9.90. This result reveals students in experimental group (YouTube format) outperformed those in the control group.

Table 2: Summary of t-test analysis of mean post test scores of students taught pollination using YouTube and those taught using conventional teaching methods

Variable	N	Mean	SD	Mean diff.	df	t_{cal}	p-value	Decision
Control	54	31.91	13.44					
				9.89	92	4.37	0.00	Significant
Experimental	40	41.81	17.29					

At stage two: the students in the experimental group were taught the Pollination concept using YouTube educational videos on pollination concepts from the internet for six weeks. The students in the control group were taught using the conventional method for the same period on the same topics. After the six weeks of treatment, the students were tested using the reshuffled PAT instrument. Marks were assigned to each and the students' scores were recorded.

Table 3 reveals the t-test analysis for significant differences for post experimental and control group performance. The p-value associated with the statistical measure is 0.000. The t-value from the table at a 95% confidence interval is 1.67. Since the calculated t-value (4.37) is greater than the tabulated t-value at a 95% confidence interval, there is a significant distinction between the groups (P= 0.00 < 0.05). The study rejected the null hypothesis. Results indicate that there is a significant difference in the mean scores of students taught the pollination concept utilizing YouTube and those taught utilizing conventional teaching methods.

Table 3: Analysis of mean post-test scores of students taught pollination concept using YouTube by gender.

Variable	N	Mean	SD	Mean Diff	df	cal	P-value	remark
Male	50	42.74	16.78					
				1.86	92	1.12	0.26	Not Significant
Female	44	40.88	17.34					

Table 3 revealed the mean scores and SD values of the male and female students taught using YouTube. The result shows that male students have an average of 42.74 while females have a mean of 40.88 with mean differences of 1.86. The calculated t-value (1.12) is less than the tabulated value of 1.67 at a 95% confidential interval (P=0.26 > 0.05). No substantial disparity exists in the average scores of male and female students when instructed on concepts utilizing YouTube as a pedagogical tool.

V. DISCUSSION

A noteworthy disparity was observed in the average scores of pupils instructed the pollination concept utilising YouTube as an educational tool in contrast to those instructed through conventional pedagogical approaches. This is in line with the findings of Aguanta et al. (2024), Atyka and Tri (2024) and Joves (2023) who found students' post-test scores and concept retention improved significantly in the experimental group, where students reported better learning experiences than in the control group. Similarly, Alzoubi et al. (2023) found that YouTube usage was associated with high scores but didn't differentiate performance based on gender, indicating equal effectiveness for both groups. Similarly, Greeves and Oz (2024) while rigorously analyzing the quantitative effects of YouTube on the academic achievements of students indicated a beneficial impact of YouTube on the educational process. In a similar vein, within the realm of medical education, YouTube possesses the potential to enhance students' comprehension, retention, and retrieval of anatomical knowledge (Srinivasa, R. S., et al., 2024).

There exists no substantial disparity in the average scores obtained by the gender of the students when YouTube was used to teach the concept of pollination. This contrasts with the findings of Dada and Ahmed (2023) who found different achievement patterns of male and female performance using hypermedia in teaching biology. Thus, a student's academic performance is typically assessed using teacher ratings, tests, and exams. In the same vain, Landrum (2021), found women frequently interact with scientific material,

specifically in biology, on YouTube for utilitarian objectives, such as satisfying educational prerequisites, rather than out of intrinsic curiosity, which may subsequently restrict their comprehensive engagement and learning. Also, male students generally demonstrate heightened engagement with scientific and technological material, which may lead to improved educational outcomes (Landrum, 2021). Gender disparities significantly impact educational outcomes, with females often exhibiting heightened involvement and achievement in distinctly gender-specific settings (Almasri, 2022).

V. CONCLUSION

From the findings obtained through the study, it becomes clear that the students who underwent teaching Pollination using the YouTube method performed significantly better/higher than those taught the same pollination concept utilising the conventional method. Thus, the YouTube teaching strategy method enhances students' academic performance in Pollination among Senior Secondary School biology students. This shows that the use of the YouTube method in teaching pollination leads to a more positive perception and quality of instruction than the use of the conventional method. No considerable distinction was noted in the academic achievements of male and female students who participated in the lessons on pollination using YouTube. This means YouTube's instructional strategy method is gender friendly.

Recommendations

Based on the findings above, some recommendations were made as follows:

- The utilization of YouTube in biology instruction on the concept of pollination in secondary school should be encouraged as it is empirically established that it enhances academic performance among biology students while teaching them the concept of pollination.
- Teachers and schools should be equipped with modern facilities and instructional packages to enable the teachers/tutors to carry out their lessons via the YouTube instructional strategy method.
- All science teachers particularly biology teachers should be encouraged to use YouTube in teaching pollination and other biological concepts.

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