

INVESTIGATING THE FEASIBILITY OF INTRODUCING COMPUTER AIDED INSTRUCTION (CAI) APPLICATION IN DISTANCE LEARNING SYSTEM IN NIGERIA

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ABSTRACT

This research examines the Feasibility of Computer Aided Instruction Application in Distance Learning System in Nigeria, using the National Teachers' Institute (NTI) Kwara study center as a case study. Forty (40) N.C.E. students and ten (10) staff of the center were randomly sampled. A questionnaire was designed to collect data from the respondents. Simple percentage, Average Total Weighted Response (ATWR) and Chi-square test were used for data analysis. The research work finds out that the students are willingly interested in the use of computer-aided instruction material for learning, but the facilities such as computer laboratory, computer personnel, and other facilities are not readily available in the study center. It is therefore recommended that the government should provide facilities and equipment like computer laboratory, microcomputers, furniture, stabilizers or uninterruptable power supply (UPS) which are essential for the introduction of Computer Aided Instruction Application in Distance Learning System in Nigeria.

Keywords: National Teachers' Institute (NTI), Computer-Aided-Instruction, Distance learning, Information & Communication Technology (ICT), Computer

1. INTRODUCTION

The journey of knowledge and learning began many millenniums ago. It started when the first question was asked and its solution was sought and implemented. Every millennium and indeed every century has its own trends and impacts in the coming times. End of one millennium marks and paves the way to new ideas for forthcoming generations. The same is true for last millennium, as it left roadmaps for the journey of learning for this millennium in the form of distance education, e-learning, and m-learning just to mention three. Experience has also shown that conventional education cannot meet the demands of the present day socio-educational milieu, especially for developing countries like Nigeria. In Nigeria for instance, the actual numbers of students admitted annually into conventional university are so low compared to the number of those yearning to have the university education.

This lack of admission capacity has necessitated the issue of Open and Distance Learning (ODL) system as an innovative and cost-effective approach to the educational system. To bridge the gap between participants in the instructional process, ODL system offers structured learning in which the instructor and students are separated by time and space, making use of Information and Communication Technology (ICT). This, offering increasing possibilities of codification of knowledge about teaching and for innovation in teaching activities through being able to deliver learning cognitive activities anywhere at any time.

These innovative teaching methods and resources are relatively new instructional approaches though are capable of enhancing the teaching and learning in schools. Unlike the conventional teaching methods and resources, it seems to make teaching easier and facilitate learning. They also seem to enhance creativity among learners more than the conventional methods such as lecture method and recitation. Innovative teaching methods and resources include Computer-Aided-Instruction (CAI), future wheel, flexible scheduling, individualized instruction, concept-mapping, film strips, projectors, computers, and television among others.

However, the possibility of achieving the goals of ODL system depends largely on the attitude of both the students and teachers who play a vital role in the teaching and learning activities. This calls for both parties readiness to effectively and efficiently use teaching methods, especially CAI. Nwosu (2002) defined CAI as an automated instructional technique in which a computer is used to present an instructional program to the learner through an interactive process on the computer. Thus, CAI involves the use of computers to teach academic skills and promote communication, language development, and other related skills. CAI is an instructional method that has been developing for over 40 years. This idiom equates with other modern terms such as computer-based instruction (CBI), Computer-Based Learning Environment (CBLE), or Computer-Aided Learning (CAL) (Olukayode, 2015).

Consequently, the teacher instead of teaching the learners, only guides and assists them on how to ask questions and pose problems, formulate hypotheses, locate information and critically assess the information found in relation to the problems posed (Aramide & Bolarinwa, 2010). Through this technological application, the objective of distance learning will become easier, as it is possible for a person with personal computers can store series of lesson text, give distance learning a higher power of interactivity, which before was only possible by using the book or modular text method. To this end, it is highly essential to use computer aided instruction for effective teaching and learning processes. So many researchers have used computer-assisted instruction in different subject areas to improve effective teaching and learning. For instance Hall, Hughes, and Filbert (2000), examined the effect of computer-assisted instruction in reading by students. Their findings indicated an improvement in reading when a computer assisted instruction is used for students.

Also, Adeniyi (1997) investigated the effect of computer-assisted instruction on academic achievement in sciences; the result was also positive. In addition, Ifeakor (2005) examined the effects of commercially produced computer assisted instructional package on student's achievement and interest in secondary school chemistry. In her study, she found that the commercially produced computer assisted instructional package had a positive effect on the students' achievement and interest. In the study of computer innovation in distance learning within Nigeria, it was faced with the problem of lack of properly funded and coordinated distance learning facility.

