

# Exploring the potential of YouTube videos towards enhancing achievement and retention of undergraduate students in environmental education

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## ABSTRACT

The poor performance of students in environmental education calls for different approaches towards teaching of the course of which the incorporation of technology is one of them. Hence, this study investigated the effect of YouTube-supported instructional strategy on academic achievement of environmental education students in University of Abuja, Nigeria. The study adopted a one group pre-/post-test quasi-experimental non-equivalent, non-randomized control group design. The population of the study comprised of 768 year three undergraduate students of Department of Science and Environmental Education, Faculty of Education at University of Abuja. A purposive sampling technique was used to select 126 year three students of environmental education in Department of Science and Environmental Education offering EED 322: Natural ecosystem. The instruments for the study were environmental education achievement test (EEAT) and YouTube videos used as test and treatment instruments, respectively. The instruments were validated by experts in the field of educational technology and environmental education. EEAT was tested using split-half method of reliability and a co-efficient value of 0.89 was obtained using Pearson product moment correlation. The findings revealed that the students performed better in the post-test (mean gain=40.01) and retention test (mean loss=2.01) after exposure to tailored YouTube videos matching their lecture contents and that a significant difference was found in the students' achievement ( $t=5.21$ ,  $p=.000$ ) and retention scores ( $t=2.44$ ,  $p=.000$ ). It was therefore recommended, amongst others, that lecturers should adopt the use of YouTube videos in teaching and learning for they are effective.

**Keywords:** YouTube, environmental education, achievement, retention, undergraduates

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## INTRODUCTION

Environmental education is an undergraduate degree program taught in very few Nigerian universities. The course is designed to expose students to the pervasive menace of environmental problems in order to inculcate the values, awareness and ethics needed for the protection, preservation and conservation of Nigerian environment at air, land and water levels. Environmental education is an emerging discipline that aims to instill values, ethics and awareness for the protection, conservation of the environment. In view of the foregoing, Stevenson (2007) opined that environmental education serves as a learning process that increases people's knowledge and awareness about the environment and associated challenges in order to develop the necessary skills, and expertise to address the challenges and foster attitude, motivation and commitment, make informed decision and take responsible actions. Based on the foregoing, environmental education in this contemporary world has become a very important

component of education in all facets. Thus, there is need to create environmental literate citizens in order to facilitate environmental sustainability.

Furthermore, during Tbilisi Conference, UNESCO (1978) stated that the major objective of environmental education is to produce a world population that is aware of, and concerned about, the environment and its associated problems and which has the knowledge, skills, attitude, motivation and commitment to work individually and collectively towards the solution of current problems and prevention of new ones. Given the above explanation, therefore it is good to effectively teach and learn environmental education properly. Hence, in the light of the foregoing, one of the ways environmental education can be taught and learned effectively with the aim of tackling environmental problems is through the incorporation of technology, which provides the students with a practical basis of what they are supposed to learn especially when dealing with abstract part of the course.

There is no doubt that technology has brought massive innovative changes into the education sector in all ramifications. It is based on this premise, nonetheless, that different techniques other than teacher-centered instruction have risen and are making major breakthroughs in tertiary education (Campillo-Ferrer & Miralles-Martínez, 2021; Falode & Mohammed, 2023). Worldwide, technology is being deployed to make learning interesting, simple and interactive especially through platforms like YouTube. One of the major goals of learning is to bring about a desirable change in learners' behavior having exposed them to the act of teaching. Most educators now deploy the use of YouTube videos to augment classroom experience and to enhance teaching and learning. The educational uses of YouTube have enormous importance because it allows active, constructive, and interactive learning opportunities. Learning through YouTube videos help students to perform better because videos are available anytime and anywhere, with high quality, and the likelihood of video repeat or stop and complete later, which contributes to developing skills and knowledge. YouTube also encourages collaboration through videos sharing among the students group, which makes learning meaningful (Ebied et al., 2016). Accordingly, Al-Zboun et al. (2018) point out that institutions worldwide now create YouTube channels to enable students view lecture videos, this is because YouTube is available for students and teachers to use successfully in and out of the classroom for it helps students learn, stimulate class discussions and achieve learning goals. YouTube videos can be used directly in the classroom as part of the teaching process. They can also be used to introduce fresh concepts, stress more information during instruction, or at the end of the lesson to confirm key points (Al-Zboun et al., 2018).

