

EFFECT OF MULTI-MEDIA INSTRUCTIONAL STRATEGIES ON ACADEMIC PERFORMANCE OF STUDENTS IN RADIO AND TELEVISION ELECTRONIC WORK TRADE IN TECHNICAL COLLEGES IN KANO STATE

Halliru Shuaibu and Muhyideen Muhammad

¹Department of Electrical/Electronics Technology, Federal College of Education (Technical)
Bichi Kano-Nigeria

ABSTRACT: *This study investigated the Effect of Multi-Media Instructional Strategy on Academic Performance of Students in Radio, Television and Electronic Work Trade in Technical Colleges of Kano State. Quasi-experimental design was adopted. A sample size of 40 Technical College (NTC III) students participated in the study. Purposeful sampling technique was used to select two intact classes from two colleges. A validated 40 - items instrument from NABTEB standardized test was used to collect data on the students' performance in the following topics; Radio Communication, Satellite Transmission / Reception and Television. To avoid bias, the researchers prepared lesson plans that were used for the teaching of the two groups. The teachers from the two technical colleges were trained on how to use the lesson plans and multi-media instructional strategy, so as to control variability in the instructional procedure in the study. Four research questions and one hypothesis were raised. The data was analyzed using SPSS, mean and standard deviation were used to answer the research questions while t-test was used to test the null hypothesis. Multi-Media instructional strategy improved the mean performance of the students in Radio, Television and Electronic Work Trade, as seen in the post-test mean performance of 46.75 as compared with pre-test mean performance of 25.75 respectively, for the experimental group. There is significant mean difference in the post-test academic performance of students taught Radio Communication, Satellite Transmission / Reception and Television using Multi-Media instructional strategy. Among the recommendations made was: Stakeholders in education should make available and encourage the use of multimedia instruction in technical colleges of Kano State by providing multimedia instructional tools.*

KEYWORDS: Multi-Media Instructional Strategies, Academic Performance, Radio, Television, Electronic, Work Trade Students.

INTRODUCTION

Multimedia is a branch of Educational Technology, relatively it is a field aimed at solving problems of teaching and learning through the use of audio, audio- visual, graphics and animations to facilitate effective teaching/ learning. Hardware and software are the two structural component of this technology which are being manipulated or rather being put into use to bring clarity and better understanding of the processes of teaching and learning. The effect of Multimedia as an instructional strategy has tremendous impact on the academic performance of students (Crosby & Stelovsky, 1995).

Instructional strategies are the techniques or methods that a teacher can adopt to meet the various learning objectives. These strategies help students to walk on the path of independent learning and become strategic learners. Instructional strategies equip teachers to make learning interesting and help students to awaken their desire to learn. Instructional strategies focus not

only on the educational contents but also on the methods and environments of the teaching process. Students' development level, interests and experiences are considered while choosing a particular teaching strategy in order to improve their academic performances and make learning permanent. Educators have become aware of the benefits and short-comings of various traditional methods used to provide instruction and training to students and practitioners (Feinstein, Raab, & Stefenelli 2005). Multimedia strategy of instruction allows teachers to integrate text, graphics, and animations into one package to present a comprehensive information for their students to achieve specified course outcome.

The term academic performance refers to how well a student does in school/college subjects. Poor grades are considered as bad academic performance. It also refers to how students deal with their studies and how they cope with or accomplish different tasks given to them by their teachers. Academic performance generally means how students are accomplishing their tasks and studies, but there are quite a number of factors that determine the level and quality of students' academic performance.

In educational institutions, success is measured by academic performance, or how well a student meets standards set out by institutions. As career competition grows ever fiercer in the working world, the importance of students doing well in school subjects has caught the attention of parents and government's education departments alike. Although, education is not the only road to success in the working world, effort is made to identify, evaluate and encourage the progress of students in college subjects (Indabawa, 2010).

Radio and Television Electronic work is one of the subjects being taught in technical colleges, it is intended to give students insight into the world of Radio, Television and Electronics Works; improve their attitude towards the maintenance and repairs of Radio, Television and Electronic Equipment and enable them to appreciate the relationship between science and technology. The objective of the syllabus is to test the students' knowledge and understanding under the following modules:

- (i) Workshop Safety Rules and Regulations;
- (ii) Basic Electricity;
- (iii) Electronic Tools and Instruments;
- (iv) Electronic Devices and Circuits;
- (v) Electronic Communication Systems;
- (vi) Workshop Practice and Maintenance;
- (vii) Entrepreneurship in Radio, Television and Electronics Works.