For instance, the Open University of Abuja which was conceived so as to cater for increasing needs of quality tertiary education in the country is no longer in existence since teacher education does not constitute part of the Federal University System. It is only the National Teachers' Institute (NTI) that runs large scale distance education programs than any other Institution in Nigeria (Ojo & Felix 2006). This makes it almost impossible to apply computer enhancement for effectiveness of distance learning efforts within the country.

2. BACKGROUND

The Nigerian National Teachers' Institute (NTI), Kaduna, was established by the Federal Government of Nigeria in 1976, in an attempt to make meaningful contribution to educational development. It is an institution meant to train teachers through the "Distance Learning System" This was done in response to a dire need to produce teachers of the right caliber in adequate number to man the nations' primary schools. The institute's first program Teachers' Grade II certificate program commenced in 1984 and it was meant to upgrade under qualified teachers to Teacher Certificate II to teach in primary schools. The duration of the program varied with students' entry qualification. The Institute's Nigerian Certificate in Education (NCE) started in 1990. It was meant to upgrade Teachers' Grade II certificate holders to NCE, to teach in primary and junior secondary schools. The Pivotal Teacher Training Program (PTTP) by distance learning was introduced by the institute to produce teachers needed for Universal Basic Education (UBE) increased in the year 2000 (NTI, 2006). In spite of the long history of distance education in Nigeria, systematic studies have not been conducted widely on distance education or distance learning. Recent literature concerning use of CAI in distance education in Nigeria, most especially NTI distance education program, to the best of the researchers' knowledge is sparse.

Many researchers such as Omofaye (2007) had earlier examined challenges facing ICT infrastructure and successful online education in Africa. In a similar vein, Oye, Salleh, and Iahad (2012) also investigate some of the challenges of e-learning in Nigerian university education. Aramide and Bolarinwa (2010) investigate the application and use of audiovisual and electronic resources at National Open University of Nigeria (NOUN). Of recent, Damilola, (2013) investigate the use of Electronic Resources by Distance Students in Nigeria, using National Open University, Lagos and Ibadan Study Centers as a case study. Thus, no specific studies have investigated the feasibility of incorporating CAI application into distance learning programs of the Nigeria National Teacher Institute. Hence, this study tends to find out the possibility of integrating CAI to the teaching and learning system and what the attitude of the students toward CAI is. It is hoped that this study will bring about useful suggestion aimed at using CAI to facilitate effective teaching and learning of the student in the NTI study center.

3. Research Questions

Four major research questions were employed to guide the research.

1. Do NTI, Kwara study center have Instructional Material?
2. Do NTI, Kwara study center have a Computer Unit/laboratory unit?
3. Do the use of Computer aided instruction interest learning of students?
4. Do the introductions of computer aided instruction to students make teaching and learning process effective?

4. Hypothesis

Ho1: Students have negative attitude toward learning using computer as instructional aids.

Ho2: There is no significant different between the responses of staff and student towards the use of computer-aided instruction in teaching and learning.

5. METHODOLOGY

The collected data were analyzed based on the purpose of the study and research questions formulated for the study. The findings of the study were presented and analyzed. The results of the answers to the four research questions formulated for the study were presented in descriptive form using tables of frequency and percentage. A structured questionnaire instrument titled

“Questionnaire on feasibility of incorporating Computer-Aided-Instruction (CAI) application in the teaching of distance learners” was used for data collection. The instrument was rated based on Likert-type 4 point rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) with the rating scores of 4, 3, 2 and 1 respectively.

In addition, three types of statistics technique were used. These are common percentages, chi-square test and Average Weighted Responses (AWR). Chi-square is given by $\chi^2 = \frac{\sum(o-E^2)}{E}$, where 0 is the observed frequency and E is expected frequency. Average Weighted Responses, on the other hand, is given by: AWR = Sum of the product of the weight and frequencies divided by the total number of respondents. Hence, the AWR is interpreted as shown in table 1 below

Table 1: Interpretation of AWR

Range of AWR/ATWR	Interpretation
1 to 2.5	Not Significant (NS)
2.51 to 4	Significant (S)

6. RESEARCH ETHICS

All relevant documents and journals used in this study were clearly cited and referenced. In addition, a signed informed consent was received from every participant, and the identification of the participants was kept anonymous. The participants were adults and had the right to decide whether or not they wanted to participate in the study.

