



Effects Of Video Courseware And Manipulative Skills On NCE Students Performance In Operating Educational Technology Media In Colleges Of Education

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ABSTRACT

The major purpose of the study is to determine the effects of video courseware and manipulative skills on NCE students' performance in operating Educational Technology media. The instruments used for the study, namely: Educational Technology Achievement Pre-test (ETAT) through questionnaire and Educational Technology Achievement Post-test (ETAPOT) through checklist. The reliability of the questionnaire was determined through Cronbach alpha reliability procedure. The study adopted Quasi-experimental research design. Quasi-experiments are subject to concerns regarding internal validity, because the treatment and control groups may not be comparable at baseline. The study was guided by 5 research questions and 4 hypotheses. The computation of the data was done using Statistical Package for Social Sciences (SPSS). Simple frequency counts and percentages were used to answer research questions 1, 2, while mean and standard deviation scores were used to answer research questions 3 to 4. The hypotheses of the study were tested using t-test at 0.05 level of significance. The results of t-test on hypothesis one, revealed that there were significant differences in the mean ratings on performance of students in the control and experimental groups (cal. $t = -1.50$ $P < .14$) and also for mean achievement score (cal $t = 2.39$, $P < .02$) and video courseware (cal. $t = -2.38$, $P < .02$). These differences were in favour of experimental group. Results of t-test for hypothesis two on manipulative skills, showed that $t = -2.39$ $p < .04$. This indicated that the null hypothesis was rejected. There was significant difference in the mean ratings on manipulative skills by experimental and control group, in favour of experimental group. Also, for hypothesis three on maintenance of Educational Technology facilities, the calculated $t = -.88$, $P < .40$. The null hypothesis is not rejected. There was no significant difference in the mean achievement ratings on maintenance of CET facilities by the experimental and control groups. Result of t-test on hypothesis four on competence possessed by trainee students in the operation of equipment, the calculated $t = .03$, $P < .98$. The null hypothesis was not rejected. Therefore, significant difference did not exist in the mean ratings on competence possessed by trainee students on the operation of equipment in both the experimental and control groups. One major implication of the study was that the lack of closed circuit television in most of the CETs in the colleges might have led to poor organization of micro teaching in the colleges and the subsequent acquisition of manipulative skills. The major recommendation of the study was that both state and federal colleges of education should recruit more trained personnel and acquire more functional facilities to be able to produce competent teachers that would meet the challenges of the 21st century teaching and learning technologies.

Keywords: Video courseware, manipulative skills, trainee students, Educational Technology

INTRODUCTION

Educational Technology is a compulsory requirement for graduation by any NCE student in a college of education system in Nigeria. The course is offered during the first semester of NCE II preparatory

to Micro Teaching Practicum in the second semester; where students are expected to exhibit the acquisition of skills on the operation and maintenance of Educational Technology gadgets. Similarly, it will also help them during Teaching Practice exercise where the acquired skills are expected to be put into practice throughout the Teaching Practice exercise. However, the teaching of the course is experiencing a lot of set-backs ranging from inadequate contact hours for practical exercises with the students, lack of adequate equipment for practice, technophobia on the part of the students and lack of adequate exposure by some lecturers on how to man the equipment. These two major factors formed sustained predicaments in providing the students ample opportunities for acquiring the requisite manipulative skills in operating Educational Technology media..

These inept tendencies may probably be some of the militating factors against the low performance of students in Educational Technology practical in the Nigerian colleges of education. It is against this backdrop that the researcher feels there is need to introduce innovative techniques of teaching the course to facilitate the enhancement of manipulative skills in handling Educational Technology gadgets in colleges of education across the country. In the colleges of education, there is no sufficient contact hours for students to actually lay their hands on the operation of basic teaching equipment outlined in the NCCE (2020) minimum standard like the overhead projectors, slide projectors, opaque projectors and the multimedia projectors.