The nature of technical colleges in Kano State today seems to be derailing from its primary aims and objectives that is to give secondary education in science and technology subjects with the aim of producing self-reliant individuals, artisan, craftsmen and technicians in the State and the nation as a whole (Abdullahi, 2010). Lack of qualitative and adequate trade teachers that can pilot the process still remain a challenge. Most of the trade teachers lack the technical skills or have no access to the technical skills or have no access to the growing technology that can help them to modify their conventional methods and adapt the new technology. Abdullahi (2010) also opined that a skill is the capability of accomplishing a task with ability, competence

and expertise. Technical colleges are expected to be rich enough in educational resources, in order that learners can be provided with all necessary learning facilities that are needed in technical learning environment. Most of the problems in technical colleges are not due to lack of articulated technical education policy or absence of colleges where to acquire the training, but rather the lack of required elements for its implementation which is as a result of Nigerian government lukewarm attitude towards technical education. If the national policy is implemented properly, most especially the policy on vocational and technical education. Nigeria will no doubt emerge as not only self-reliant nation, but also a country which is technologically advanced enough to cope with industrial changes (Ahmad & Ohize, 2014).

The rapid growth of electronic technology offers a formidable challenge to the electronics teacher, who may be almost paralyzed by the mass of details. However, the use of practical instructional materials can simplify the learning process to a great extent. In order to ensure an effective teaching learning process, it is important for the teacher to be thoroughly acquainted with the teaching resources and services available to him. Instructional materials for electricity and electronics subjects' instruction at technical colleges are not adequately available; more so, how to make the best instructional use of those available with the modern innovation are grossly lacking and faced with a lot of problems in its use by electronics teachers (Aneale, 2000; Medugu, 2009; Umunadi, 2009; Bello & Shuaibu, 2013; Taale & Mustapha, 2014). Among the problems highlighted by the aforementioned scholars were:

- (i) Poor teachers' professional knowledge and technical know-how to teach practical skill content areas of electronics.
- (ii) Low teacher competence in the area of effective instructional resource utilization.
- (iii) Failure to appreciate the importance of using instructional materials in promoting understanding of electronics principles.
- iv) Insufficient awareness of types of instructional materials for use in teaching different electronics contents.
- (v) Poor maintenance culture of existing instructional materials especially projected and manipulative types.
- (vi) Lack of finance to acquire or improvise needed instructional materials.

Olawale (2013) further reported that instructional materials include materials used to facilitate learning for better results. Similarly, Uzuegbu, Mbadiwe & Anulobi (2013) refer to instructional materials as any device used to assist the teacher in the preparation of a lesson, teaching of the lesson and facilitate students' learning of the subject matter. Instructional materials include those objects that are commercially acquired or improvised by the teacher to make conceptual abstraction more concrete and practical to the learner. Instructional materials are not ends in themselves but means of attaining specific instructional functions. The ability of the teacher to effectively utilize the available instructional materials optimizes the attainments of academic performance; this varies with the level of utilization. A situation where an electronics teacher pays "lip service" to activity-oriented instructional methods and resources that could enhance creative thinking in the learners negates the objectives of electronics education at the technical college (Iwu, Ijioma, Onoja & Nzewuihe, 2011).

Statement of the Problem

The researchers observed that the academic performance of students in Radio and Television Electronic work trade seems to be dwindling in recent years. This development may be attributed to poor instructional strategy, inadequate and unprofessional teachers, and insufficiency of instructional materials.

The above observation has been supported by other researchers like Uwaifo (2009) who buttressed that inadequacy of facilities both qualitatively and quantitatively has put the learners and the teachers at a disadvantage. The teacher may also have problem in a class with large students' population. The implication of this scenario is that only a small proportion of the students benefit from the current pedagogical system. There is dearth of multi-media facilities for the training of students in technical colleges in Kano State. The high cost of computer and teaching aids ownership is a major constraint to acquisition of the items. Access to affordable and reliable internet connectivity is only available in a few institutions, faculties and offices, even then, electrical power fluctuations have considerably reduced the reliability of the access and makes access difficult. Clarity and understanding Radio and Television Electronic trade still pose as a challenge because of its complexity and limited qualitative, adequate human and material resources. The aforementioned problems informed the researchers to conduct a study on the Effect of Multi-Media Instructional Strategies on Students' Academic Performance in Radio, Television and Electronic Trade in Technical Colleges of Kano State.