7. RESULTS

Findings or results of the study with respect to research questions 1, 2, 3 and 4 were presented in table 2 while the results of the null hypotheses were presented in tables 3 and 4 (a & b). The interpretation and brief discussion of each analysis are shown at the end each of the tables.

Table 2: Responses to research question 1-4

Q1: Do your study centers have any Instructional Material?	Frequency	Percentages (%)
Yes	30	60
No	20	40
Total	50	100
Q2: Do your study center have a Computer Unit/laboratory unit?		
Yes	21	42
No	29	58
Total	50	100
Q3: Do the use of Computer aided instruction interest learning of students?		
Yes	43	86
No	7	14
Total	50	100
Q4: Do the introductions of computer aided instruction to students will make teaching and learning process effective?		
Yes	44	88
No	6	12
Total	50	100

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From question 1 in the above table 2, it was revealed that 60% of respondents indicated that their study center actually has instructional materials. Meanwhile during the interactive session with some of the respondents, they were asked on what type of instructional materials they thought, would be very effective in teaching, majority of the respondents (about 70%) agreed that Computer Aided Instruction (CAI) would be more effective for teaching and learning. Therefore, they suggested that there is need for CAI in the study center for effective teaching and learning.

Also from table 1 above, majority of the respondents (58%) confirmed that there is no computer unit/laboratory in the study center. While 86% of respondent indicated that the use of CAI will interest the learning activities of the students. 88% of the respondents affirmed that the introduction of computer aided instruction to students will make teaching and learning process effective.

8. TESTING OF THE HYPOTHESIS

Hypothesis one (Ho1): Students have negative attitude toward learning using computer as instructional aids.

Table 3: Attitude of Students toward Learning, Using Computer as Instructional Materials

S/N	ITEMS/QUESTIONS	SA	A	D	SD	AWR	REMARK
1	Is your study center has Instructional Material?	11	17	11	11	2.44	NS
2	Is your study center has a Computer Unit/laboratory unit?	22	20	18	0	3.68	S
3	Do the use of Computer aided instruction interest learning of students?	32	7	8	3	3.36	S
4	Do the introductions of computer aided instruction to students will make teaching and learning process effective?	7	15	21	7	2.44	NS
ATWR						2.98	S

Since ATWR of 2.98 falls into the second row of table 1, then, the ATWR is significant. That is there is a significant positive attitude of students toward learning, using computer as instructional materials. Hence, hypothesis Ho1 which state students have negative attitude toward learning, using computer as instructional aids is rejected.

Hypothesis two (Ho2): There is no significant different between the responses of staff and student towards the use of computer-aided instruction in teaching and learning.

Table 4(a): Observed Frequencies Based on Status

ITEM	SA	A	D	SD	TOTAL
Staff	58 (54.2)	55 (42.8)	21 (38)	16 (15)	150
Student	213 (216.8)	159 (171.2)	169 (152)	59 (60)	600
Total	271	214	190	75	750

NB: () Expected are in parentheses

The expected frequencies are computed using the formula

$$E = \frac{T_r T_c}{N}$$

Where E = Expected frequencies
Tr = Total row
Tc = Total column
N = Number of Respondents

Table 4(b): Calculation of chi-square (χ^2)

O	E	O – E	(O – E) ²	(O – E) ² /E
58	54.2	3.8	14.44	0.2664
55	42.8	12.2	148.84	3.4776
21	38	-17	289	7.6052
16	15	1	1	0.0666
213	216.8	-3.8	14.44	0.0666
159	171.2	-12.2	148.84	0.8694
169	152	17	289	1.9013
59	60	-1	1	0.0166
χ^2				$\Sigma = 14.26$

Degree of freedom = (r – 1)(c-1) = (4 – 1)(2 – 1) = 3

Table value = 7.815

Since the calculated value of 14.26 is greater than the critical value or table value, (7.815) then the hypothesis is rejected. That is there is significant difference between the responses of staff and students toward the use of Computer aided instruction in teaching and learning.

9. DISCUSSION OF RESULTS

According to the findings of this study, it was revealed that majority of respondents indicated that their study center has instructional materials but confessed that there is no computer unit/laboratory in the study center. Though when further asked on what instructional materials would be very effective in teaching, majority of them agreed that Computer Aided Instruction (CAI) would be more effective for teaching and learning. Therefore, they suggested that there is need for CAI in the study center for effective teaching and learning. This is also in line with the findings of Omofaye (2007), who observed that NOUN does not have the necessary funding to acquire CAI infrastructure.

