

**EFFECTS OF TELEVISION AS INSTRUCTIONAL DEVICE ON THE  
PERFORMANCE OF SENIOR SECONDARY SCHOOL STUDENTS IN CHEMISTRY  
IN MINNA METROPOLIS.**

**BY**

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## ABSTRACT

*This study investigated effects of television instruction on student's academic performance in chemistry in senior secondary schools in Minna metropolis, Niger State. Three objectives, research questions and two hypotheses were formulated to guide the conduct of the research. The study adopted quasi-experimental design involving students of two classes in two selected schools. Data for the study were collected during teaching-learning process. The instruments used for data collection were teacher-made achievement tests conducted both in treatment and control groups. Non participant observation technique was used to observe and record student's behavior during teaching-learning process. The research hypotheses were analyzed using descriptive statistics (percentage, mean, and standard deviation) and inferential statistic (T-test). The major findings of the study indicated that interest and comprehension of students taught chemistry using television instruction was more effective than that of those taught using traditional teaching process. It also showed that performance of students taught chemistry by using television instruction was high than those taught using traditional teaching process. Finally, the researcher recommended that the government should as a matter of urgency provide schools with these television instruction materials. Furthermore, chemistry teachers should be sensitized on how to use the materials to optimize academic performance of their students.*

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# CHAPTER 1

## INTRODUCTION

### 1.1 Background of the study

Chemistry as a science was birthed as other science fields from the curiosity of mankind and his search to understand his environment and make it comfortable for himself and his kind. Chemistry has evolved over the ages to become a core aspect of scientific knowledge, from this knowledge man has developed both household materials and industrial equipment, machines, computers and even foods, drinks and drugs have been synthesized by this knowledge.

Chemistry has become an inevitable part of modern life, hence its status as a core science subject in the Nigerian senior secondary school curriculum. The teaching of chemistry in the conventional way has presented some challenges especially with students understanding of concepts that seem abstract, thus they are either uninterested or keep failing in such topics.

This research study is aimed at discovering the effects of using audiovisual techniques, especially television as an instructional device in the teaching of chemistry in secondary schools in Minna metropolis.

Research has shown that educational television is a great aid in students' learning and academic achievement. However, a researcher claims that the use of television, in itself does not guarantee positive gains. Using television alone, without careful consideration of the viewing process and level of interactivity in the instructional environment, will not readily result in learning since educational television is a complex medium whose messages

are not easy to decode. Educational television exemplifies the components of the communication process which comprises of the following: the sender (teacher, script writer, producer, and director); target audience in a particular context, in the case of ETV, students, whose meaning-making process may be influenced by aptitudes, interests, needs, and desires; purpose or coded messages transmitted via satellite; channel or medium by which the coded messages are transmitted or broadcast; and feedback or students' reactions on the TV programs that are shaped by environmental context. With this complex process of meaning making on educational television, it is a combination of technology use and teacher's processing of content which allow students to integrate concepts meaningfully.

For instance, in an experimental study conducted at Sta. Ana Unified School District<sup>3</sup> investigated the effectiveness of three methods of instruction: conventional classroom instruction, televised instruction only, and a combination of classroom and televised instruction for teaching science content and vocabulary were investigated. Results of their study showed that the combination of televised and classroom instruction returned the greatest achievement. On the other hand, there was no significant difference noted in the achievement of the televised and conventional classroom instruction. Likewise, another study found that video enhanced curriculum for senior high school students had positive effect on students' knowledge achievement and attitude toward science subject. Experimental groups that watched video series juxtaposed with teachers' interactive processing of chemistry concepts shown in videos outperformed the control groups that only received classroom instruction without videos.

Even in e-learning environments, in which direct instruction or processing of concepts by teachers are not provided, the effect of level of interactivity applied in learning

still holds true. In another study, researchers examined the effect of interactive video on learning achievement and learner satisfaction in e-learning environments. They compared four groups of learners in four learning environments—with interactive video, with non-interactive video, without video, and traditional classroom. The 138 undergraduate students were randomly assigned in each group. The subjects were given pre-lecture and post-lecture tests. Findings supported their hypothesis on the positive effects of interactive video. Students in the e-learning setting with interactive video outperformed those in other settings and showed higher levels of learner satisfaction.

