**IMPACT OF INSTRUCTIONAL VIDEO ON STUDENTS’ ACADEMIC PERFORMANCE IN BASIC SCIENCE AND TECHNOLOGY IN NIGER STATE**

**BY**

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**ABSTRACT**

The study investigated the effect of instructional video on students’ academic performance in basic science and technology in niger state using non-equivalent control group quasi-experimental research design. Two research questions and two null hypotheses guided the study. The population for this study consisted of 864 JSS II students from the six junior secondary schools in Niger State. The sample for the study comprised of 110 (60 males and 50 females) randomly selected from all the junior secondary schools in Niger State. The instrument for data collection was Basic science and technology Achievement Test (EDAT). Three experts validated the instrument. The reliability of the instrument was determined using Kuder Richardson 21 (KR-21) formulae and a reliability coefficient of .85 was obtained. The research questions were answered using Mean and standard deviation while Analysis of Covariance (ANCOVA) was used to test the hypotheses at .05 level of significance. Findings from the study revealed that Video-kit model was effective in enhancing technical college students’ performance in BST topic video; there was no significant mean effect of gender on students’ Mean performance score in BST. In line with the findings of the study, it was recommended among others that BST teachers should employ innovative approaches such as instructional video during instructions of video concepts in basic science and technology to facilitate students’ academic performance in the subject.

**Keywords**: academic performance, instructional video, junior secondary schools.

## Introduction

Science is a field of study that involves a dynamic process of seeking for knowledge about nature through observation and experimentation (Anaekwe, Olisakwe & Nwankwo, 2009). Science education specifically is the training and acquisition of scientific knowledge through observations and analysis of events that helps an individual to integrate effectively into the society (Ifeakor & Okoli, 2011). Ukah (2013) sees science education as a social process and medium for acquisition of relevant knowledge, skills and attitudes for scientific literacy while Ellah (2014) described science education as the knowledge gained through understanding of scientific concepts and processes required for personal decision making, participating in civic cultural affairs and economic productivity for survival in a changing world.

Science education involves various investigative processes and activities with regards to developing, acquiring and controlling knowledge, skills, increasing productive capacity and influencing peoples’ attitude about the natural factors of the environment. This is why one of the goals of science education is to provide knowledge and understanding of the complexity of the physical world, forms and conduct of good life (Federal Republic of Nigeria, 2014). It is well known world-wide that science and technology are central to the changing world because they supply man’s basic needs such as food, clean water, shelter, energy, basic health care and education among others. It is in this realization that Nigeria and other nations of the world lay emphasis on science education at all levels including secondary education level. According to the National Policy on Education (Federal Republic of Nigeria

(FRN), 2014) the objectives of PostBasic education among others are to provide trained manpower in the applied sciences, technology and commerce at sub-professional grades and entrepreneurial, technical and vocational job-specific skills for self reliance and for agriculture, commercial and economic development.

The science subjects are very important in providing trained manpower in the applied sciences, technology and commerce at sub-professional grades and entrepreneurial, technical and vocational jobspecific skills for self reliance. Their importance in preparing professionals such as chemistry, biology and physics teachers, doctors, pharmacists, agricultural scientists, biologist, engineers and many other professions cannot be overemphasized. Raina (2011) posits that the study of these science subjects also equips its beneficiaries with necessary knowledge; skills and attitudes to enable them interact meaningfully with their environment, solve every day problems and live successfully in this day of advancing science and technology. Furthermore, Raina observed that the current 6-3-3-4 system of education in Nigeria which focuses on selfreliance and sustainable national development is built around science and technology with its activities centering on the science subjects (Chemistry, Physics and Biology among others).

Furthermore, Agbi (2006) opines that the knowledge of science subjects is applied in manufacturing, processing and the development of materials for construction, building, pharmaceutical, water works, food stuff, fertilizers, insecticides and herbicides. The government of Nigeria has demonstrated her concern towards the study of science subjects in concrete ways. For instance, the establishment of specialized universities of agriculture and technology, polytechnics and colleges of technology, the 60:40 ratio of university admission policy in favour of science candidates and the establishment of special science schools by some states of the federation are geared towards promoting science education. More importantly, the activities of professional bodies such as Science Teachers Association of Nigeria (STAN), Chemical Society of Nigeria (CSN),

Nigerian Institute of Physics (NIP), Nigerian Society of Biochemistry and Molecular Biology (NSBMB) and many others are in line with the stakeholders desire to encourage the effective teaching of these science subjects in the schools.