Consequently, the need to imbibe the culture of media-based instruction by teachers handling Educational Technology course at the Nigeria Certificate in Education (NCE) level cannot be compromised if quality training of NCE teachers in acquiring manipulative skills in the operation of Educational Technology media is to be attained. In the National Commission for Colleges of education (NCCE, 2020) minimum standard; the teacher was described as the “King-pin” of quality education, because education in its broadest sense provides the backdrop against which development in all spheres of life acquires its meaning. It is in light of this development, that the NCCE made the establishment of the centre for Educational Technology (CET) a compulsory requirement for the accreditation of any College of Education in Nigeria in order to regulate the training of the teachers.

Educational Technology is the study and ethical practice of facilitating human learning and improving teacher’s performance by creating, using and managing the appropriate technological processes and resources (Wikimedia, 2018). This demonstrates the central position a teacher occupied in the instructional process. Educational Technology could also be seen as a field that is involved in the facilitation of human learning through the systematic identification, organization, development and utilization of all learning resources and through the management of these processes (AECT, 1972).

Although in Educational Technology, most of the equipment used in enhancing the manipulative abilities of the students are tangible objects of learning, hence their operation is tedious and complex; therefore, the development of innovative courseware would go a long way in facilitating the understanding of how these equipment work. Courseware according to Landu (2013) is a self-spaced instructional package articulated in sequential processes in order to facilitate the understanding of complex concepts.

In Nigeria, unfortunately the traditional talk-chalk method remained largely unchanged because of the conservative principles of some teachers that find it difficult to accept reforms in education; yet the teachers often saw that they are prawn to authoritarian and didactic approaches to instructional deliveries which have fast become obsolete and irrelevant in the 21st century learning technologies. Educational Technology is a first semester course aimed at giving students manipulative skills in both the operation of teaching equipment and the local development of instructional materials so as to make them resourceful, versatile and productive to be able to face the challenges of the information age, According to Olayiwola (2003), manipulative skills are the basic skills and competences needed by the students in order to be able to operate Educational Technology equipment and materials with minimum comporment.

The Educational Technology equipment selected in this study; where some identified skills for operating them are to be discussed include: overhead projector, slide projector, opaque projector, multimedia projector otherwise known as Liquid Crystal Display (LCD) or Digital Light Processing (DLP) projector and the Gnee – Board. The manipulative skills to be explored in this study include: overhead projection techniques, identification and function of projector components, operation techniques, rudiments for the maintenance of these equipment, general principles of all projecting devices, and preparation of mounted graphic materials for both transparent and opaque materials.

The frequent utilization of Educational Technology equipment may require some turn-around maintenance at a regular interval so that the equipment can remain functional for optimal usage. The association for Educational Communication and Technology AECT (1999) defined media maintenance as the sporadic inspection of teaching and learning facilities to determine their level of efficiency. Lack of frequent maintenance culture of the projecting equipment may largely affect the utilization of these facilities since the trainee- teachers are mostly allowed to lay their hands on the equipment, therefore they may be required to acquire simple maintenance and precautionary techniques to be able to effectively use these facilities during their training exercises. In the treatment procedures, the control group will be given Educational Technology achievement test (ETAT) to pre-test their background knowledge after which they will be taught operation and maintenance of Educational Technology equipment using media-based instruction which will be preceded by a post-test known as Educational Technology achievement post-test (ETAPOT) to determine the effect of the conventional teaching on the Control Group (CG).

Similarly, a pre-test named Educational Technology Pre-test (ETPT) will be administered on the Experimental Group (EG) after which the video courseware will be used as treatment on the Experimental Group to determine the effect of the video courseware on the manipulative abilities of the experimental group, they will subsequently be subjected to practical operation and maintenance of four (4) identified Educational Technology equipment; namely: Opaque, overhead, slide and LCD projectors. The post-test for Experimental Group is named Equipment Operation and Maintenance Techniques Test (EOMTT).

Sequel to these developments, central position occupied by Educational Technology in the provision of instructional techniques, techniques of handling and producing instructional media; require more innovative and revolutionized instructional strategies that can enhance efficient teacher performance and effective means of communication that can cope with the challenges of the information age. It is in light of this development; that the study intended to determine the effect of video courseware on the manipulative abilities of NCE students in operating Educational Technology media as means of skills enhancement and acquisition strategies.