Clearly, the available research suggests that educational television has a great potential for enhancing learning. Its effect is contingent upon several variables such as interactivity and type of instructional settings. However, we know very little about instructional television's effects on the academic performance of students in different learning environments across academic subjects in elementary and secondary education in the local setting.

This study aims at occupying the aforementioned gap in research by investigating the differences in learning outcomes as indicated by the gain scores on the achievement tests of students in the three learning environments: (1) learning that involves watching Knowledge Channel Shows (Passive), (2) learning using Knowledge Channel Shows with interactive processing of content by the teacher (Active), and (3) learning through transmissive lecture mode (Lecture). Specifically, this study aimed at addressing the following questions:

1. Are there significant differences in the students' achievement across the three learning environments?

2. How does learning environment, location or the interaction of learning environment and location contribute to the significant differences in the students' achievement scores?

Literature posits that educational TV shows make a difference with other methods of teaching. Furthermore, it also shows that instruction which covers the ability of the teacher to use television as a teaching tool makes a difference on how students learn and achieve inside the classroom. Hence, about 50 years ago, the notion that instructional television could replace the traditional classroom teacher was proven false. Up until now, the teacher still remains to be the major in-school influence to student learning outcomes, and educational television shows simply enhance the learning that the teacher provides.

Educational videos can engage student interest with dramatization, animation, and application portions, which are covered in detail during class discussions and class activities that would ensure comprehension. Findings in this study show that educational television stimulates class discussion, reinforces lectures and reading, provides a common base of knowledge among students, and helps teachers teach more effectively. As a result, the teachers revealed that their use of technology in the classroom enhanced student comprehension and discussion of content, better accommodation of students with diverse learning styles, and an increase in student motivation to learn.

Another study underscored the elements of effective classroom television. This examined a ten-year track of formative and summative research conducted by the Foundation for Advancements in Science and Education (FASE), the creator of Futures and The Eddie Files, and other ITV programs. The study found that shorter programming was of higher value and had greater impact, and that video was “most useful when used to

support, rather than replace, the teacher”. Educational television plays the supporting role, catching the interest of students, helping them focus on particular subjects, and emphasizing key points.

## **1.2 Statement of the Problem**

Chemistry has always been an interesting subject but its perception as abstract because of some complex phenomenon it deals with has so far discouraged many students from gaining in-depth knowledge.

Since it has proven effective and proficient, the use of audiovisuals in teaching subjects like Math, English, geography and others it is evident that this technique might work in teaching chemistry as well.

## **1.3 Research Questions**

1. Is traditional conventional practice of teaching the best teaching method possible for the teaching of chemistry in the region under study?
2. Is the audiovisual (television instruction) method more effective than the traditional conventional practice of teaching chemistry in the region under study?

## **1.4 Purpose of the Research**

The purpose of this research is to discover the effectiveness of television instruction on performance of senior secondary school students in chemistry as against

conventional practice of teaching chemistry in Minna metropolis. This research seeks to present which of the two instruction techniques is more profitable and favorable for students' performance in chemistry within the Minna metropolis of Niger state, Nigeria.

There is already a bias world over that the use of audiovisuals are the best teaching methods for our present and future generations of students who are more and more been surrounded, caught up and addicted to media, thereby making them either uninterested or incapable of learning through other teaching methods.

This bias is not unfounded as several research experiments has been carried out over time all over the world in different countries, all coming to similar conclusions that favored the use of audio-visual instruction over the conventional traditional teaching method that has been in practice for ages.

However, this bias might not be true for all regions across the world, peculiar circumstances societal influences and individual differences can affect the effectiveness of the audiovisual methods. Through the results obtained from this experimental research, the better and more effective of the two will be revealed and will give a consensus over the debate of which teaching method is best for chemistry in this region.

## **1.5 Limitations**

This research is limited by some factors not under the control of the researcher;

1. The lack of television instruction programs that specializes on chemistry as a subject. This will result in using those that have been customized for foreign audiences which might not be effective for the region being studied, given possible differences in curriculum and instruction content.

2. Electrical inconsistencies will also present challenges especially for viewing of television instruction. This might become a disadvantage to the experimental sample that are treated with television instruction.
3. Another factor that will be out of the researchers control will be that of the students' individuality, that is; IQ, retention, state of mind and other such individual factors that can affect the overall final result of the research experiment.

## **1.6 Research Hypothesis**

H01. There is no significant difference in the achievement scores of students taught with the conventional traditional instruction method and those taught with the television instruction method.