Purpose of the Study

The main objective of the study is to determine effect of multimedia instructional strategy on academic performance of students in Radio and Television Electronic work in technical colleges of Kano State. Specifically, the study determined:

1. The mean difference in the pre-test performance scores of (Radio Communication, Satellite Transmission / Reception and Television) in Radio, Television and Electronic Work Trade Students using multi-media and traditional instructional strategy groups
2. The effects of multi-media instructional strategy on post-test of experimental and control group students' academic performance students in (Radio Communication, Satellite Transmission / Reception and Television) in Radio, Television and Electronic Work Trade.
3. The effects of traditional instructional strategy on post-test of experimental and control group students' academic performance in (Radio Communication, Satellite Transmission / Reception and Television) in Radio, Television and Electronic Work Trade.
4. The mean difference between the post-test mean academic performance of technical college students when multi-media and traditional instructional strategies are used in teaching (Radio Communication, Satellite Transmission / Reception and Television) in Radio, Television and Electronic Work Trade.

Research Questions

Four (4) research questions were formulated to guide the study.

1. What is the mean difference in the pre-test of students' academic performance of students in (Radio Communication, Satellite Transmission / Reception and Television) in Radio, Television and Electronic Work Trade of technical colleges in Kano State?
2. What is the posttest mean academic performance of students taught (Radio Communication, Satellite Transmission / Reception and Television) using multi-media instructional strategies in Radio, Television and Electronic Work Trade?
3. What is the posttest mean academic performance of students taught (Radio Communication, Satellite Transmission / Reception and Television) using traditional instructional strategies in Radio, Television and Electronic Work Trade?
4. What is the posttest mean difference between the academic performance of students that are taught (Radio Communication, Satellite Transmission / Reception and Television) using multi-media instructional strategies and traditional instructional strategies when compared?

Hypothesis

Based on the research questions one null hypothesis was developed to guide the study:

Ho₁: There is no significance difference between the mean responses of multimedia instructional strategy (experimental group) and traditional lecture method (control group) on the academic performance of students in Radio and Television Electronic work trade

Significance of the Study

When effects of multimedia instructional strategy are identified the ministry of education, policy makers and examinations governing bodies such as National Board for Technical Education will adopt it and make it a pre-condition for engaging and promoting the implementers (teachers) of Radio, Television and Electronic Works Trade in technical colleges. Adequate provision of instructional materials for effective teaching and learning may also be realized.

Scope of the Study

This study is delimited to effect of multimedia instructional strategies in the department of Radio and Television Electronic work trade (test items were drawn from the following topics: Radio Communication, Satellite Transmission / Reception and Television.). Other aspects covered by the study include: Qualitative and adequate trade teachers, Insufficient instructional materials, Multimedia method of teaching in technical colleges of Kano State, viz; Government Technical Kano and Mairo Tijjani Technical College Kano.

Previous Work/Literature Review

The literature has been reviewed under the following sub-headings:

1. Conceptual Framework

2. Qualitative and adequate trade teachers
3. Insufficient instructional material
4. Multimedia method of teaching Radio and Television Electronic work trade.
5. Academic performance
6. Review of Related literature
7. Summary

METHODOLOGY

This chapter consist of description of the research design, area of the study, population of the study, sample and sampling techniques, instrument for data collection, validity and reliability of the instrument, method of data collection, method of data analysis, and instrument for data analysis.

Research design

A quasi-experimental design was used for this study. Specifically, the pretest, posttest, non-equivalent control group design was adopted for this study. According to Gall, Gall and Borg (2007) quasi-experimental design can be used when it is not possible for the researcher to randomly sample the subject and assign them to treatment groups without disrupting the academic programmes of the schools/colleges involved in the study. This design was considered suitable for this study (effect of multimedia instructional strategy on academic performance of Radio and Television Electronic Work Trade students) because intact classes non-randomized groups were studied; hence, the design is illustrated below:

Group	Pretest	Treatment	Posttest
Experimental	O1	X	O2

Control	O1	-X	O2

Where, O1 = Pretest for both experimental and control groups.

O2 = Posttest for both experimental and control groups.

X = Treatment given to the experimental group (Multimedia instruction).

-X = No treatment given to the control group (Conventional Teaching).

----- = Non-randomization

Area of the study

This study covered two (2) Government Technical Colleges (G. T. Cs) in Kano State where technical education has been duly accredited by the National Board for Technical Education.