On another hand, YouTube videos can equally be used as an educational resource that teachers can use as a model for classroom activities and discussions. YouTube provides students and teachers with a different stock of videos that illustrate the concepts they want to teach (Chenail, 2011). Duncan et al. (2013) opined that YouTube videos are valuable to practical, medical and clinical science education, and research, and they may be used in various ways to stimulate students' participation in order to checkmate lack of interest that usually comes with conventional learning. In a research conducted by Kosterelioglu (2016) on the effect of video clip in teaching, the students noted that using video clips arouse interest, increase concentration, and improve memory and intelligence. YouTube clips compliment the work of the teacher by bridging the gap between theory and practice, thereby enhancing academic achievement.

Achievement refers to the performance of students having undergone instruction. Hence, according to Kayii and Dambo (2018), achievement is a measuring scale that tells the degree of performance to which a student has accomplished a specific task at the end of the instructional engagement. Retention, on the other hand, is the ability to recall facts and previous information after undergoing a series of instruction. In the light of the foregoing discuss, it is therefore pertinent to try different approaches to the teaching and learning environmental education so as to produce students that are environmentally literate, and those who can help in the preservation, conservation and protection of the environment for sustainable development.

Studies on the efficacy of YouTube supported instruction towards enhancing students' achievement and retention have been very promising. For example, Al-Zboun et al. (2018) checked the impact of the YouTube and Facebook on students' achievement in geography and

reported that students taught with YouTube performed better because videos stimulate various senses and also capture attention and interest of learners. This shows that YouTube videos have what it takes to improve students' performance. Similarly, Felicia and Mumini (2019) investigated the effect of YouTube on performance of secondary school students in biology concepts and found that experimental group taught with YouTube videos did not perform better than the control group. Additionally, Beji and Saidu (2021) checked the impact of YouTube-based instruction on students' achievement and retention in school workshop management in colleges of education in north central Nigeria and reported a significant difference in the achievement and retention scores of students exposed to YouTube instruction. In a study titled effectiveness of using YouTube to enhance the learning of computer in education skills in Najran University by Ebied et al. (2016), it was discovered that students taught with YouTube performed better than the traditional class. Furthermore, Olasina (2017) investigated the educational values of YouTube videos for academic writing and discovered that the experimental group that was exposed to YouTube videos in order to improve their writings performed better than the control group. In a similar regard, Gambari and Adamu (2008) studied the impact of videotaped instruction on the teaching, learning and retention of primary school teachers and the findings indicated that the students taught with video package performed and retained better than those taught using conventional method. Azor et al. (2020) checked the effect of YouTube audio-visual documentaries on achievement and interest in history curriculum and reported a significant difference in achievement of students exposed to YouTube videos history. More so, Gambari et al. (2014) investigated the effectiveness of computer animation and geometry instructional model on mathematics achievement and retention of students in junior secondary schools and the results revealed that students taught geometry using computer animation performed better in than those in the control group. The results of the various studies revealed the usefulness of YouTube videos in instruction even though most of them were carried in different disciplines other than environmental education.

Thus, based on the foregoing, in spite of the technological advancement that has made the world a global village, and which has simplified learning, most Nigerian lecturers always fail to incorporate the use of technology in teaching of environmental education of which some of its contents are considered to be abstract in nature. With respect to this study, it was discovered that students always record low performance in EED 322: Natural ecosystem, which is abstract in nature. This is not unconnected to the methodologies often deployed, which are merely lecture methods often viewed to be uninspiring and unattractive. Therefore, this problem calls for the need to try a different approach to the teaching of this course in order to enhance students' performance. In view of the aforementioned, this study hinges on the fact that whether the use of adopted YouTube videos can offer students different angles to learn from with the aim of enhancing learning outcomes.

### **Aim and Objectives the Study**

The aim of the study is to investigate the effect of YouTube-supported instructional strategy on academic achievement of undergraduate students of environmental education at University of Abuja, Nigeria.