The study also revealed that CAI motivates students' learning activities. This result is in consonance with the findings of Oye, Salleh, and Iahad (2012), who stated that CAI enables the individual to plan and direct his/her own learning process. In another development, Hawkrigde, Jaworski and McMahan (1990) considered what the computers should and can be used for in

development country schools. Findings from this study revealed that the introduction of computer aided instruction to students will make teaching and learning process effective. Also, Olivers (1994) said that computer is expected to provide enhanced teaching and learning opportunities and to develop students' information skills and expertise.

It was also found that students have significant positive attitude toward learning using Computer as instructional materials, though the necessary materials are not readily available. Finally, there was no significant different between the opinion of staff and students towards the feasibility of introduction of Computer-aided instruction.

10. CONCLUSION

The introduction of Computer-Assisted-Instruction (CAI) to the NTI study center is possible and feasible. It has been established that CAI is one of the most effective innovative teaching methods that could enhance academic performance of the learners and possibly promote effective teaching. This position seems to have been proved by the findings of this study.

11. RECOMMENDATIONS

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

- (i) Government and stakeholders in Education should provide functional computer laboratories equipped with adequate backups, equipment and power supply to boost teaching and learning with computer applications.
- (ii) Government and other concerned authorities should conduct ICT seminars, conferences, and workshops for the teachers and students to help boost their knowledge of computer usage.

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APPENDIX
RESEARCH QUESTIONNAIRE

This is education researches, which require seeking information on the opinion of the staffs and students of NTI, Ilorin study center. INVESTIGATING THE FEASIBILITY OF INTRODUCING COMPUTER AIDED INSTRUCTION (CAI) APPLICATION IN DISTANCE LEARNING SYSTEM IN NIGERIA Using NTI as a Case Study.

Please kindly provide necessary information required for this study, your information shall be treated strictly as confidential.

Please tick (✓) where applicable.

PART A

Name of study centre.....

Location/Town.....

Name of Respondents (Optional).....

Designation.....

PART B

1. Which type of Instructional Material could be more effective for teaching.
 (1) Text book
 (2) Modular Text
 (3) Computer Aided Instruction
 (4) Others (Please Specify).....
2. Do you have Computer Unit in your study centre Yes () No ()
3. Does your centre have a computer Laboratory? Yes () No ()
4. The use of Computer aided instruction arose the interest of students.
 Yes () No ()
5. Are you aware that computer can be used as an instructional aid.
 Yes () No ()
6. Introduction of computer aided instruction to students we make teaching and learning process effective. Yes () No ()

PART C

Please rate the item below with regards to the acceptance or rejection of the statement made using this scale.

SA - Strongly Agree -4, A - Agree -3
 D - Disagree -2, SD - Strongly Disagree -1

S/N	Item	SA	A	D	SD
A	CAI MANPOWER NEED				
1.	The centre needs personnel trained for the use of computer facilities as instructional aid in the study center.				
2.	Staff in the study center are willingly interested to develop themselves in the use of computer facilities.				
B	NON-AVAILABILITY OF COMPUTER FACILITY				
3.	There is no computer facilities at the study centre to assist students in computer aided instruction.				
4.	Students are not familiar with the use of computer as an instructional aid in the study centre.				
5.	The use of computer aided instructional material will help				

	student in coping with programme objectives.				
C	AVAILABILITY OF OTHER INSTRUCTIONAL AIDS				
6.	Students are only familiar with the use of text book, modular test method as instructional aid for study.				
7.	The modular test is being used in the process of instruction at the study centre.				
8.	I prefer the use of text book, modular test than computer aided instructional material to study.				
9.	Audio-visual instruction were used at study centre by the tutors.				
10.	The instructional media supplied and used are adequate and relevant to help the student.				
11.	The self instructional style of modular test has help in the process of studying the text.				
D	ATTITUDE OF STUDENT TOWARD LEARNING, USING COMPUTER AS INSTRUCTIONAL MATERIAL				
12.	The students are interested to change their attitude toward the use of computer as an aided instructional material.				
13.	Students are willingly interested to learn the use of computer as an aided instructional material.				
14.	There are advantage in the use of computer aided instruction in teaching and learning process.				
15.	There was provision of adequate orientation on the use of computer as an instructional aid in NTI.				