H02. The television instruction method will not be successful in this region against the conventional traditional instruction method.

## **1.7 Scope of the Research**

This research was carried out in Minna metropolis containing two local governments (Bosso and Chachanga) and targeted at all chemistry students in senior secondary schools in the region. The research measures, compares and makes conclusions between the interest and achievement of students taught with television instruction and those taught with traditional method.

## CHAPTER 2

### 2.0

### LITERATURE REVIEW

#### 2.1 Introduction

Science and technology is the bedrock for the development and advancement of any nation, that is why the Nigerian government have placed special attention on curriculum updating, facility provision programs and projects to facilitate the improvement of science education in the nation, but still their efforts have failed to achieve its goals as revealed by the alarming statistics of below average performance of science students in achievement and qualification examinations like WASSCE(West African Senior Secondary Certification Examination) and UTME(Unified Tertiary Matriculation Examination).

In an attempt to remedy this situation, the search is on for a more efficient way to educate students with better results and there came the audio-visual method that uses multi-media devices that present students are familiar with and most are even addicted to. Research has shown (Enger, 1976; Savenye, 1989) that video media provides for (a) the capture of uncommon and hard-to-duplicate material and phenomena; (b) the ability to easily present, static and moving material; (c) the alteration of visual, auditory, and temporal characteristics of material and phenomena; and (d) the option to incorporate animation for added clarity. A multitude of studies have sought to capture achievement effects following the use of television or video instruction with students of all ages (McNeil & Nelson, 1991). However, many of the studies investigated only the total replacement of live instruction with videotape/videodisk instruction.

Results of these studies did show an initial increase in student motivation among students within the videotape/videodisk treatment groups, but did not yield a positive effect between the videotape/videodisk treatment and students' achievement (Reeves, 1986; Levin, 1991). In addition, an argument was posed by Clark (1983) that it is not media's influence on learning that should be studied. Clark argued that it is not media that caused the proposed changes in learning; he contended that media are merely vehicles to deliver instruction. Clark believed that media and associated attributes only influence the way learning is delivered. In Contradiction to Clark, Kozma (1991) offered the argument that we must continue to investigate instructional technology because it is the dynamic union of the learner working with the medium that is important. Depending on the learner and the medium, the construction of knowledge will vary. Kozma's beliefs are further supported and extrapolated by research work conducted on situated cognition. Brown, Collins, and Duquid (1989) proposed that knowledge is situated. That is, it is bound to any activity, context, or culture in which it is developed. If this is true, then the learner and the learning are heavily influenced and affected by the instructional use of media.

We feel strongly that using media well can positively affect an individual's learning. Can an effective methodology for enhancing science instruction with video technology be documented? Can the effects of media in teaching be observed and assessed? Many studies have been conducted that attempt to show a significant difference in achievement gains

between treatment groups where media is used as the mode of instruction and those groups where no medium is being employed (Enger, 1976; Savenye & Strand, 1989; Levin 1991; McNeil & Nelson, 1991; Cohen, 1992). Most recently, video technology has been called on by Gabel and Bunce (1994) to assist in the chemistry classroom, because many teachers lack the correct conceptual understanding of a chemistry topic needed to teach it. These researchers assert that quality technology may play an important role in the teaching–learning process of chemistry to aid teachers in facilitating the construction of sound chemistry conceptual frameworks among their students.

Studies to the contrary revealed that when novelty effects, teacher differences, and environment are controlled, significant differences proposed by the integration of media use into instruction all but disappear (Kulik & Cohen, 1980). Based on the multitude of contradictions in research results in the field of media effects on achievement and attitude, this study was designed to view multiple variables simultaneously, to possibly account for the incongruities. The study attempted to expose an interaction effect between integrated video media use and student logical thinking ability levels with respect to achievement and attitude among secondary general chemistry students. Teacher differences were controlled for by randomization and by prescribing a strict set of treatment procedures. Equality of student groups was confirmed by pretest of their prior knowledge of chemistry. If an interaction effect occurs between the two independent variables, it may lead to a better understanding for the dichotomy in many of the previously cited studies' findings. Because the teacher, classroom instruction, and student ability are influential in student accomplishment and disposition, these variables must be considered during the research into video media effects. It is important that this complex interaction be examined. As access to

technology becomes more commonplace in educational settings, and funding continues to diminish, educators will need to understand the strength of media as a learning tool as well as know how to implement the use of media most effectively and efficiently in the classroom.