Sequel to the activities of these professional bodies being in line with the stakeholders desire to encourage the effective teaching of the science subjects in schools, Dogra (2016) asserts that the world today needs graduates who can take advantage of their diverse skills and in-depth academic knowledge in order to benefit from professional problem solving and life-long learning. Hence, science students encountering fast changes in the educational systems will realize that they are in a challenging and continually varying complex situations in the world. Therefore, education should relate and accommodate the future profession of students and offers learning opportunities that correspond with curriculum to be successful (Gillespie & McFetridge, 2006; Bastable, 2007). The teaching strategies should also enable the learners to cope with students day-to-day challenges, the teacher should employ approaches that encourage the learners to uphold motivation, critical thinking skills, life-long learning, problem solving, group process skills, creativity, and empowerment. These may make students no longer passive but active in learning. The teacher need to inculcate in students the need to continually evaluate how learning helps them expand their understanding to become skilful learners in the constructivist classroom by questioning themselves and their learning strategies. Such a process provides them with extensive tools to maintain learning and could make them perceive things in new ways (Dogra, 2016).

To achieve this height, it becomes imperative to start planning for a firm scientific foundation right from the childhood at pre-basic and basic education levels to help children begin career exploration at their very young age. To move with this pace, Basic Science and Basic Technology (BST) are now been taught as Basic Science and Technology (BST) in all basic education classes to lay apposite foundation for the study of core science subjects at the senior secondary education level. This ultimately enables students to gradually build up their knowledge in science and technology at Basic Education level.

In Nigeria, Basic Science and Technology as an important subject is taught at the basic (primary and Junior Secondary) education level while the science subjects (Physics, Chemistry and Biology) are taught at the Senior Secondary education level. Basic Science and Technology provides students at the basic education level with the needed theoretical and practical frameworks which are inevitable prerequisites for future study of Physics, Chemistry and Biology as school subjects. This statement was buttressed by Okundaye (2005) who maintained that basic science enables students to understand science concepts, principles, theories and laws which are further elaborated in the core sciences. Jirgba (2008) further maintained that basic science teaching exposes students to scientific activities. It is in this respect that the Federal Republic of Nigeria in her National Policy on Education (FRN, 2014) places emphasis on technology education as a foundation for the nation’s socio-economic emancipation through technical knowledge and skills necessary for agriculture, industry, commerce and economic development.

To buttress the emphasis on science and technology education in the national policy, Basic Science and Technology has been structured along three levels of basic education (Primary 1-3, Primary 4-6 and Junior Secondary 1-3) with reduced number of topics and contents to be learnt. The Basic Science and Technology concepts are organized into themes to avoid duplication of contents and unnecessary repetition; it therefore arouses curiosity and develops scientific attitudes and skills in students (Agogo & Ode, 2011). This also helps learners to develop reflective thinking and good study habits which are needed for scientific method of inquiry and successful future life.

Basic Science and Technology curriculum adapted a spiral approach of teaching which expressed the fundamental unity of scientific thought. It is expected that by teaching Basic Science and Technology at these level, every Nigerian student would be given the basic knowledge and understanding of what science is all about and exposed to some of the innovations that are taking place around them. This assertion blends with the objectives of science teaching which are to produce individuals who will be able to live effectively in the modern age of science and technology and contribute to the development of the nation (Agogo & Ode, 2011).

According to the National Curriculum for Junior Secondary School (FRN, 2012), basic science and technology is aimed at enabling students acquire specific science process skills such as: observing, organizing acquired information, generalizing on the basis of acquired information, predicting as a result of generalization and designing experiment (including controls where necessary) to check predictions. Olusi (2008) earlier shown that concrete steps ought to be taken to get students groomed or trained in science and technology to enable them use scientific facts to interpret natural phenomena such as earthquake, volcanoes and other natural disasters. This may ultimately help them in solving environmental challenges. But the teaching of basic science and technology is faced with myriads of challenges. For instance, the subject is handled by teachers who are single subject specialist either in biology, chemistry, physics, integrated science or agricultural science, taught in an illequipped classroom, library and laboratory, without teaching aid. Some of these claims are verifiable because they might not have anything to do with disparity in achievement of students in BECE Basic Science and Technology as it relates to their performance in science at senior secondary education level.