These Colleges were: G.T.C. Kano; Mairo Tijjani Girls' Science and Technical College Kano (GSTC). Kano State is located in the northwest geopolitical zone of Nigeria. It came into being on May 27, 1967, having being created from the old Northern Region. Kano State borders Katsina State to the North-West, Jigawa State to North-East, and Bauchi and Kaduna States to the South (Federal Republic of Nigeria, 2006).

Population of the Study

The population for this study comprised all NTC III students (males and females) of Radio and Television Electronic Work Trade in the two technical colleges in Kano State. The total of 40 students were used for this study. NTC III students were chosen because significant portion of the Radio and Television Electronic Work Trade curriculum contents were taught to the students.

Sample and Sampling Technique

The entire population was purposely used as the sample of the study (that is 40 students).

School	Rank	Group
G.T.C Kano	1 st	Control
Mairo Tijjani GSTC	2nd	Experimental

Instrument for Data Collection

Radio and Television Electronic Work Trade pre-test National Business and Technical Examination Board (NABTEB) past question paper was adopted by the researchers based on approved syllabus of year (2007). Test items were drawn from the following topics: Radio Communication, Satellite Transmission / Reception and Television. The instrument solicited responses from standards on skills in Radio and Television Electronic Work Trade. Each item on the instrument has four options lettered A to D. Only one answer is correct and the other three are distractors. The items covered domains of learning namely: Motor skills, Verbal information, intellectual skills, Cognitive and attitudinal skills.

Validation of the Instrument

The draft of the lesson plans was given to three (3) experienced and knowledgeable electrical and electronics technology experts at the Department of Electrical/ Electronic Technology Education, Federal College of Education (Technical) Bichi, Radio and Television Department Mairo Tijjani Technical College, and the Department of Electrical and Electronics, Government Technical College Kano.

Reliability of the Instrument

Radio and Television Electronic Work Trade pre-test instrument was considered reliable for this study because it was adopted and developed from NABTEB past question papers (a standardized test instrument being used in Nigeria to test students in technical colleges).

Treatment Procedure

Experimental group received treatment of multimedia method while the control group were taught with the traditional lecture method. The teaching of experimental group was done by

the researchers while that of control group was done by the school trade teacher. The topics covered were Radio Communication, Satellite Transmission / Reception and Television. The topics were drawn from NABTEB curriculum. Test items drawn from each topic were indicated on appendix I. The two groups were taught in three weeks. The teaching of both experimental and control groups was guided by lesson plans presented on appendix II and III respectively. The use of intact classes in different colleges was to help avoid contamination of treatment if all the groups were taught in the same college. The researchers made attempt to control the following extraneous variables that may affect the study.

1. Hawthorne effect.
2. Teacher Variable.
3. Effect of pre-test and post-test history.

Method of Data Collection

At the end of treatment on the experimental and control groups, the Radio and Television Electronic Work Trade pre-test was administered directly to each of the study sample by the researchers with help of research assistant (Radio and Television trade teacher). The researchers and research assistant supervised the subjects to ensure that students did not interact among themselves throughout the test period. The answer scripts and the test question papers were collected at the end of the test, and marked by the researchers using the marking schemes indicated on appendix IV.

Method of Data Analysis

Statistical package for social sciences (SPSS) was used to analyze the research questions, percentage, mean and standard deviation were used to answer the research questions. Hypothesis was tested using T- test at 0.05 level of significance. The grading system was adopted from NABTEB grading system; i.e. A= 70 to 100 marks, Excellent. B= 60 to 69 marks, Very good. C= 50 to 59 marks, Good. D = 40 to 49 marks, Pass. And F= 0 to 39 marks, Fail (NABTEB 2007). Decision Rule: Any mean score that is less than 40 marks was considered as fail. For testing the H_0 ; if the calculated p-value > critical p-value (0.05), H_0 was accepted and it was concluded that there is no significant effect between the variables compared. While if calculated p-value < critical p-value, H_0 was rejected and it was concluded that there is significant effect between the two variables compared.

RESULTS/FINDINGS OF THE STUDY

Research Question One

What is the mean difference in the pre-test of students' academic performance in (Radio Communication, Satellite Transmission / Reception and Television) in Radio and Television Electronic work trade in Technical Colleges of Kano State?