This study was designed to examine both achievement and attitude changes of secondary chemistry students who were exposed to the integrated video-enhanced micro units using the World of Chemistry video series. The use of video media in education is not new; however, its strengths have yet to be maximized. The quality of the video media, the target audience for whom video media will be most effective, as well as the most operative methodology with which to incorporate its use into instructional settings must be sought and discovered.

Instructional Television is an emerging instructional medium used in many parts of the world to improve students' academic performance and to enable a teacher teach a large group of students within and outside the school environment. Instructional Television as described by James, Richard, and Fred(1969) constitute of simple television cameras used in classroom which serve as image magnifiers to aid demonstration, small portable video tape recorders which permit review and evaluation of student performance. In their own view Vankatali, Pannersalvam and Sauthanam (2004) describe Instructional television as programmed related to an organized programmed of formal instruction and is directed to individual viewers who come under non formal educational programmed where suitable follow-up work by the teacher is essential to consolidate the gain of knowledge. Vankatali et al (2004) further stated that, instructional television programmed tend to bring into classroom experiences that local

teachers cannot arrange. These include costly demonstration, complicated experiments and visual excursion to far off places and current events. Such programmed carefully produced an involving all kinds of inter related learning experiences which produce good result. They seek to overcome the obsolescence of the syllabus and present the latest advances in all fields. The programmed fully exploits the following potentials of the medium.

1. Immediacy for bringing to viewers the latest and existing new findings.
2. Omnipresence for taking the viewers to the exact place like a research laboratory of a hospital and conference.
3. Animation and special effects to help clarity concepts, invisible processes.
4. Visual power for showing a variety of things.
5. Intimacy with the things presented.

The term “instructional television” refers to the use of the television medium in any of its various technical forms to present information, ideas and experiences in any subject area and at any level as some portion of organized educational programmed. The methods and practices of educational television are rapidly evolving in the wake of changing educational philosophies and newly developing communication alternatives.

A study conducted by the ministry of education and culture in India (1981) recommended that television facilities should be used for educational development as well as notably for widening access to education, for reducing existing disparities between different regions of the country as well as different sections of the population and for bringing about an overall improvement in the quality of education. The study proved that television, through commonly devised programmed could contribute to the creation of national integration, bring about awareness of problems of national significance and develop

desirable attitudes and values among children and youth and the population at large. Various studies have shown that media have a profound influence on the minds of children as well as adults; some of them tend to encourage positive habits as well as curiosity on the part of the

Historical studies revealed that there is no innovation investigated and discussed thoroughly as instructional television as it is the applications of television in formal course regardless of age or gender level and regardless of whether or not they are given for credit. This includes school instructions in part of courses for direct teaching or for facilitating lecture-demonstrations. Instructional television may be distributed by open or closed circuit systems or by both simultaneously.

The primary goal of Instructional Television is to improve quality of education and classroom utilization. Instructional Television now stands as the most significant cross road in its history. A research study conducted by Wilbur Schramm (1962) revealed that there can no longer be any doubt that students learnt efficiently from instructional television. The fact has been demonstrated now in hundreds of schools, by thousands of students in every part of the United States and in several other countries. Another historical development of instructional television was the instructional television experiment (SITE) carried out in 1975 to 1976 in India which marked the most advanced and probably the largest experiment of human communication known so far. The main objective of the (SITE) was to experiment with satellite technology, providing instantaneous information for national development to those in the remotest part of the country and also provide for transmission to primary school children in these villages.

## **2.2 Instructional Television and gain in knowledge**

Research studies on instructional television revealed that children exposed to instructional television programmed learned better than those that were not exposed to it. A study conducted by Neurath (1962-66) in India on evaluation of the school television in Delhi clearly indicate that children from schools taught with instructional television method performed better in question relating to visual perception and factual questions, while questions relating to understanding were left exposed to learners thereby improving their academic achievements in various subject exposed on the performance of both categories. Furthermore, he stated that students who were taught with instructional television method did distinctly better on the understanding (problem solving) of questions. Consequently, Neurath recommended instructional television to be used for teaching of physics and chemistry.

Some of his convincing remarks about his recommendations on the use of instructional television were:

(a) The whole teaching performance of every single teacher is slowly improving.