The curriculum of Science and Technology as declared by Adejoh (2006) is a broad field curriculum in which subject matter is integrated with the various science subject areas of biology, chemistry, physics, astronomy, geology and environmental science synthesized to provide a holistic and unified nature of science. Thus, a holistic view of science is presented to students in basic science and technology without mentioning its components such as physics, chemistry or biology. This broad based multidisciplinary and industry-oriented approach when employed brings students to the centre of learning and succeeds in removing the general phobia around gender in the study of science. To this end, BECE Basic Science and Technology achievement and performance in science of male and female senior secondary school science students is also examined in the study.

In reference to gender, Nwosu (2011) opined that gender is a dimension of social organization which shape how people interact with others and how people behave or act and think about themselves. Ellah (2014) stated that gender is socially constructed for the purpose of allocating powers, duties, responsibilities, statues and roles in any social context. Gender is the societal meaning assigned to male and female with a particular role that each should play. This is verifiable in relation to students’ achievement in BECE Basic Science and Technology and their performance in science at senior secondary level because, Ellah also noted that there is a general belief among Nigerians that males are superior to female in terms of physical physique, cognition, logical reasoning and academic achievement.

Gender imbalance is conceived as the structural relationship of inequality between males and females as manifested in education, labour market, political structures as well as household jobs. The male, in most cases, consider themselves as superior to their female counterparts. In this respect Offor (2007) stated that in Nigeria, women have been subordinated to men and functioning as appendages to men’s life and career than as fully equal individuals in their own right. Orokpo (2006) observed that girls perform more poorly relative to boys at all levels of educational system in Nigeria especially in sciences. Obasi (2007) also stated that the enrollment and performance of students especially the females in Basic Sciences (the bed rock of science and technology) create a worrisome atmosphere. Obasi further attributed gender imbalance in science education to factors such as tradition, culture, custom, opportunity cost of education, early marriage among girls, lack of female role models, poor self-concept and sex stereotype. All these studies indicate further studies on male and female students’ achievement in BECE Basic Science and Technology in relation to their performance in science in other to find out the extent and magnitude of relationship between them in order to enhance students’ performance in science at senior secondary level.

There is no doubt that students performance in science might not be dependent on their achievement in BECE, regardless of how successful they are, success may not be guaranteed if performance in science becomes abysmal when tasks are more challenging. The world today needs students who can take advantage of their diverse skills and in-depth academic knowledge in order to benefit from scientific problem solving and life-long learning. Hence, science students who experience inadequate acquisition of scientific skills and process, insufficient knowledge of the basic concepts in the subject matter, career interest and aspirations, influence of ability level and gender of students in the educational systems may realize that they are in a challenging and continually varying complex situations. Since all these factors may have influence on one’s performance, it becomes paramount to investigate achievement in BECE Basic Science and Technology and the corresponding performance estimate of students in science at senior secondary education level. This is because BECE results may be used to place students in science classes and such a process could provides them with extensive tools to maintain learning that will make them perceive things in new ways using variety of approaches which would go a long way in achieving meaningful learning of science concepts. Hence students’ achievement in BECE, performance in science and gender as well as the extent and magnitude of relationship between achievement in BECE and performance in science at senior secondary education level was investigated in this study.

**Statement of the Problem**

The falling standard of education manifested in the students’ academic performances at various examinations is leaving researchers and stakeholders to wonder about the future and place of Nigerian education (Oteze, 2011; Nwoke, & Akukwe, 2015; Oviawe, Ezeji, & Uwameiye, 2015). This has been blamed on teachers’ method of teaching, inadequate instructional facilities, students’ lack of interest, among others. The prevailing teachercentred methods of teaching do not actively involve the students’ in the learning process and seem to be responsible for their performance in examinations. This trend has invariably led to students’ poor performance in school subjects such as Basic science and technology which continues to record decline in students’ performance as revealed from BECE in the year 2009, 2010, 2011 and 2012. BECE asserted that the overall performance of students’ in basic science and technology has been quite low with the highest mean score in basic science and technology recorded as 34.67%, 38%, 40.43% and 27.78% respectively.

**Purpose of the Study**

The purpose of this study was to determine the effects of using Instructional video on students’ academic performance in the topic video in basic science and technology. Specially, the study sought to:

**Research Question**

1. What is the effect of Instructional video and conventional teaching method on students’ Mean performance scores in basic science and technology?
2. What is the effect of gender and instructional approaches on students’ post-test Mean performance scores in basic science and technology?

**Research Hypothesis**

Ho1: There is no significant difference in the Mean performance scores of students’ taught basic science and technology using Instructional video and those taught with the conventional teaching method.

