

Instructional Television Utilization for the Enhancement of Cognitive Learning Skills: Implication for the Challenges in Science Education

Ofil, Glory Osaretin

*Dept of Educational Technology and Library Science
Faculty of Education, University of Uyo.
Akwa Ibom State, Nigeria.*

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Abstract

This paper focused on Instructional television utilization for the enhancement of cognitive learning skills. The study adopted a quasi experimental design with two intact classes comprising of forty students each randomly selected for the study. Two hypotheses were postulated to guide the study. Physics achievement test was developed and validated with a reliability coefficient of 0.71. Data were analysed using t-test statistics and result revealed there was a significant difference in the use of instructional television on the performance students while there was no significant difference in the performance of male and female students in the experimental group. Recommendations were made that instructional television should be used in teaching Physics due it abstract nature.

Introduction

Science is the bedrock of technological development of a nation. To this end the Federal Government to of Nigeria has continuously placed emphasis on the study of science and technology. In spite of the importance of science in national development, students' performance in science subjects is not encouraging as has been observed. One of the challenges in science education is poor performance. West African Examination Council (WAEC, 2010) revealed that achievement of students in Biology, Chemistry and Physics in the May/June examinations has been on the decline. Of the total number of students who sat for the examination in the year under review, the total percentage of candidates who attained credit level (grade 1-6) and above in Biology, Chemistry and Physics averaged 26%, 34.92% and 22.61% while 53.13%, 43.79% and 45.49% respectively failed out rightly. The poor performance of students in science subjects has been attributed to poor teaching methods in the form of excessive talking, copying of notes and rote learning of text book materials adopted by teachers. The challenge of not having well equipped laboratory for practical experience has also contributed to poor performance in Physics (Ibe, 2006)

The students are exposed to expository rather than inquiry methods of science instruction which does not predispose students to experimentation (Anulobi, 2009). However, the National Policy on Education (NPE, 2004), stated that the aim of education is to inculcate in the child, the spirit of inquiry and creativity through the exploration of nature. That education should equip students with skills with which to live effectively in our modern age of science and technology. In line with above objective, the aim of science is to develop in students the ability to think critically in order to make reasonable decisions in issues that concern them, and the society at large. Research findings in education tend to indicate that the instructional materials adopted by teachers do

influence the cognitive, psychomotor and affective outcomes of the students. Instructional materials perform specific functions in learning such functions ranges from simplifying teaching to making teaching effective. One of such instructional materials is the use of instructional television. This is the production of television programmes directed towards helping students achieve specific instructional objectives with a specific target population. This is referred to the transmission of educational programs through the television which can be stored in Video, CD and DVD. They are used to teach students repeatedly till they gain mastery on what is being taught. They could be employed in topics where teacher find it difficult to carry out practical. The main basic tasks of teaching are to release, instigate, and increase such motivational processes and forces like interest and the need, desire and wish to learn. Instructional television could be used to achieve this aim.

Cognitive skills are mental and reasoning skills that are used in the process of acquiring knowledge (Ekanem, 2006). They include skills such as perception, reasoning, memory and concentration. The stronger these skills the easier it is for learners to learn. It is generally accepted that individuals acquire cognitive skills more rapidly from visual images. Instructional television could help learners to think in alternative ways, to question, to discover, to be motivated and enthusiastic. Instructional television does not only state a fact, by oral speech, it also shows that fact, illustrates it and within a few moments puts it in a larger context of knowledge related to the fact. These various kinds of elaboration via sound tracts and pictures increase the memorial of the basic statement or information. It has been found that the duplication of sensory channels and the richness of elaborated information are features that contribute to the ease of learning and also to the strength of retention of verbal information. According to Adeosun (1998) educational instruction television is used to achieve objective which are supposed to reflect in the attitude of the learners. Okworo (2008) and Ofili (2003) found out that television and video tape influence learners they help to stimulate learning and enrich the class with material not likely to be available in real classroom setting. According to these scholars they make learning more permanent and offer experiences, which promote self-activity on the part of the students. Perception is very important in learning. In perception we use our sense to comprehend objects and events. The eyes, ears and nerve endings are some of the means through which perception takes place. Instructional television is a useful tool that helps to stimulate our perception it increases our hearing and seeing simultaneously and hence our cognitive skills. Also nothing absolutely new is ever learned effectively with one exposure. Repetition helps to reinforce and extend learning and to make the learned information more enduring. Instructional television allows repetitive viewing the learner can view well until the concept being taught is well understood Rubin (1979). The need for participation and practice was one of the facts emphasized for enhancing learning. According to him a widespread of criticism of audiovisual materials and methods is lack of participation and overt practice. Instructional television could be used to increase the participatory role of a learner and facilitate thinking and problem solving as well as stimulate other learning activities. Practicing a response in an instructional television setting increases retention Singer (1979). The greater the association the more likely the material or concept being presented will be retained. They make the teacher's role more that of a guide, the organizer and stimulator and less that of a dispenser of information.

Gender issues and academic achievement has become a very important issue among researchers. Some studies are in view that boys perform better than girls and vice versa. Females and males could do well in science if exposed to similar conditions Nsofor (2001). According to this view, sex difference has little or no effect on performance in sciences. Essentially achievement by learners depend more on personal effort. This implies that high achievement could be traced to the individual's efforts.