(b) Science teachers are becoming aware with new methods of teaching science and technical subjects. His observations about impact of instructional television on the students and school system were:

- i. Television lessons provide a break in the routine, thus making school itself more interesting.
- ii. The impacts of television lesson are less than the impact of television as an innovation within the whole television teaching process.

Rehman (1977) conducted a study about an assessment of the educational components of the satellite instructional television experiment (SITE, 1975 – 1976, India) based on the in-depth analysis of the responses of 2069 children and 785 teachers to eight programmed. The following major findings emerged out of the study. Comprehension in relation to the programmed was generally found to be partial. Some part of the concept was better understood some not so well and some not at all. The assessment made on the basis of responses to questions administered to test comprehension revealed a range of variation from 2 percent to 84 percent on individual questions among children and from 0.5 percent to 100 percent among teachers. The impact of the instructional television was assessed in terms of an overall comprehension of the programmed. The programmed were liked by the children from 80 – 93%.

Aghi (1977) stated that, TV expose of science education programmed stimulated an interest among the experimental school children of grade III and V. They become “High” performers from “low” performance compared to control school children among whom the trend was “low” to “medium” and medium” to high” performance. Out of seven item tested, statistically significant information gain as a result of TV viewing of science education programmed was observed on items like “fuel” plant root system’, milk,” transportation” and “counting”.

Another study conducted by space applications centre, Ahmedabad (1979) in Kheda India, a series of science programmed for children of 6 to 12 years was carried out. These programmed were on nutrition, hygiene, environmental science nature and the universe, etc. various questions were asked in order to know the impact of instructional television programmed the children of experimental villages gave appropriate answers, in responses to

questions relating to principle of hygiene, simple experiments and information about surroundings as compared to control villages.

Kanade (1982) studied the impact of instructional television on the behaviour of the rural elementary school children drawn from television and non-television schools. The major findings were as follows:

- a) Creative behaviour of the children was found to be positively influenced as a result of exposure to instructional television verbal and non-verbal aspects were influenced to some extent.
- b) Curiosity behaviour was not affected. But inquisitive aspect of curiosity appeared to have been stimulated.
- c) Children's language fluency was improved. But language refinement remained unaffected.
- d) Children showed more positive attitude.
- e) There was no evidence to suggest that intelligence together with television influenced criterion behaviour.

Coldevin (1974) in his research study on television effects on Canadian Arctic high school student: A cross - cultural comparison has shown some of the effects of television between students of different cultures. The purpose of the study was to contrast and compare television effects across three distinct types of students grouping serviced by the high school namely, Euro Canadian (white), Inuit (Eskimo) students in Frobisher Bang and Inuit (Eskimo) students from the various isolated settlements in the Eastern Arctic. The data was compared on the two primary levels of cultural racial origin Euro Canadian (white), Vs.

Inuit (Eskimo) and made background. (Frobisher Bay) Vs settlements) specifically the independent variables were assessed in the following basis:-

### **2.3 Television indices:**

- a. Availability
- b. Exposure levels and timing
- c. Most at least preferred programmed
- d. Perceived primary language
- e. Projected situational utility role in terms of information education and community programmed

On the basis of findings of the present study, it can be concluded that fundamental attitudes have been appreciably altered among native students and that the changes were directly proportional to television exposes. The process of change will continue unchecked given the present programming format. It will seem therefore that of a familiarity with the traditional Eskimo life style value structure and language were to be forwarded to future generations critical changes were requisite in both the television format and formal educational curricular. In his own view Greenhill (1959) said that the students who had studied zoology by television lessons had obtained good results than their counterparts who were taught through conventional method. Further he observed through his experiment for a period of five years that the television instruction was effective.

In another study by Gardon (1960) in his experiment of language teaching through television has shown some difference between television teaching and face-to-face teaching by the regular teacher. The student performances were recorded through tape recorder before and after the remedial programmed. Student taught by television had an average gain

score of 9.8 as compared with slight average loss of 0.4 for students taught by their own teachers.

Tsuji (1964) conducted a study on supplementary TV in an isolated village in Japan. Fifth grade study children in two schools received one science and one social studies programmed per week, twenty minutes in length. The other two schools in the village served as a control group. At the end of the TV classes in all the three measures namely intelligence social sciences and science were at 0.01 level of significance. There was no significant difference in social studies.