Ho2: There is no significant difference in the Mean performance scores of male and female taught Basic science and technology using Instructional video and those taught with the conventional teaching method.

**Methodology**

The study employed a pre-test, post-test non-equivalent control group quasi-experimental research design in examining the effects of Instructional video on Basic science and technology students performance in junior secondary schools in Niger State. The design was specific with non-equivalent control group and non-randomized groups. This is because intact classes consisting of male and female students were used for the different groups.

The population for the study consisted of all the 1,064 JSS II basic science and technology students from the six junior secondary schools in Niger State, Nigeria as at 2016/2017 academic session. JSS II students were used for the study because vocational I students were still new at the junior secondary schools and JSS III were about to write their final examinations, thus the students do not need any distractions. The sample for the study comprised of 110 JSS II (60 males and 50 females) students drawn from two intact classes from the six junior secondary schools in Niger State. Simple random sampling technique was used to select two junior secondary schools for the study. The two junior secondary schools were grouped into two groups; namely: experimental group and control group and used for this study.

The instrument and treatment package were used for data collection were the researchers developed Basic science and technology Achievement Test (EDAT); and lesson packages on video using video-kit model and the conventional teaching method. EDAT contains 25-items that tested students’ knowledge, comprehension, application and basic science and technology skills on detailed drawings and short answers questions that were set on definition, construction of common types of video and application of to real life based on the Basic science and technology NBTE (2008) curriculum. The basic science and technology topic video were taught to students in the experimental classes using Instructional video. The following specific objectives of teaching Video were to be achieved by the students’ at the end of the topic: (i) define video; (ii) give some of the examples of common types of video; (iii) construct various common types of video; (iv) apply video to solve real life problems; while students in the control group classes were taught the same topic with the conventional teaching method. EDAT was used for pre-test and post-test.

EDAT was validated by two Technical teacher educators and an expert in Measurement and Evaluation. The reliability of EDAT was determined by administering EDAT on a trial group of intact class of 35 JSS II Basic science and technology students in a technical college within the study population but not included in the main study using testre-test method. The reliability co-efficient of .79 was obtained using Kuder Richardson’s formula 21 (KR-21).

**Experimental Procedure**

The researchers sought for permission from the Principals and cooperation of the Basic science and technology teachers in each of the junior secondary schools used for the study to enable them conduct the research in their junior secondary schools. The researchers explained the purpose of the research to them and requested for their assistance in conducting the experiment. The regular teachers were coached on the lesson plan and notes prepared for the experiment two weeks before commencement of the study. The class lasted for three weeks. The experiment came to an end with the post-test. Adequate control measures were taken to eliminate all the extraneous variables that would have otherwise threatened the validity of this study.

The following precautions were taken in the course of the experiment: (i) attendance was taken at the beginning of every class session so that scores of students who would have missed any of the sessions was not used during data analysis; (ii) the three groups were given equal number of treatment; (iii) to prevent the subjects from being familiar with the questions of the pre-test and post-test, the items were re-arranged; and (iv) the time allowed for the pre-test and post-test was the same.

Mean and Standard Deviation were used to answer the research questions while the hypotheses were tested with analysis of Covariance (ANCOVA) at .05 level of significance. The pre-test scores of were used as the covariates to their post-test scores. The ANCOVA served as a means of controlling the extraneous variables from dependent variables thereby dealing with the threats of initial differences across the groups; and increasing the precision of the experimental results. Acceptance and rejection of the null hypotheses depended on this alpha level and the degree of freedom in relation to the calculated F-value. Acceptance mean of achievement score was 50 per cent in this study.

**Results**

**Research Question 1**: What is the effect of Instructional video and conventional teaching method on students’ Mean performance scores in basic science and technology?

**Table 1.** Mean Performance scores of Students’ taught Basic science and technology with Instructional video and those taught with the Conventional Teaching Method at Pre-test and Post-test Scores

Groups

N

Pre

-

test

Post

-

test

−

*X*

gain

score

Diff in

−

*X*

−

*X*

1

**SD**

**1**

−

*X*

2

**SD**

**2**

Instructional video 40 31.57 7.73 51.51 8.64 20.24

Conventional Teaching 62 31.55 8.79 33.67 12.13 2.12 18.12

Method

Table 1 shows the mean performance scores of students taught with instructional video and those taught with the conventional teaching method at pre-test and post-test. The results indicates that students’ taught with instructional video had a pre-test Mean performance score of 31.57 with a standard deviation of 7.73 while at post-test, their Mean performance score increased to 51.51 with a standard deviation of 8.64 showing a Mean gain of 18.12. This gave a difference in Mean performance gain of 18.12 in favour of the experimental group (Instructional video). Also, students taught using the conventional teaching method had a pre-test Mean performance score of 31.55 and a standard deviation of 8.79 but their Mean score at post-test was still minimal at 33.67 with a standard deviation of 12.13 indicating a little mean gain of 2.12. This implies that Video-kit model was effective in the improvement of students’ academic performance in the topic video in basic science and technology.