Table 1: Comparing the Pre-Test Scores of Control Group Against Experimental Pre-Test Group

One-Sample Statistics						
	N	Mean	Std. Deviation	Std. Error Mean		
pre-test Control	20	25.7500	9.71637	2.17265		
pre-test Experimental	20	30.4000	7.78933	1.74175		

Test Value = 0						
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
-test Control	11.852	19	.000	25.75000	21.2026	30.2974
pre-test Experimental	17.454	19	.000	30.40000	26.7545	34.0455

It can be observed from table 1 that mean difference of the pre- test scores of the Experimental group is higher than the Control group.

Research Question Two

What is the post-test academic performance of students taught (Radio Communication, Satellite Transmission / Reception and Television) in Radio and Television Electronic work trade using multimedia teaching method?

Table 2: The Experimental Post-Test Group

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
post-test Experimental	20	46.7500	11.52971	2.57812

Table two presents the mean, standard deviation and the error mean of the post-test of the Experimental group.

Research Question Three

What is the post-test academic performance of students taught (Radio Communication, Satellite Transmission / Reception and Television) in Radio and Television Electronic work trade using traditional teaching method?

Table 3: The Post-Test Scores of Control Group

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
post-test Control	20	39.0500	11.91847	2.66505

Table three presents the mean, standard deviation and error mean of the post-test of the Control group.

Research Question Four

What is the post-test mean difference between academic performance of students that are taught (Radio Communication, Satellite Transmission / Reception and Television) in Radio and Television Electronic work trade using multimedia and traditional teaching method when compared?

Table 4: Comparing the Post-Test Scores of Control Group Against Experimental Post-Test Group

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
post-test Control	20	39.0500	11.91847	2.66505
post-test Experimental	20	46.7500	11.52971	2.57812

One-Sample Test						
Test Value = 0						
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
post-test Control	14.653	19	.000	39.05000	33.4720	44.6280
post-test Experimental	18.133	19	.000	46.75000	41.3539	52.1461

Table four present the significance difference of both pre-test and post- test of all the groups.

H₀₁: There is no significance difference in the post-test mean academic performance of students taught (Radio Communication, Satellite Transmission / Reception and Television) in Radio and Television Electronic work trade using multimedia and traditional teaching method.

Major Finding

There is significance difference in the post-test mean academic performance of students taught (Radio Communication, Satellite Transmission/ Reception and Television) in Radio and Television Electronic Work Trade using multimedia and traditional teaching methods. Therefore, H₀ was Rejected.

DISCUSSIONS OF THE FINDINGS

Data collected to answer research question one shows the results of the analysis on mean ratings of both experimental and control groups. From the data, pretest control group has a mean score of 25.75 and experimental group has a mean score of 30.40. The results imply that the students in pretest group were found to be significantly different in their performance during the test. Nevertheless, students of the experimental group who were taught, using the multimedia instructional strategy has a mean score of 46.75 in posttest. This result shows that the students in experimental group obtained higher mean scores as shown in Table 2. Meanwhile the students in the control group that were taught using traditional method has the mean score of 39.05 in the posttest as presented in Table 3. This indicated that students taught using multimedia instructional strategy perform better in the test. This is similar to the findings of Umunadi (2007), Ogundola, Popoola and Oke (2010) and Medugu (2011). Medugu (2011) maintained that use of instructional aids improves students' understanding and their achievement in electricity and electronics courses than those who are not exposed to their use.

Table 4 presents the data analysis on whether there is no significant difference between the mean rating of Radio and Television Electronic students that were taught, using multimedia instructional strategy and those that were taught using conventional method. The results show that experimental group has a mean score of 30.40 in the pretest and 46.75 for the posttest mean score, while the control group also has 25.75 pretest mean score and posttest mean score of 39.05. The analysis in Table 4 further shows that there was significant difference in terms of performance between the experimental group that was exposed to multimedia instructional strategy and their control group counterpart taught using traditional teaching method. The results imply that the treatment has influence on student performance.

Research Question One

The pre-test score analysis of control group has a mean score of 25.75, standard deviation of 9.716 with error mean of 2.17, against experimental group with mean score of 30.4, standard deviation of 7.789 and error mean of 1.741.

Research Question Two

Post- test analysis of experimental group with mean score of 46.75, standard deviation of 11.528 and error mean of 2.578.

Research Question Three

Post-test analysis of score of control group having 39.05 mean score, standard deviation of 11.918 and error mean of 2.66.