Statement of the Problem

Educational Technology as a core-course offered in the first semester of NCE II aimed at improving the pedagogical disposition of NCE students preparatory to Micro Teaching practicum and Teaching Practice is operationally inept by lecturers in the information age. The teaching of this course seemed to be suffering some set-back because of the traditional classroom approach employed by teachers which negates the innovative teaching techniques brought about by ICT; thereby making the learners and the traditional techniques incompatible; which results into inhibiting factors in the instructional process. It is in the light of this development, that the study attempted to introduce innovative teaching methods that are more media-friendly by incorporating video courseware to determine its effect on the trainees' manipulative skills and mean achievement score in operating Educational Technology media. Although some studies were conducted on the effect of media on teaching and learning, but no study was done on the effect of video courseware and manipulative skills on NCE students' performance in operating Educational Technology media. Therefore, the problem of this study put in to question is. 'What is the effect of video courseware on the manipulative skills of NCE students' performance in operating Educational Technology media in the Nigerian Colleges of Education?

Purpose of the Study

The major purpose of the study is to determine the effects of video courseware and manipulative skills on NCE students' performance in operating Educational Technology media. Specifically; the study sought to:

1. Ascertain the effect of video courseware on NCE students' performance in operating Educational Technology media.
2. Determine the effect of video courseware on the manipulative abilities of NCE student in operating Educational Technology media.
3. Find out the effect of video courseware in facilitating NCE students' skills on the maintenance of Educational Technology media.
4. Investigate the effect of video courseware on NCE students' mean achievement score in manipulative skills on the operation of Educational Technology media.

5. Determine the effects of video courseware on NCE students' competence in operating Educational Technology media.

Significance of the Study

The inclusion of Educational Technology in the NCE programme has gone a long way in making the trainee-teachers more productive, versatile and resourceful in their respective disciplines. Although, the programme may have experienced series of problems like inadequate funding for the purchase of CET consumables, dearth of equipment, lack of trained personnel and other infrastructural development problems; the programme continued to improve due to global challenges brought about by ICT. As a result of this phenomenal development; it has become imperative for Educational Technology lecturers to introduce more innovative teaching strategies that can compete favourably with innovations brought about by ICT in the teaching industry that has gone a long way in providing teachers with a more positive approach to teaching difficult and abstract concepts in the operation and maintenance of Educational Technology media.

NCE students will benefit both in the practical and theoretical significance of the study because the courseware will improve their insight into the course content. Similarly, the study has theoretical significance of improving the present state of knowledge in Educational Technology more especially in the area of teach-re-teach cycle. The result of this study will also assist NCCE in diversifying teaching strategies highlighted in the NCCE (2020) minimum standard. The findings of this study will also assist researchers in developing more flexible, versatile and innovative courseware for teaching difficult and abstract concepts that can help in the development of manipulative skills not only in Educational Technology but also in other related fields of human endeavour.

Scope of the Study

The scope of the study was limited to effect of video courseware and manipulative skills on NCE II students' performance in operating Educational Technology media in some selected colleges of education in the northeast zone of Nigeria. Only NCE II students will be used for the study because Educational Technology is a core- course offered by NCE II students during the first semester preparatory to Micro Teaching Practicum in the second semester and Teaching Practice in NCE III.

Literature Review

Detailed literature review was done that covered theoretical and conceptual frameworks using different theories and concepts like Dual-Coding Theory (Paivio, 1971), Mindtools (Jonassen, 1995), Concept of Cognitive Apprenticeship (Ghefaily, (2003), theories of Computer Assisted & Computer Based Instructions and projection techniques. Courseware is a term that combines the words 'course' with 'software'. Its meaning originally was used to describe additional educational material intended as kits for teachers or trainers or as tutorials for students, usually packaged for use with a computer. The term's meaning and usage has expanded and can refer to the entire course and any additional material when used in references and online or 'computer formatted' classrooms. The researcher identified some equipment and manipulative skills that learners find difficulties in assimilating through conventional talk-chalk method. These manipulative skills are overhead projection techniques, maintenance procedures, identification of projectors parts and the general principles of operating Educational Technology media. These manipulative and operational skills are overhead projection techniques, maintenance procedures, identification of projector parts and the general principles of operating educational media. It is in the light of this development; that video courseware as an instructional package was introduced to enhance and facilitate the understanding of Educational Technology media.