**Research Question 2:** What is the effect of gender and instructional approaches on students’ post-test Mean performance scores in basic science and technology?

**Table 2.** Post-test Mean Performance scores of Male and Female Students’ taught Basic science and technology with Instructional video

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Groups Gender | N | −  *X* | SD | −  *X*gain score | −  Diff in *X*  gain |
| Experimental Male | 33 | 52.02 | 8.28 | 0.42 | 0.27 |
| Female | 7 | 51.60 | 9.12 |  |  |
| Control Male | 53 | 34.01 | 12.13 | 0.69 |  |
| Female | 9 | 33.32 | 11.36 |  |  |

Table 2 reveals the Mean performance scores of male and female students taught with instructional video at post-test. The results from Table 2 revealed that at post-test, the male students in the experimental group (Video-kit model) had a Mean performance score of 52.02 with a standard deviation of 8.28 while their female counterparts had a Mean performance score of 501.6 with a standard deviation of 9.12 indicating a slight Mean difference of .27 in favour of the male students’.

**Hypothesis 1:** There is no significant difference in the Mean performance scores of students’ taught basic science and technology using Instructional video and those taught with the conventional teaching method.

**Hypothesis 2**: There is no significant difference in the Mean performance scores of male and female taught Basic science and technology using Instructional video and those taught with the conventional teaching method.

**Table 3**. Analysis of Covariance (ANCOVA) for significant difference between the Mean performance scores of Students’ taught with instructional video and those taught with the conventional teaching method

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sources of Sum of Squares Variations | | DF | Mean Square | F-value | Sig. |
| Corrected model | 18358.046 | 2 | 4589.512 | 43.513 | 0.000 |
| Intercept | 24655.624 | 1 | 24655.624 | 243.079 | 0.000 |
| Pre-test | 1.197 | 1 | 1.197 | .011 | 0.915 |
| Methods | 18125.957 | 1 | 18125.957 | 172.087 | 0.000 |
| Gender | 271.802 | 1 | 271.802 | 2.580 | 0.110 |
| Method\*Gender | 183.625 | 1 | 183.625 | 1.743 | 0.188 |
| Error | 22646.004 | 105 | 105.330 |  |  |
| Total | 460175.000 | 110 |  |  |  |
| Corrected total | 41004.050 | 109 |  |  |  |

Significant at P<.05

Testing hypothesis 1, Table 3 reveals that there was significant effect of instructional strategies on students’ academic performance in basic science and technology with calculated F-value of 172.082 with associated probability value of .000. Since the associated probability value of .000 is less than .05 set as bench mark, the null hypothesis which stated that there is no significant difference in the Mean performance scores of students’ taught basic science and technology using Instructional video and those taught with the conventional teaching method is rejected. Thus, inference drawn is that, there was significant difference in the Mean achievement scores of students taught basic science and technology using Instructional video and those exposed to the conventional teaching method with the students’ taught using Instructional video having a higher Mean performance score in the post-test. The result shows that Videokit model resulted in an improvement of students’ academic performance in basic science and technology than the conventional teaching method.

Testing hypothesis 2, Table 3 revealed no significant Mean effect of gender on students’ Mean performance scores in basic science and technology with calculated F-value of 2.580 with associated probability value of .110. Since the associated probability value of .110 is greater than .05 set as bench mark, the null hypothesis which stated that there is no significant difference in the Mean performance scores of male and female taught Basic science and technology using Instructional video and those taught with the conventional teaching method is retained inference drawn is that there is no significant difference in the Mean performance scores of male and female taught Basic science and technology using Instructional video and those taught with the conventional teaching method.