Specifically, the study seeks to determine the followings:

**Table 1.** Research design layout

Group	Pre-test	Treatment	Post-test	Retention
EG I	Pre-test for EG I	Treatment for EG I	Post-test for EG I	Retention for EG I

Note. EG: Experimental group

**Table 2.** The results of the pre- & post-test mean of undergraduate students

Group	n	Mean	Standard deviation	Mean difference
Pre-test	126	28.54	11.88	40.01
Post-test	126	68.55	5.91	

1. The difference in mean achievement scores of undergraduate students exposed to YouTube-supported instruction.
2. The difference in mean retention scores of undergraduate students exposed to YouTube-supported instruction.

**Research Questions**

The following research questions were raised to guide the study:

**RQ1.** What is the difference in mean achievement scores of undergraduate students exposed to YouTube-supported instruction?

**RQ2.** What is the difference in the mean retention scores of students exposed to YouTube-supported instruction?

**Research Hypotheses**

The following null hypotheses were formulated to guide the study, and were tested at 0.05 level of significance:

**HO1.** There is no significant difference in the mean pre-test and post-test achievement scores of undergraduate students exposed to YouTube-supported instruction.

**HO2.** There is no significant difference in the mean retention scores of undergraduate students exposed to YouTube-supported instruction.

**METHODOLOGY**

The study adopted a one group pre-/post-test, quasi-experimental, non-equivalent, non-randomized control group design. The population of the study comprised 768 year three students of Department of Science and Environmental Education in Faculty of Education, University of Abuja. A purposive sampling technique was used to select 126 year three students of environmental education to be used for the study. The choice of 300 level students was appropriate because they were the ones offering EED 322: Natural ecosystem, as a course, whose contents are usually abstract. The instruments for the study were a 30-item multiple-choice achievement test named environmental education achievement test (EEAT) as well as adopted YouTube videos used as treatment, obtained online to suit the content areas of the course. The instrument had four options A to D out of which one is the correct answer and the other three were used as distracters. The test instrument was validated by two education experts in the faculty while the YouTube videos used as treatment package were validated by experts in Department of Computer Science at University of Abuja, as well as two educational technology experts in Federal University of Technology, Minna. The achievement test was pilot-tested on 15 400 level students using a split-half method of reliability and a co-efficient of 0.89 was obtained using Pearson product moment

**Table 3.** Descriptive statistics of mean retention scores of undergraduate students exposed to YouTube instruction

Group	n	Mean	Standard deviation	Mean difference
Post-test	126	68.55	5.91	2.01
Retention	126	66.54	4.89	

correlation. One mark was allocated for each correct answer whereby the final scores were converted to percentage. The clips were played to the students for a period of four weeks. For the retention test, the same EEAT instrument was administered after two weeks to the same students. Descriptive statistics involving mean and standard deviation was used to answer the research questions while inferential statistics involving t-test was used to test the null hypotheses at 0.05 significance level. The results were computed using SPSS software version 25.

**Table 1** shows research design layout.

**RESULTS**

**Research Questions**

**RQ1.** *What is the difference in mean achievement scores of undergraduate students exposed to YouTube-supported instruction?*

**Table 2** shows the descriptive statistics of the pre- and post-test performance of undergraduate students exposed to video instructions and those taught using conventional method. From **Table 2**, the students had a pre-test mean of 28.54 and a standard deviation of 11.88 and a post-test mean of 68.55 and a standard deviation of 5.91. The mean difference is 40.01. This means the students had a better performance after administering the treatment.

**RQ2.** *What is the difference in the mean retention scores of students exposed to YouTube-supported instruction?*

**Table 3** shows the descriptive statistics of the mean post-test and retention scores of students exposed to YouTube instruction. From **Table 3**, the students had a post-test mean of 68.55 and a standard deviation of 5.91. From **Table 3**, students also had a mean retention scores of 66.54 and a standard deviation of 4.89. The mean difference is 2.01. This means the students retained the information after exposure to YouTube instruction.

**Testing of Hypotheses**

**HO1.** *There is no significant difference in the mean pre-test and post-test achievement scores of undergraduate students exposed to YouTube-supported instruction*

**Table 4** shows t-test summary of the mean performance of undergraduate students exposed to YouTube videos and those taught using conventional method. From the results, t-value=5.21, and p<0.05. This means, therefore, that the null hypothesis that says there is no significant difference in the mean pre- and post-test scores of undergraduate students exposed to YouTube instruction is hereby rejected. This implies that a significant difference exists in the two groups with the students performing better after the administration of the treatment.