Maeda (1962) conducted an investigation with television lessons in a remote village school at, Doruba in Japan. After six month of viewing of a series of science lessons; achievement tests were given. It was observed that the ability of the pupils had been remarkably raised. After one year it was further investigated by the investigator of the ministry of education and notice that the ability in science had been higher than the national average's.

Kelly (1964) made more than three hundred comparisons on achievement tests between television teaching and conventional teaching during the period 1956-1961. These test comparison were classified under four subject matter areas: - English, Mathematics, science and social studies. Results of the comparison show that student generally did well when television was used as a regular resource. In one out of every four comparisons, significantly higher achievement scores were made by television groups.

#### **2.4 Attitude, interest and acceptance of children towards instructional television in the world.**

A number of researches conducted across the world have revealed significant increase in interest and attitude among students towards instructional television in the world. Shukla and Kumar (1977) pointed out that children exposed to instructional television programmed did show more inquisitiveness particularly during classroom teaching related to general science while Aghi (1977) indicated that, TV viewing had an impact on the thinking of children.

In a research conducted in India by Agrawal (1981) revealed that there was general acceptance of use of television in the schools by teachers and students alike. This acceptance was reflected in the statements made by them after television was withdrawn the children felt miserable and lonesome and indicated that their food had become tasteless in the absence of television. The influence of visual aid in shaping the children's attitude can be inferred from the studies conducted by Peterson and Thurstone (1933). In the early thirties they undertook to discover whether children's social attitude could be influenced by movies. These investigations established conclusively that movies can change the attitude of children toward social issues. By measuring the cumulative effects of films, they found that attitude produced by film was lasting.

Meccoby (1963) reviewed studies on television and concluded that children's attitudes and bodies can be shaped by what they see on television that emotions and impulses are aroused in the child's view to match those portrayed by screen characters.

The collection of learning data on students' attitude and aspirations of instructional television experiment of Mayo et al (1975) in El Salvador indicated that, majority of students responded favorably towards instructional television throughout the four years (1969-1972) in which attitudes were surveyed. However, high initial enthusiasm declined somewhat as

students progressed from seventh to ninth grade. Attitude towards English benefited most from the introduction of instructional television a subject little liked by non-instructional television students but, well regarded by instructional television students. Disadvantaged children and children with low general ability were more favorably disposed towards television series than their more advantaged peers.

Based on the above research findings made by various scholars in the world we can conclude that application of instructional television in Nigerian schools could be very useful in improving students' academic achievement. However, inadequate power supply and television facilities in every nook and corner in the country may hamper the progress of this type of instructional medium in Nigeria. However, political will and determination will enable the government to explore this emerging method of instruction in order to cater for the need for quality education in Nigeria.

## **2.5 How to Teach with Television**

To teach most effectively with television the instruction must be accompanied with:-

- a) Pre-viewing activities
- b) Activities during the viewing
- c) Post viewing or follow up activities

Pre-viewing- Students preparation for viewing televised lesson is of primary importance. Before viewing the televised lesson Kinder (2009) expresses that, there should be a series of questions related to each of the televised lesson. The assignments an outline of each television lesson and a listing of sources material should be given to the students before the televised course. He goes further to emphasize that assignments should direct students

source materials for study and should include a number of key questions which can be answered. So as to test the total learning that is expected to occur.

Such test questions should be administered immediately after the viewing of the televised lesson. For the effective learning through this media Brown (2007) maintains that a few pertinent introductory comments should be made by the teacher before the televised lesson store. During viewing, Dale (1991) is of the opinion that students can take notes during viewing but it is however, not essential because effective learning can take place while viewing without necessarily taking down note. He further argues that students can jot down relevant comments or questions that occur to them during the viewing session. In this way, the teacher can discover points which were not fully understood by the students at the time they were viewing the lesson. Here the teacher steps into air out comments that questions should be considered soon after the lesson before the test, hence they will serve as the base for evaluation of students general understanding of the lesson.

In summary students should be encouraged to undertake activities that will reinforce learning and sharpen their interest and sense of inquiry. They may write a review or some many of the televised lesson. A question and answer period on the notes that were taken during a televised lesson will disclose any vaguely understood and difficult parts of the lesson.

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter unveils the methods of research experimentation, data collection and analysis of the data obtained. The research is focused on discovering the effect of television instruction on the performance of senior secondary school students in chemistry in Minna, Niger state.