**Discussion of Findings**

The findings of this study revealed that video-kit model is more effective in enhancing students’ academic performance in basic science and technology. This was demonstrated through the high Mean performance gain of students’ in the experimental group as against their counterparts in the control group. Testing hypothesis 1, the findings also revealed that there was significant difference in the Mean performance scores of students taught basic science and technology using Instructional video and those exposed to the conventional teaching method with the students’ taught using Instructional video having a higher Mean performance score in the post-test. The findings of this study revealed that the use of concrete materials, manipulative and specifically Instructional video resulted in higher students’ performance than when students’ learn through the conventional teaching method. This implies that Instructional video were more effective in enhancing students’ performance as compared to the conventional teaching method. This finding is in line with the findings of Raphael and Wahlstrom (1989) who reported that students who use manipulative in their classes usually outperform those who do not. Similarly, Chester, Davis and Reglin (1991) reported that third grade students’ who were taught geometry concepts with manipulative scored significantly higher on the post-test than the group that was presented concepts using only drawings and diagrams is in line with the findings of this study. Rule and Hllagan (2006) reported that the use of manipulative that involves hands-on and minds-on activities have positive effects on improving students’ academic performance to support the findings of this study. Also supporting the findings of this study, Munger (2007) reported that the experimental group taught mathematical manipulative scored significantly higher in mathematical achievement on the post-test scores than the control group. Also in accordance to the findings of this study, Ikutal, Abanyam and Onabe (2017) found that students taught with instructional materials and manipulative perform significantly better than those taught with the conventional teaching method. The findings of this study is in agreement with Akinyemi and Orukola (2014) who noted that people learn and remember 10% of what they hear, 30% of what they discuss with others and as high as 60% of what they experience directly or practice. Contrary to the findings of this study, Hougas (2003) reported that there was no significant difference in the achievement between the experimental and the control groups after using manipulative while teaching.

The findings of the study also revealed that male students’ improved in their Mean performance scores like their female counterparts taught using instructional video as a minor gap existed between them. The results also revealed that there was no significant effect of gender on students’ academic performance in basic science and technology. The non-significant difference in performance observed between male and female students in basic science and technology may be attributed to the effectiveness of instructional video. The findings of this study is in accordance with that of Hougas (2003) who reported that there is no significant difference in the achievement between the male and female students’ after using manipulative while teaching. Supporting the finding of this study, Oludipe (2012); Ndinika and Ubani (2017) found no significant difference in the Mean scores of male and female students. The finding of this study contradicts that of Ibe and Nwosu (2003) who reported that girls achieved more than boys in science subjects, and that female learners show some superiority over male learners. This findings of Larbi and Okyere (2014); Nwoke and Akukwe (2015) who noted that when girls and boys are instructed through extensive use of manipulative, girls benefit most, which enable them to perform at almost equal level as their male counterparts contradicts the findings of this study. Asaf and Zahoo (2017) found that girls performed better than boys in their study did not support the findings of this study. Also contradicting the findings of this study is that of Ogundola (2017) who found that gender had effects on students’ achievement in basic science and technology in favour of girls. Barbican (2008) asserted that irrespective of the method used in teaching concepts, boys usually achieved significantly better than girls contradicts the findings of this study. The findings of this study disagree with that of Nnamani, Akabogu, Uloh-Bethel and Ede (2018) who reported that gender had effect on students’ achievement in favour of the girls. Okoro (2011) asserted that male students achieve higher than their female counterparts in science. However, Thompson and Thompson (1994) reported that concrete materials are likely to be misused when a teacher has in mind that students will learn to perform some prescribed activity with them. It is important to ensure that the Instructional video are used properly and for sufficient time for effective and meaningful learning to occur.

## Conclusion

The findings of this study revealed that Instructional video promoted students performance in basic science and technology irrespective of their gender. It is concluded that in this time when there is urgent need for a sound and improved quality of education, it becomes pertinent to promote best practices in the education system in the use of manipulative such as Instructional video.

**Recommendation**

Based on the findings of this study, the following recommendations were made:

1. Basic science and technology teachers should use innovative approaches such as Instructional video in teaching to foster students’ interest and academic performance.
2. Basic science and technology teachers should be trained and exposed to in-service training, seminars, workshops, conferences and other forms of training-on-the-job to enhance their knowledge on new wave of instructional manipulative such as instructional video for teaching.
3. Government and all stakeholders in the education sector should encourage basic science and technology teachers through the provision of instructional materials in basic science and technology studios for teaching and learning basic science and technology.
4. Basic science and technology studios should be established in junior secondary schools and other TVET institutions to enable teachers and students’ to improvise and use instructional manipulative such as instructional video and perform basic science and technology practical.

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