**Table 4.** t-test summary of the mean performance of undergraduate students exposed to YouTube instruction

Group	n	Mean	Standard deviation	df	t-value	p-value	Decision
Pre-test	126	28.54	11.88	250	5.21	.000 <sup>s</sup>	Rejected
Post-test	126	68.55	5.91				

Note. Significant,  $p < 0.05$

**Table 5.** t-test summary of the mean performance of undergraduate students exposed to YouTube-supported instruction

Group	n	Mean	Standard deviation	df	t-value	p-value	Decision
Pre-test	126	68.55	5.91	250	2.44	.000 <sup>s</sup>	Rejected
Post-test	126	66.54	4.89				

Note. Significant,  $p < 0.05$

### *HO2. There is no significant difference in the mean retention scores of undergraduate students exposed to YouTube-supported instruction*

**Table 5** shows t-test summary of the mean retention scores of students exposed to YouTube instruction. From **Table 5**,  $t=2.44$ , while  $p < 0.05$ . This means that the null hypothesis that says there is no significant difference in the mean retention scores of undergraduate students exposed to YouTube instruction is hereby rejected.

## DISCUSSION

The findings of this study revealed that YouTube videos improved students' performance performed better by having a higher mean. To further confirm whether the difference was significant, hypothesis one was tested and subsequently got rejected in **Table 4**. The rejection revealed that a significant difference exists in the sense that after the post-test, it was discovered that the treatment, YouTube videos, improved the students' performance. This finding is possible because with YouTube videos, students have different approaches to learn from and learning is made possible as students have varying options in terms of flexibility, methodology and most importantly, self-paced learning that incorporates different audio-visual characteristics, which make learning practical. The finding agrees with Al-Zboun et al. (2018) who checked the impact of YouTube and Facebook on students' achievement in geography and reported that students taught with YouTube performed better because videos stimulate various senses and also capture attention and interest of learners. It also agrees with Beji and Saidu (2021) whose study reported a significant difference in the achievement of students exposed to YouTube instruction. It also agrees with Azor et al. (2020) whose study revealed a significant difference in the achievement of students exposed to YouTube instruction. Additionally, the study is in congruence with Olasina (2017) who investigated the educational values of YouTube videos for academic writing and discovered that the experimental group that was exposed to YouTube videos in order to improve their writings performed better than the control group. In a similar vein, the findings is in conformity with Gambari and Adamu (2008) who studied the impact of videotaped instruction on the teaching, learning and retention of primary school teachers and the findings indicated that the students taught with video package performed better than those taught using conventional method. However, this finding is not in tandem with that of Felicia and Mumini (2019) that investigated the effect of YouTube on performance of secondary school students in biology concepts and found that the experimental group taught with YouTube videos did not perform better than the control group.

Also, it was discovered that there was a significant difference in the mean retention scores of undergraduate students exposed to YouTube instruction. A significant difference was noticed in the post-test and retention scores of the students exposed to YouTube video instruction. This finding is possible because with YouTube videos, students have the opportunity to pause and rewind contents at their convenience thus forming a lasting cognitive experience in them. This finding agrees with Beji and Saidu (2021) whose study revealed a significant difference in the retention of student exposed to YouTube instruction. It also tallies with Gambari and Adamu (2008) whose study revealed the existence of a significant difference in the mean retention scores of students exposed to video-supported instruction. It also agrees with Gambari et al. (2014) who found a significant difference in the mean retention scores of students taught using computer animation.

## CONCLUSIONS

Based on the findings of this study, it can be concluded that instruction using YouTube videos is more effective in teaching for a statistically significant difference was found in the performance and retention of students having been exposed to YouTube videos.

### Recommendations

The following recommendations are hereby prescribed:

1. YouTube videos should be used by teachers to augment normal classroom session as this will make learning interesting, and less stressful.
2. Teachers should be trained on how to operate and incorporate modern technologies in the classroom so as to generally enhance teaching and learning.

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**Data availability:** Data generated or analysed during this study are available from the authors on request.

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