#### **3.2 Research Design**

This research was carried out using quasi-experimental design, with two groups;

1. Experimental group and
2. Control group

For comparison between achievement scores of both groups of candidates subjected to television instruction for experimental and traditional conventional instruction for control groups. Two secondary schools were used for this research, SSS2 class in both schools were for the experimental group and the control group respectively.

#### **3.3 Sample and Sampling Procedure**

Random sampling was used to select the secondary schools from Minna metropolis that were used for the research. Bosso Secondary School was for control group while for experimental group FUT Model school was used.

### **3.4 Research Instrument**

The instruments used for the collection of data were achievement test and observation techniques. Achievement tests were taken before and after the teaching session for both experimental and control groups. Observation techniques were used to assess students' interest, attention and behavior during session.

### **3.5 Data Analysis**

Data analysis for the scores of achievement tests conducted was descriptive statistics (percentage). To analyze the null hypotheses accurately, the researcher used inferential statistics (T-test) to compare the mean scores of experimental and control groups in order to determine the extent of students' comprehension and achievement in the use of television instruction and it was based on this analysis, the researcher compared the calculated values with critical values and made appropriate decision on null hypotheses.

## CHAPTER 4

### ANALYSIS AND DISCUSSIONS

#### 4.1. Introduction

This chapter provides detail information, data analysis and discussions of research results carried out on effect of the use of television instruction on student's academic performance in chemistry in senior secondary schools in Minna metropolis, Niger State.

#### 4.2. Research Questions

1. Is traditional conventional practice of teaching the best teaching method possible for the teaching of chemistry in the region under study?

Answer: The result indicates that most of the students taught chemistry using traditional conventional teaching in the control group did learn and passed the achievement test but still performed averagely while some failed and few were exceptional.

**Table 4.2.1.: Number of students passed/failed the test in control group (post-test)**

| Grade | Test |
|-------|------|
| Pass  | 27   |
| Fail  | 7    |
| Total |      |

|  |    |
|--|----|
|  | 34 |
|--|----|

The result in table 4.2.1 revealed that twenty seven (27) students passed the achievement test and seven (7) failed. The researcher also used the same questions for experimental group achievement test and then the result was converted to percentage like that of treatment group.

**Table 4.2.2.: Number of students passed/failed the tests in experimental group (post-test)**

| Grade | Test |
|-------|------|
| Pass  | 28   |
| Fail  | 0    |
| Total | 28   |

The result in table 4.2.2 indicated that twenty eight (28) students passed the achievement test and none (0) students failed the test.

Going by the above results in treatment and control groups it is obviously clear that students in treatment group performed better than students in control group because the number of students passed the tests in experimental group was greater than number of students passed

the tests in control group. Therefore, it is pertinent to say that the traditional conventional teaching is not the best choice.

2. Is the audio-visual (Television Instruction) method more effective than the traditional conventional practice of teaching chemistry in the region under study?

Answer: From results derived in analysis shows that television instruction is much more effective than traditional practice of teaching chemistry.

**Table 4.2.3 Group Statistics**

| Field1           | N  | Mean   | Std. Deviation | Std. Error Mean |
|------------------|----|--------|----------------|-----------------|
| Field2 Exp group | 28 | 16.036 | 2.5456         | .4811           |
| Control group    | 34 | 11.882 | 2.6602         | .4562           |

**Table 4.2.4 Independent Samples Test**

|                                    | Levene's Test for Equality of Variances |      | t-test for Equality of Means |        |
|------------------------------------|---|------|------------------------------|--------|
|                                    | F                                       | Sig. | T                            | Df     |
| Field2 Equal variances assumed     | .144                                    | .705 | 6.237                        | 60     |
| Field2 Equal variances not assumed |   |      | 6.264                        | 58.614 |

|         |                             | t-test for Equality of Means |                 |                       |   |
|---------|-----------------------------|------------------------------|-----------------|-----------------------|---|
|         |                             | Sig. (2-tailed)              | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |
|         |                             |                              |                 |                       | Lower                                     |
| Field 2 | Equal variances assumed     | .000                         | 4.1534          | .6659                 | 2.8214                                    |
|         | Equal variances not assumed | .000                         | 4.1534          | .6630                 | 2.8265                                    |

|        |                             | t-test for Equality of Means              |
|--------|-----------------------------|---|
|        |                             | 95% Confidence Interval of the Difference |
|        |                             | Upper                                     |
| Field2 | Equal variances assumed     | 5.4853                                    |
|        | Equal variances not assumed | 5.4802                                    |

