

COMPUTER AS AN INSTRUMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY IN MATHEMATICS EDUCATION IN NIGERIA

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Abstract

The Electronic machine called computer permeate into every field of human endeavour. In area of science, education, medicine, economy. Therefore, this study considered computer as an instrument of information and communication technology in mathematics education. A sample size of 107 NCE HI students in mathematics and computer science were used for the study. A structured questionnaire of four(4) likert scale was used for data collection. Two research questions guided the study. Mean and standard deviation were used to answer questions asked. The result and findings revealed that computer when use in instruction helped in the mastery of mathematics contents. Recommendations were made at the end of the study.

Computer could simply be seen as an electronic device that receives or accepts data in diverse for process and bring out the results in a desired form. These characteristics or features endeared this machine to all sphere of human endeavour. In our Banking and Economics sector, the computer is used in the accounting, record keeping and analysis of large figures which is not possible using manual. According to Iji (2004), linear programming by the computer is now a vital means of deduction making in government, education, military, science and businesses.

In this era of technology advancement and attainment, computer is use to attain this aspect. Nigeria launched a new satellite I (X) called NIG-SAT-I-X.

During the process of launching, in China, all the Engineers were in computer room analyzing the different orbits this satellite will reach and the time needed for each phase of the launch. This satellite can be use in different aspect such education, medicine and pharmacy etc. This shows how important is the Electronic machine called Computer. With the multi-functional and multi-dimensional capabilities of the computer, it becomes pertinent that our educational system should explore and use computer as a teaching resources which can facilitate and enhance effective and efficient learning in our educational institution.

Adagunodo (2002) states that in the area of teaching and education, the paradigm of learning has shifted drastically from the conventional technique to a more dynamic and flexible one, which is learner centred. He stressed that learning is now done at the convenience and disposition of the learner. For instance, a student decides on what to learn, when to learn, where and how to learn. Adagunodo, stressed that this nature of learning is in tune with the "just -in-time" (JIT) philosophy of education of Japanese.

Besides, the modern philosophy of education targeting at mathematics, science and technology has been achieved largely through Computer Assisted Instruction (CAI). According to Gallo and Nenno, in Iji (2004), this new educational philosophy is subsumed in these three premises:

- (i) Students will learn more rapidly if

- (ii). pieces of information are given to them at once.
- (iii) Students should be given the opportunity to actively respond to the material given.
- (iv) Students should be provided immediate results, indicating whether a response was correct or not. Adegunodo (2000) identified the following as the major components of CAI;
 - i. A representation of the subject matter they teach,
 - ii. A model to determine the mental state of the students,
 - iii. A set of teaching strategies.

Using our different mathematical soft -ware for teaching mathematics (MINITAB, MATLAB, EXCEL, ASSESS, and most preferred SPSS), this three premises of CAI, can be identified as:

- (i) Introduction and installation of the mathematical software.
- (ii) Explanation on the methodologies or models on how to use the software and
- (iii) Teaching and learning process which the pictures in the classroom cannot be forgotten especially with repeated practice within and outside mathematical or computer laboratories (class room).

The learning out comes during this processes will enhance the application of computer/laptop in mathematics education.

However, Ball, Higgs, Oldknow, Straker and Wood (1987) considering the potentials of computer in teaching style states that style of teaching which involves the use of microcomputers can aid greatly the actualization of important high level skills which are exactly those which will be required in the future. Besides, Freudenthal (1981) predicts that the

transition to the computer paradigm has proved to be one of the major problems of mathematics education in the eighties and the nineties. According to him, the implication here is that the mathematics educators need to concern themselves with the ways micro computer could be used to assist and improve the teaching and learning of mathematics in the classroom. Ball et al in Iji (2004), on the use of computer in Mathematics teaching reports that:

Only minorities of both primary and secondary teachers of mathematics are using computers to support this style of learning. A recent survey suggests that nearly three quarters of secondary mathematics teachers use computers either very rarely or never in their work. The position in primary school is little if any better (P.8).