In the conceptual framework, the concept of video courseware, types of projection equipment, types of projection techniques, general principles of all projecting equipment, equipment maintenance procedures and types of computer-based instruction were discussed. The study adopted common-coding theory within the framework of Paivio's Dual-Coding theory which stipulates that there is connectivity between what we see and hear which results in to motor sensory action that can help students of Educational Technology in handling media equipment by enhancing the students' manipulative skills. The various empirical studies reviewed revealed that computer mediated instruction more especially video instruction are generally more effective in influencing learning than the conventional method of teaching Educational Technology. It was also discovered that CAI was more effective in facilitating achievement in many subjects including Educational Technology.

However, no study to the best of the knowledge of the researcher examined the effect of video courseware and manipulative skills on NCE students' performance in Educational Technology; an area the study explored.

METHODOLOGY

Design of the Study

The study adopted Quasi-experimental research design. The choice of this method was particularly necessitated by confounding variables that cannot be controlled or accounted for with random assignment, the study participants have the same chance of being assigned to the intervention group or the comparison group.

Area of the Study

The study was conducted in the northeast zone of Nigeria covering Gombe, Bauchi, Yobe, Adamawa, Taraba and Borno States. All the ten (10) state and Federal Colleges of Education were involved in the study.

Population of the Study

The target population of the study are four (4) colleges of education out of the ten (10) Centres for Educational Technology in the ten (10) colleges of education in the North-east zone. A total of four hundred and ninety five (495) out of four thousand nine hundred and fifty thousand (4,950) NCE II students also constitute the population.

Sample and Sampling Technique

Simple random sampling technique without assignment was used for the study to obtain two hundred (200) NCE II students out of a total number of six hundred (600) students drawn from the five (5) schools namely; School of Business Education (40 students), School of Technical Education (40 students), School of Vocational Education (40 students), School for Early-Child and Primary Education (40 students) and School of Science Education (40 students).

Instruments for Data Collection

The instruments used for the study, namely: Educational Technology Achievement Pre-test (ETAT) through questionnaire and Educational Technology Achievement Post-test (ETAPOT) through checklist. In the treatment procedures, the control group was given Educational Technology achievement test (ETAT) to pre-test their background knowledge after which they were taught operation and maintenance of Educational Technology equipment using media-based instruction which was preceded by a post-test known as Educational Technology achievement post-test (ETAPOT) to determine the effect of the conventional teaching on the Control Group (CG).

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Validation of the Instruments

Two of the experts drawn are Educational Technologists from the Department of Arts Education of the University of Nigeria Nsukka, while one expert was drawn from the department of science education all in the faculty of education university of Nigeria, Nsukka.

Reliability of the Instruments

The instruments were trial-tested using two colleges of education, one in the South-East and the other from the North-Central with a view to establishing the reliability of the instrument. The reliability of the instrument was determined through Cronbach Alpha reliability procedure. The choice of this method was necessitated by the fact that coefficient Alpha can be employed generally without regard to the nature of the scoring method used (Frisbe, 1988). The instrument for experimental students in the experimental group showed reliability coefficient of 0.89, 0.90 and 0.88 for sections 'B', 'C' and 'D' respectively. The overall reliability coefficients of the instrument for experimental group stood at 0.89. The instrument for lecturers and supportive staff showed reliability coefficients of 0.92 and 0.94 for sections 'A' and 'B' respectively. The overall reliability co-efficient of the instruments for both experimental and control groups stood at 0.93.

Method of Data Collection

The instruments was administered to all students in all the centres for Educational Technology in the study area by the researcher and his assistants. The checklist was used by the researcher or his assistants to determine on the spot the available resources and their numbers. The instruments were supported by introduction letters to facilitate effective response by the students after using the video courseware and conventional method of teaching.