Research Question Four

The post-test analysis results of both groups were compared against each other, control group with 39.05 mean score, standard deviation of 11.918 and error mean of 2.66 against experimental group with mean score of 46.75, standard deviation of 11.529 and error mean of 2.578.

Hypothesis

Ho1: There is significance difference in the post-test mean academic performance of students taught (Radio Communication, Satellite Transmission / Reception and Television) in Radio and Television Electronic work trade using multimedia and traditional teaching method. Hence, HoH0 was rejected.

CONCLUSION

The findings of the study revealed that there is significant difference in the post-test mean academic performance of students taught (Radio Communication, Satellite Transmission/ Reception and television). Both experimental group and control group students' results show the effect of instructions received by each group. If students in technical colleges are well exposed to multimedia instructional strategy (Computer, Television and DVD player, Power points slide and projector) their performance level will greatly improve and the best way to make learning more concrete in the absence of real objects is to make use of multimedia instructional strategy.

RECOMMENDATIONS

Based on the findings of this study which indicated the effectiveness of multimedia instruction as compared to the conventional methods of teaching, the following recommendations were advanced:

1. Stakeholders in education should make available and encourage the use of multimedia instruction in technical colleges of Kano State by providing multimedia instructional tools.
2. The technical college teachers should learn to adopt the use of multimedia instruction in teaching Radio and Television Electronic Works.

3. National Board for Technical Education should carry out a review of Radio Television and Electronic Work Trade curriculum for technical colleges with a view to incorporate multimedia instructional technique into the teaching of Radio and Television Electronic Work Trade.

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APPENDIX I

QUESTIONNAIRE

RADIO, TELEVISION AND ELECTRONIC WORKS

The following questions evaluate the extent to which you understand information covered in recent instructional sessions. Please circle the correct option lettered **A to D**.

The test questions for pre- test and the post test is as follows

Research Question one

What is the mean difference in the pre-test of student's academic performance in (Radio Communication, Satellite Transmission / Reception and Television) in Radio and Television Electronic work trade in Technical Colleges of Kano State?

1. The outstanding characteristic of a direct coupled amplifier is its:
 - A. utmost economy
 - B. temperature stability
 - C. avoidance of frequency sensitive components
 - D. ability to amplify direct current and low frequency signals
2. In multistage amplifiers, direct coupling is especially suited for amplifying:
 - A. high frequency ac signals
 - B. changes in dc voltages
 - C. high-level voltage
 - D. sinusoidal signals
3. The most desirable feature of transformer coupling is its:
 - A. higher voltage gain
 - B. wide frequency range
 - C. ability to provide impedance matching between stages
 - D. ability to eliminate hum from the output
4. RC coupling is popular in low-level audio amplifiers because it:
 - A. has better low frequency response
 - B. is inexpensive and needs no adjustments
 - C. provides an output signal in phase with the inputs signal
 - D. needs low voltage battery for celled supply
5. The decibel gain of a cascaded amplifier equals the:
 - A. product of individual gains
 - B. sum of individual gains

- C. ratio of stage gains
- D. product of voltage and current gains
- 6. The voltage gain of a single- stage common emitter amplifier is increased when:
 - A. its a.c load is increased
 - B. resistance of signal source is increased
 - C. emitter resistance is increased
 - D. a.c load resistance is increased
- 7. In radio communication, the conversion of radio waves into electric impulses is done by:
 - A. antenna
 - B. loudspeaker
 - C. detector
 - D. oscillator
- 8. In radio wave transmission, the wave is radiated into space through:
 - A. aerial
 - B. transducer
 - C. oscillator
 - D. microphone
- 9. The sending end equipment in communication system is referred to as:
 - A. receiver
 - B. transmitter
 - C. channel
 - D. aerial
- 10. Ability of radio receiver to discriminate between wanted signal and all the other signals pick up by the is known as:
 - A. amplification
 - B. selectivity
 - C. fidelity
 - D. sensitivity

Research Question two

What is the post-test academic performance of students taught (Radio Communication, Satellite Transmission / Reception and Television) in Radio and Television Electronic work trade using multimedia teaching method?