The situation stated above is not even better in Nigeria today. For instance, a workshop for lecturers in higher institutions on the use of computer packages in research analysis held in National Mathematics Centre (NMC) Abuja, on October, 2011 revealed that only 20% of the participants are conversant with the use of computer packages and these are the trainers of our would-be-teachers. Harbor-Peters, (2001) emphasized that teachers are very much ignorant of the use of computer in the mathematics classroom. This emphasis is as a result of the reverence of mathematics to the learner, society, and the nation.

Orok, (2009) sees mathematics as that discipline that brings about self reliance, patriotism and self productivity. This revealed that mathematics is very important in every realm of human endeavour. Also, the issue of student's poor performance in internal and external mathematics examinations is no longer news to anyone. This is because literatures are abounding on the importance of mathematics to science

and technology as well as on students' poor performance in mathematics (Harbor-Peters, 1982). For mathematics to serve as a veritable tool necessary for the transformation of our nation to science and technology driven nation, mathematics educators are to adopt a new and alternate strategy for the teaching and learning of mathematics. And this strategy is the use of computer /laptop and teaching - learning process in mathematics. Eisenbers and Johnson (2002), strongly emphasizes the integration of computer into the classroom with a usual focus on the available technologies.

Finger and Grimment (1993) in their study listed strategies which they believed were likely to assist teachers in the successful implementation of technology in schools. Among such strategies include the involvement of teachers every aspects of project initiated. Hoyles (1992) observed that innovation, because it inevitably perturbs the dynamics of a classroom, makes more apparent the mathematical beliefs and understanding of teachers and students alike.

Federal Ministry of Education (1998) recognized that the quality of education depends on the quality and quantity of its teachers. This hinged on the impression that teachers are the custodians of the implemented curriculum of education (Iji, 2001). This is because any planning and investment in education that trivials the role of teachers would be fraught with disappointing results. Anikweze (1996) states that teachers are determinants of quality in schools. That is why Ukeje (1991) rightly argued that if the child is the center of the educational system, the teacher is the pivot of the educational process. It is upon the teacher's appropriate practices and

functional efficiency that the success of the educational system lies. This is why it has always been popularly stated that no education system can rise above the quality of its teachers (FME, 1998).

However, computer as an instrument of information and communication technology may be provided in schools, but if the right quality and quantity of teachers are not there, the instrument is worthless and the result cannot be achieved. This is because is uncommon for people to offer what they do not have. This implies that Net teachers must be qualitatively trained to enable them face the challenges associated with the use of computers in mathematics lessons.

Therefore, base on the aforementioned, this study will look at the computer as an instrument of information and communication technology as it relates to mathematics education in Nigeria.

Purpose of the Study

This study is specifically designed to examined:

- iv. Whether the use of computer is teaching of mathematics positively enhance the training of mathematics teachers.
- v. Whether the use of computer is instruction, assist mathematics students to acquire skill of instructional delivery.

Research Questions

The following research questions were used to guide this study:

- vi. Computer do not enhances the training of mathematics teachers positively?
- vii. Computer do not assist mathematics students to sufficiently acquire skills of instructional delivery?

Methodology

The survey research design was adopted for this study. This was because the opinions of the respondents were sought on the matter of this study. The population consist of 107 NCE III students of mathematics and computer science Department of College of Education, Afaha Nsit in Akwa Ibom State. The choice of these respondents is because they have been introduce into the rudiment of computer in their first year.

There was no sample because all the students in these departments were used for the study.

The researcher developed six-item questionnaire, which was used for the study. An initial 10 items was generated before validation exercise was carried out. The validation was done by the experts in Mathematics Education and Measurement and Evaluation. A reliability test was conducted for instrument using a pilot respondent which are not members of the main respondent. The test gave a reliability of 0.78 coefficient. The state of the instrument was a four (4) likert scale of Strongly Agree (SA = 4), Agree (A = 3), Disagree (D=2) and strongly disagree (SD=1). The researcher personally administered and collected the instruments from the respondents.