Method of Data Analysis

The researcher used frequency counts and percentages to answer research questions 1 and 2, while mean (\bar{x}) while standard deviation were used to answer research questions 3 and 4. With regard to the hypotheses, t-test was used to test the hypotheses at 0.05 level of significance. On research question 1 on performance, any item whose percentage score is below 50% is considered not available while research question 3 on maintenance and hypothesis 1 on mean achievement scores; items with scores between or 0.50 – 1.49 are not adequate and items between 1.50 – 2.49 are less adequate while 2.50 – 3.49 – adequate and 3.50 - 4.00 are very adequate. Research question 4 on mean achievement score and manipulative skills and hypothesis 2 on manipulative abilities, any item whose mean score ranges between 0.50-1.49 - not at all, 1.50 - 2.49 is seldom used and 2.50 - 3.49 is frequently used while 3.50 – 4.00 is very frequently used. On research questions 4 and 5 on mean achievement and manipulative skills as well as competence possessed by students in the operation of Educational Technology media, 50% and below are considered not well taught while above 50% are considered well taught based on the acquisition of manipulative skills by the respondents. The computation of the data was done using Statistical Package for Social Sciences (SPSS).

RESULTS

The results of t-test on hypothesis one, revealed that there were significant differences in the mean ratings on performance of students in the control and experimental groups (cal. $t = -1.50$ $P < .14$) and also for mean achievement score (cal $t = 2.39$, $P < .02$) and video courseware (cal. $t = -2.38$, $P < .02$). These differences were in favour of experimental group. Results of t-test for hypothesis two on manipulative skills, showed that $t = -2.39$ $p < .04$. This indicated that the null hypothesis was rejected. There was significant difference in the mean ratings on manipulative skills by experimental and control group, in favour of experimental group. Also, for hypothesis three on maintenance of Educational Technology facilities, the calculated $t = -.88$, $P < .40$. The null hypothesis is not rejected. There was no significant difference in the mean achievement ratings on maintenance of CET facilities by the experimental and control groups. Result of t-test on hypothesis four on competence possessed by trainee students in the operation of equipment, the calculated $t = .03$, $P < .98$. The null hypothesis was not rejected. Therefore, significant difference did not exist in the mean ratings on competence possessed by trainee students on the operation of equipment in both the experimental and control groups.

The results of data analysis on research question 1 and 2 indicated that Educational Technology media which assisted in the application of the video courseware were available and functional in majority of the colleges of education while the results on research question 3 revealed that most of the concepts on maintenance of educational technology media were well taught. Results on research question 4 revealed that micro teaching skills were well practiced by trainee teachers which was enhanced by the video courseware. One major implication of the study was that a ratio of one facility/personnel to 25 students which was recommended in the NCCE minimum standard (2020) was not realistic in all the colleges in the study area based on the findings of this study. This lack of adequate facilities for practice by students reduced the chances of the trainee teachers to acquire the requisite competence and skills to manipulate these media. This is in line with the findings of Collins (1987), Akinpelu (2006) and Onasanya (2007) that the effective utilization of teaching facilities is largely dependent on the teacher's acquisition of relevant skills that can help them create the enabling environment to impart knowledge.

CONCLUSION

1. Majority of the CETs in the colleges of the study area do not have adequate facilities for teaching and learning.
2. Only a negligible number of available facilities are not functional; but majority of the facilities in most of the colleges are functional which provided good room for the application of the video courseware
3. The facilities for the training of teachers are not adequate in majority of the colleges. However, federal colleges of education appear to have more facilities than the state colleges.
4. Findings on research question 3 and hypothesis 3 indicated that no significant difference existed on the acquisition of manipulative skills on maintenance of CET facilities by control and experimental groups.
5. A ratio of one facility/personnel to 25 students was recommended in the NCCE minimum standard (2020); this is not realistic now in all the colleges in the study area based on the findings of this study.

RECOMMENDATIONS

- 1- State and federal colleges of education should recruit more trained personnel and acquire more functional facilities to be able to produce competent teachers.
- 2- Educational Technologists should be recruited as coordinators of CETs to be able to appropriately manage the CETs as contained in the NCCE minimum standard (2020).
- 3- Closed Circuit Television (CCTV) or studio web cams should be acquired for all the CETs for effective micro teaching exercise, as the first equipment requirement in the NCCE minimum standard.
- 4- The time allotted for micro teaching practicum and Educational Technology are grossly inadequate, the minimum standard should be reviewed to provide more time for the acquisition of knowledge and skills by trainee-teachers.

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