Statement of the problem

Studies have shown that the prevalent conventional method presently being used in schools by Physics teachers is not effective enough and as such, have not helped students in understanding and retention of Physics contents Eshiette (2009). Considering the abstract nature of the subject, the inability of teachers to carry out practical in some aspect of the subject and the need to improve on the achievement of students it becomes necessary to explore other method that could be used for effective delivery of this subject. This study therefore, investigates the effect of instructional television on the academic performance of Physics students.

The purpose of study

The purpose of study was to determine the effect of instructional television on

- The academic performance of senior secondary school Physics students
- To determine if Instructional television has any gender effect on Physics students

Research questions

How does the use of instructional television influence the performance of physics students?

Is there any gender influence on the performance of students taught with instructional television?

Hypotheses

The following hypotheses guided the study at 0.05 level of significance

- There is no significant difference in the mean achievement scores of students exposed to instructional television and those exposed to the Conventional method.
- There is no significant difference in the mean achievement scores of male and female students exposed to Instructional television.

Research method

The study adopted a quasi experimental posttest, treatment-control design with two schools randomly selected. From each school, two intact science classes of forty students each were used for the experimental and control group making a total of eighty students. A video containing electromagnetic waves content was used for the experimental group while the control group was taught using the lecture (chalk and textbook) strategy. One researcher made instrument Physics Achievement Test (PAT) was used to collect data which was a 20-item multiple choice questions. This was validated with a test-retest reliability of 0.72. Mean scores and t-test were used for analysis of data collected.

Findings

Research Question One

How does the use of instructional television influence the performance of physics students?

Table 1: Mean and standard deviation of students' scores from pre-test and post-test

Group	N	Mean Pretest	Mean Posttest	Mean Gain	SD
Control	50	27.21	47.14	19.93	7.04
Experimental	50	28.28	62.28	24.00	5.83

Table 1 shows that the mean of the experimental group 62.28 with standard deviation of 5.83 is greater than that of the control which is 47.14. This shows that the experimental group who were exposed to instructional television performed better than the control group

Research question two

Is there any gender influence on the performance of students taught with instructional television?

Table 2: Mean and standard deviation of male and female students' scores from post-test

Group	N	Mean Pretest	Mean Posttest	Mean Gain	SD
Male	57	27.21	62.53	7.09	8.27
Female	43	26.45	61.95	7.06	8.59

Table 2 shows that the mean scores of males and females students exposed to Instructional television are 62.53 and 61.95 respectively which is basically the same. This shows that Instructional television enhanced the performance of male and female students alike.

Hypotheses 1

- There is no significant difference in the mean achievement scores of students exposed to instructional television and those exposed to the Conventional method.

Table 3: Comparison of the Post-test Scores of the Experimental and Control Groups.

Group	N	X	SD	df	t	Sig.
Control	50	47.14	8.8	49	12.16	.143
Experimental	50	62.28				

The result of the analysis in table 3 shows a significant effect of the use of Instructional television on the academic achievement of Physics students ($t = 12.16$, $df = 49$, with .143 level of significance) this means t-cal was statistically significant at $P < 0.05$. This shows that the experimental group performed better than the control group. Based on this, the null hypothesis was rejected meaning there is a significant effect of use of Instructional television on the academic performance of the experimental group. This difference can be attributed to the use of Instructional television in the teaching since all other conditions were the same for both groups.

Hypotheses 2

There is no significant difference between the academic achievement of males and females in the experimental group

Table 4: Comparison of the Post-test Achievement Scores of Males and Females in the Experimental group.

Group	N	X	SD	df	t	Sig.
Male	57	62.53	2.55	1.49	49	0.00
Female	43	61.95				

The result of the analysis as shown in table 4 reveal there is no significant difference in the performance of male and female students with t value of 1.49 and df of 49 at .000 level of significance. Therefore the null hypothesis was upheld meaning that there is no significant effect of use of Instructional television on academic performance of male and female Physics students in the experimental group. This study showed that gender has no effect on the use of Instructional television in the learning process.

Discussion

The result of the study revealed that there is a significant difference in academic achievement of students taught with Instructional television and those taught without it. This study support the finding of (Anulobi 2009; Eshiet 2009; Okworo 2008; Enemugha 2008). They discovered that the use of instructional television in teaching science subjects enhance students academic achievements. They affirmed that they are effective in teaching owing to their ability to captivate and hold attention as well as provide for direct interaction of students with what is learnt. The use of Instructional television is effective and result in more learning in less time and better retention of what is learnt, especially when the material being learned was repeated to the learners. They provide experiences not easily obtained through other media and contribute to the efficiency, debt and variety of learning. The study also shows that the use of Instructional television is not gender dependent this is in agreement with studies of Okworo (2008) and Eshiette (2009) but negate the study of Enemugha (2008) who discovered male performed better than females when taught Biology with Instructional television.

Conclusion and recommendations

The use of Instructional television improved the academic achievement of students in the teaching and learning of Physics. There was no gender effect in the use of Instructional television. The following recommendations are made

- Instructional television should be used in the teaching of physics to enhance learning
- Government and non-governmental organizations should equip our schools with Instructional television media facilities for effective teaching
- Curriculum developers should expand the curriculum to include the use of Instructional television especially in topics where practical cannot be carried out for effective teaching
- There should be provision for regular supply of electricity in schools at all times

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