1. Which of the following is responsible for producing pictures on television screen?
 - A. Electron beam

- B. Raster's
 - C. Line transformer
 - D. Sync separator
2. The two segments in the frequency of the television receiver are:
- A. r.f and i.f
 - B. audio and video
 - C. r.f and a.f
 - D. VHF and UHF
3. The illumination in a television receiver can be controlled by:
- A. deflection yoke
 - B. brightness
 - C. contrast control
 - D. intensity control
4. A good quality picture in T.V receiver has:
- A. 405 lines
 - B. 450 lines
 - C. 625 lines
 - D. 650 lines
5. Which of the following amplifiers produces the best amplification?
- A. Video amplifier
 - B. I.F amplifier
 - C. R.F amplifier
 - D. Radio amplifier
6. The type of signal applied to sync separator is:
- A. video signal
 - B. picture signal
 - C. sync pulses
 - D. video pulses
7. When there is no vertical or horizontal outputs, the symptom is from:
- A. sync separator
 - B. AGC
 - C. CRT
 - D. loud speaker

8. The result of mixing the three primary colours is:
 - A. cyan
 - B. magenta
 - C. white
 - D. yellow
9. The basic foundations on which a colour TV is built are:
 - A. red green and cyan
 - B. red green and blue
 - C. red blue and magenta
 - D. green blue and yellow
10. Dynamic convergence is made by using
 - A. temporary magnet
 - B. electromagnet
 - C. permanent magnet
 - D. magnetic induction

Research Question three

1. What is the post-test academic performance of students taught (Radio Communication, Satellite Transmission / Reception and Television) in Radio and Television Electronic work trade using traditional teaching method?
1. The primary function of a capacitor in rectifier circuit is that it:
 - A. resists the flow of current
 - B. steps down voltage across the circuit
 - C. induces electromagnetic wave
 - D. filters current ripples
2. The equivalent capacitance of the capacitor $4\mu\text{F}$ and $5\mu\text{F}$ connected in series is:
 - A. $9\mu\text{F}$
 - B. $2.2\mu\text{F}$
 - C. $1.0\mu\text{F}$
 - D. $0.45\mu\text{F}$
3. The addition of information to a carrier is called:
 - A. signal
 - B. modulation
 - C. demodulation
 - D. mixers
4. A device that converts energy from one form to another is called:

- A. energy transformer
 - B. microphone
 - C. loudspeaker
 - D. transducer
5. The result of AND operation of two variables is logic 1 when it is:
- A. less than unity
 - B. at unity
 - C. above unity
 - D. zero
6. The binary number 10101 is equivalent to decimal number:
- A. 12
 - B. 19
 - C. 21
 - D. 27
7. An automatic gain control is used in radio receiver to overcome the effect of:
- A. noise
 - B. atmospheric condition
 - C. feedback
 - D. signal-to-noise ratio
8. The audio frequency and the intermediate frequency signals are separated by:
- A. local oscillator
 - B. frequency modulator
 - C. detector
 - D. mixer
9. When replacing a new fuse in a radio circuit it is important to check for:
- A. the size of the fuse
 - B. the rating of the fuse
 - C. correct rating of the fuse
 - D. rating of the power diode
10. Radio communication begins from the microphone and ends on the:
- A. intelligence
 - B. antenna
 - C. loud speaker
 - D. local oscillator

Research Question four

What is the post-test mean difference between academic performance of students that are taught (Radio Communication, Satellite Transmission / Reception and Television) in Radio and Television Electronic work trade using multimedia and traditional teaching methods when compared?

1. the most important safety precaution when working on a radio set is to:
 - A. ensure correct uses of all hand tools
 - B. confirm the fault in the radio set
 - C. remove the set from the supply
 - D. put off all supply in the shop
2. In FM, when frequency deviation is doubled:
 - A. modulation is doubled
 - B. modulation is halved
 - C. carrier swing is halved
 - D. modulation index is decreased
3. In an AM system, full information can be conveyed by transmitting only:
 - A. the carrier
 - B. the upper sideband
 - C. any one sideband
 - D. the lower sideband
4. The sound of a television broadcast is:
 - A. amplitude modulated
 - B. space modulated
 - C. frequency modulated
 - D. depth modulated
5. Transmission of picture in a television system is form of:
 - A. light
 - B. video
 - C. wave
 - D. sound
6. When there is no raster, no picture and no sound in TV set the suspected fault stage is:
 - A. power supply
 - B. sound section
 - C. vertical sweep

- D. antenna
7. A colour television has
- A. one electron gun
 - B. two electron guns
 - C. three electron guns
 - D. four electron guns
8. Transformer coupling is generally employed when load resistance is:
- A. extra large
 - B. very large
 - C. large
 - D. small
9. Class C amplifiers are used as:
- A. A.F amplifiers
 - B. R.F amplifiers
 - C. detectors
 - D. sensors
10. The counting system that uses base eight is known as:
- A. decimal system
 - B. octal system
 - C. denary system
 - D. binary system