### 4.3. Discussions of the Findings

Generally, the findings of the study revealed the effect of the use of television instruction on students' academic achievement in chemistry in senior secondary schools. For instance, going by the results of achievement tests conducted showed that the students in experimental group scored higher marks than students in control group. This may be attributed to the fact that the students in treatment group were exposed to the use of televised programs. Therefore, gained a better insight into the topics being taught than students in control group who were exposed to chalk and talk teaching process. This clearly indicated that the use of television as instructional device has significant effect on student's academic achievement. This result is not surprising because it is consistent with David, (2008) earlier argument in favour of audio-visual aids. Her argument came from Gestalt theoretical

consideration which emphasized that learning takes place faster when the whole situation in question is perceived. The theoretical consideration of the gestaltists is also in consonance with Emmanuel (2010) views that audio-visual aids enable students to relate parts of the topic to whole and come to understand how context clues help to determine the best word choice that facilitate understanding.

Hypothesis one (1) which stated that there is no significant difference between achievement scores of students taught chemistry using television instruction and that of those taught the subject using chalk and talk teaching process. The result revealed that the scores of students in experimental group was higher than that of students in control group and the resulting differences in the means and standard deviation of the experimental and control groups means that there was significant difference between the achievement scores of students in treatment group and that of those in control group. Therefore, the null hypothesis was rejected.

Hypothesis two (2) indicated that the use of television instruction will not achieve success in terms of performance of students as against the already established traditional teaching method. But to the opposite direction did the result go as students in experimental group showed better scores than those in the control group. Thus, the null hypothesis was rejected.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1. Introduction**

This chapter presents the summary and conclusion of the results relating to the research questions postulated and hypotheses tested. It also gives general recommendations as to how the findings of the research can enhance academic achievement and make suggestions for further research.

#### **5.2. Summary**

The study investigated the effect of the use of television instruction on student's academic performance in chemistry in senior secondary schools in Minna metropolis. It focused on the influence of variables such as comprehension and interest on academic achievement of students taught chemistry using television instruction. In the course of the work, three research questions and two hypotheses were formulated to guide the study. The data for the study was collected through achievement tests and observation. Two schools from Minna metropolis of Niger State were selected for the research. Twenty eight (28) and Thirty four (34) students were sampled respectively for experimental and control groups. The method for data analysis in this study was descriptive statistics such as frequency distribution, mean, standard deviation and simple percentage and inferential statistics such as T-test. Generally, the result of the analysis showed that the use television instruction have significant impact on students' academic performance in chemistry in senior secondary schools.

### **5.3. Conclusions**

From the study conducted the use of television instruction seemed to be an innovation and radical approach in teaching chemistry because the chemistry teachers and students in the schools have never used any television instruction in their classes due to non-availability of the equipment's and required televised programs to the teachers. Lack or inadequate source of power is a great hindrance to the effective use of this instructional method the schools.

It was in view of this that the study hoped to make certain recommendations and suggestions to remedy the situation, if chemistry is to enjoy its status among the subjects in the science curriculum, and if it is to enjoy the support and interest of the students.

#### **5.4. Recommendations**

In the light of the findings in this study, the following recommendations are made

- i) There is ardent need for government and state holders to provide television instruction equipment's in the schools to facilitate teaching-learning process.
- ii) There is compelling need to secure a stable source of power in schools to ensure sustainable use of the instructional method particularly television instruction.
- iii) There is the need to review the NCE curriculum for chemistry to incorporate a course that entails techniques of operating television instruction so as to train prospective chemistry teachers how to use the equipment's effectively.
- iv) There is the immediate need for ministry of education to organize seminars, conferences and workshops to sensitize chemistry teachers on how to use television instruction in teaching-learning process.

#### **5.5. Suggestions for further studies**

At this juncture, the researcher would like to point out that the study was limited to just two senior secondary schools in Minna metropolis due to certain factors:- such as time, finance and human constraints to mention but a few. In this regard, the researcher advanced the following suggestions for further studies:-

- i) Future research on a similar topic should endeavor to cover more senior secondary schools in the metropolis so as to have broader feature of the effect of the use of television instruction on student's performance in chemistry.
- ii) A similar research should be expanded to cover a wide range of subjects more than one used for this study.
- iii) Finally, the researcher suggests the conduct of similar research in other states of the federation.

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