The mean response was used to analyzed the data generated from the questionnaire. To ascertain the degree of agreement or disagreement a cut off point of 2.50 was adopted for the mean score. This implies that any response with a mean of 2.50 and above were considered as Agree and response below 2.50 was regarded as disagreed for positively cured items. And a mean of 2.50 and above implies Disagree and below 2.50 implies. Agree for negatively cured items. The

degree of deviation from one respondents to another were calculated using standard derivation (SD).

Results

Research Question 1: Computer do not enhances the training of mathematics teachers positively?

Research Question 2: Computer do not assist mathematics students to sufficiently acquire skills of instructional delivery?

Table 1: Mean Ratings of the Respondents on Computer as an Instrument of Information and Communication Technology in Mathematics Education

S/N	Contents	Means	SD	Remark
1.	Computer assist me in learning mathematics	3.29	0.35	Agree
2.	I can use mathematics software like MATLAB/SPSS	3.50	0.45	Agree
3.	Excel and Assess help me in mathematics calculation and analysis	3.38	0.50	Agree
4.	The use of computer have help me improve in knowing mathematics	4.40	0.48	Agree
5.	Use of computer do not helped me to understand mathematics	2.20	0.39	Disagree
6.	Technique of teaching delivery can easily be acquired through the use of computer	3.75	0.51	Agree

From table 1, it could be observed that the mean scores of Item 1 to 4 and item 6

cued positively ranging from 3.29 to 4.45 and the 5th item was negatively cued with a mean score of 2.20. This implies that the respondents agreed with the items of the questionnaires. The Standard Deviation (SD) of the items ranged from 0.35 to 0.51. This implies that the gaps between the responses of the respondents are adequate and acceptable since they are closed.

Based on the result of the analysis from the study, the following major findings are made.

- viii. Using computer to teach mathematics greatly improve the mastery of the contents of mathematics taught. And these help to improve the knowledgeableability of the students.
- ix. Using different software like Excel, Assess, MATLAB, SPSS in teaching mathematics courses greatly affected their learning positively.
- x. Instructional delivery are easily acquired by the students using Computer Assisted Instruction (CAI).

Discussion

The findings revealed that computer help in effective preparation of a qualitative would-be-teacher in area of mathematics. This implies that the use of computer help the students in mastery of mathematics contents. The study is in line with Odogwu (2002), Bail et al (1987) and Iji (2004 and 2001). They stressed that students taught with Computer Assisted Instruction (CAI) performed better than those taught without traditional or conventional method of teaching.

In essence, this implies, for effective and meaningful mathematics instructions, computer must be used

during lessons. Proper preparation of the mathematics teachers at this level of education is therefore very crucial. This is because this set of mathematics teachers are expected to teach at the primary and junior secondary school level which is the foundation of our educational system. Therefore, the mathematics teachers should be given adequate opportunity to be properly trained on the act of using the computer in the mathematics classroom.

Conclusion

The study took a critical look at the computer as an instrument of information and communication technology in mathematics Education. It was noted that mathematics Education can better be appreciated if this instrument of information and communication technology is used in delivering classroom instructions. This implies that mathematics contents and problem - solving skills can be achieved through the use of computer during lesson presentation. Therefore, for us as nation to achieve technological advancement and attainment, there is need for all the higher institutions especially those of teacher's education to start using computer during their instructional activities.

Recommendations

- The following recommendations were made in the course of this study.
1. All Colleges of Education and different facilities of Education should incorporate the use of computer in teaching and learning of mathematics education programmes.
 2. Government and cooperate bodies should help in the provision of computers/laptop to schools to enhance their practice.

3. Regularly conferences, workshop, and seminars should be organized to train the lecturers of mathematics on how to use computer in their instructional activities.
- xi. Education Tax Fund (ETF) or Tertiary Education Tax Fund (TETFUND) should also help in providing computer to schools and supervise their usage. This is because some school may receive these items without making use of them.
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