APPENDIX II

LESSON PLAN (A)

SUBJECT: RADIO, TELEVISION AND ELECTRONIC WORK

TOPIC: COMMUNICATION SATELLITE

DATE:

CLASS: NTC III

TIME: 35MIN

SEX: MALE/ FEMALE

TEACHING AIDS: COMPUTER,

BEHAVOURAL OBJECTIVE: At the end of the lesson, the students should be able to:

1. Explain the term communication satellite.
2. State any two (2) functions of communication satellite.
3. Describe how a communication satellite uses a relay station (to transmits and receives signal).

PREVIOUS KNOWLEGDE: The students are familiar with transmitters, antenna and receivers.

PRESENTATION: The lesson was presented in the following steps:

STEP I: Explain the term communication satellite.

COMMUNICATION SATELLITE

Communication satellite is the one that has relay stations, receiving radio signal from one location and transmitting them to a communication satellite that can relay several versions of programs or many thousands of telephone signal at once.

STEP II: Describe how a communication satellite is to use as relay station.

Communication satellites are usually put in high altitude, geosynchronous orbit over ground station. A ground station has a dish antenna for transmitting received radio signals to countries and communities or organizations. For example, television casters and Telephone companies use these satellite continuously.

STEP III: At this point allow students to ask questions and clarify their issues where necessary.

STEP IV: Lastly allow students to copy note from marker board.

CONCLUSION: Conclude by summarizing the main points of the lesson to the students.

EVALUATION: Evaluate the students by asking questions based on the presented lesson.

APPENDIX III
LESSON PLAN (B)

SUBJECT: RADIO, TELEVISION AND ELECTRONIC WORK

TOPIC: Basic Principles of Radio and Television transmission

DATE:

CLASS: NTC III

TIME: 35MIN

SEX: MALE/ FEMALE

TEACHING AIDS: COMPUTER, MARKER BOARD, DIAGRAM AND A RECIEVER

BEHAVOURAL OBJECTIVE: At the end of the lesson the students should be able to:

- i Explain the principles of radio and television transmission.
- ii Answer relevant questions in the past NABTEB examination question papers.

PREVIOUS KNOWLEGDE: The students have an understanding on radio transmission.

PRESENTATION: The lesson is presented in the following steps:

STEP I: Presenting a block diagram of a radio transmitter

STEP II: Explain principle of Television transmitter as follows:

When sound is picked by a microphone it converts it into electrical signal. The signal is processed and transmitted to atmosphere by Radio transmitter. Also the light from the scene is picked by television camera and converted into electrical signal. The signal is processed and transmitted to atmosphere by television transmitter.

STEP III: Explain principle of Television receivers. On the other hand, transmission of Radio signal is received by Radio receivers and converted back to its original sound form by a speaker. The transmitted video signal is received by video receiver and converted back to picture on cathode ray tube screen.

STEP IV: At this juncture the students were allowed to ask questions and the teacher clarified their issues where necessary.

STEP V: Lastly, the students were allowed to copy the note from the chalk board.

CONCLUSION: Conclude by summarizing the key points presented in the lesson.

EVALUATION: Evaluate students by asking them few questions based on the lesson presented.

APPENDIX IV

THE PRE-TEST AND POST-TEST MARKING SCHEMES

RESEARCH QUESTION ONE:

- 1 = B
- 2 = A
- 3 = C
- 4 = D
- 5 = B
- 6 = C
- 7 = A
- 8 = A
- 9 = D
- 10 = B

RESEARCH QUESTION THREE:

- 1 = D
- 2 = B
- 3 = B
- 4 = D
- 5 = B
- 6 = C
- 7 = A
- 8 = C
- 9 = C
- 10 = C

RESEARCH QUESTION TWO:

- 1 = B
- 2 = A
- 3 = C
- 4 = C
- 5 = B
- 6 = C
- 7 = A
- 8 = C
- 9 = B
- 10 = C

RESEARCH QUESTION FOUR:

- 1 = C
- 2 = B
- 3 = C
- 4 = C
- 5 = C
- 6 = A
- 7 = C
- 8 = A
- 9 = B
- 10 = B

Research question one (Pre-test) carry 4mark each, Total of 40marks

Research question two, three and four (Post-test) carry 2mark each. Total marks = 60marks