

Strategies for Improving Teaching and Learning of Computer Science in Selected Senior Secondary Schools in Sokoto State

¹MUSTAPHA ISAH A. & ²AMINU KABIRU

¹Department of Curriculum Study and Educational Technology, Usmanu Danfodiyo University, Sokoto, Nigeria. Email:

²Department of Science Education, Sokoto State University, Sokoto, Nigeria. Email:

Abstract

The study investigated strategies for improving teaching and learning of computer science in some selected senior secondary schools in Sokoto State. Descriptive survey research design type was used. A total of thirty (30) Senior Secondary Schools were randomly sampled. Principals, Vice Principals and all the Computer Science teachers were selected and a total of 120 respondents were employed to form the sample size. The Instrument with reliability index of 0.84 was adapted. Data were analyzed using mean and standard Deviation and null hypotheses was tested using ANOVA at 0.05 level of significance. It was revealed that there significant in the mean rating of respondents on the strategies for improving availability and quality of instructional facilities required for effective teaching and learning of computer science in the state. Part of the recommends stated that school authority (Education Secretaries and principals) should ensure that computer science teachers are sponsored on retraining programmes at least twice a year through workshop, seminars and conferences to enable them learn the modern technological skills in their chosen field of endeavor.

Keywords: Strategies, Teaching, Learning, computer science, secondary school

Introduction

Computer science education was first introduced into the Nigeria educational system (6-3-3-4) in 1982 then as computer science as a result of the newly National Policy on Educational that came into being after the National Curriculum Conference of September, 1969, Ojo (2008). In attempt to realize the objectives of setting up introductory technology, there must be adequate teaching of the subject on the part of the teacher as well as adequate learning on the part of the students (Magaji, 2006). Computer science is now regarded as one of the prevocational subjects, and according to Obanya (2007), it is a school subject providing students with a process of orientation in production and consumption through experiences in planning, testing, servicing and evaluating types of consumer and industrial

goods. Ogbazi (1989) reported that the Federal Government felt that the 6 – 5– 3 system was not meeting the needs of the society hence the introduction of the 6 – 3 – 3 – 4 system. According to him, the Federal Government renamed the subject computer science and proposed the 6 – 3 – 3 – 4 system of education, all this is done in an attempt to ensure that the societal needs were met. According to World Bank in Etim (2006), secondary education is now being recognized as the corner stone of the education system in the 21th century. It therefore, means that quality secondary education is indispensable in creating a bright future for individuals and nations alike. The learner is therefore, seen as the central figure of curriculum implementation process.

This study therefore seeks to investigate possible strategies that could be adopted for improving the teaching and learning of computer science which will foster the realization of the national goals and objectives.

Adeyegbe (2012) noted that computer science was structured to assist learners to develop interest in computer. The aim therefore as outlined in the National Curriculum for secondary school was that at the end of secondary schools, computer appreciation would have been attained and solid foundation laid for students' entrance into a vocation of their choice. Olaniyan and Ojo (2008) stated that a nation that does not take the development of computer science seriously will find her nation being relegated to the back bench in the committee of nations, even if such a nation has all the resources in the world, she would still be poor socially, economically and politically.

Lack of functional education however leads to unemployment which by extension leads to underdevelopment in any nation saddled with this problem. Investigation shows that schools in Sokoto State have inadequate Computer laboratories, computers and other teaching and learning equipment's needed for computer science studies. These equipments are not only insufficient but those available have not been totally benefit. The use of computer in teaching is a relevant and functional way of providing education to learners in order to assist them developing the required capacity for the world to work (Kosoko-Oyedeko & Tella, 2010). The National Policy on Education was well structured and the contents well defined but implementation calls for question (Ajala, 2002).

Without proper improvement on the problems comforting computer science teaching in senior secondary schools in Sokoto State, students

upon graduation, are bound to be completely obsolete and unmarketable in our contemporary society where knowledge of computer has become a prerequisite for employment, interview and in some cases for promotion. There is no doubt that much studies on computer science education in Nigerian secondary schools exist, it appears however, that such studies did not focus attention on the situation of computer science education in Sokoto state.

Several efforts have been made to evaluate the implementation of science and technology education programmes in Nigerian schools. Eguabor, (2000) points to the fact that students find aspects of the concepts and principle outlines of science and technology curricula difficult to understand despite teachers' efforts to explain and illustrate in such units. The causes of these difficulties arise from a number of factors such as poor teaching and the abstract nature of the concepts. Zahra (2013) noted that ICT has taken a prominent collaborative position as a tool for various creativities in education. It is equally serving as a catalyst in modifying teaching and learning activities to the advantage of both teachers and learners in the learning environment. Awotunde (2004) further point out that, the syllabi of science and technology are defective since they place little or no emphasis on traditional technologies of the student's environment. The efforts to transform the Nigerian society technologically according to him must be based partly on the acquisition of skills and knowledge in the traditional technologies at the secondary school level. Andrews (2017) observed that, the science and technology curricula was overloaded with contents which had a little relevance to the societal needs. As a result of this, many students left the Junior Secondary School without having the capability to join vocations, talk less to being scientifically literate enough to take rational decisions in adulthood.

Research Questions

1. What are the strategies for improving the funding for effective teaching and learning of computer science in senior secondary in sokoto
2. what are the strategies for improving the availability and supply of instructional facilities required for effective teaching and learning of computer science
3. To what extend are strategies for improving the methodologies required for teaching computer science improve.

Hypotheses

H₀₁: There is no significant difference in the mean responses of Principal, Vice Principal and Teachers on the strategies for improving the availability and quality of instructional facilities required for the teaching and learning of Computer science in senior secondary schools in Sokoto State.

H₀₂: There is no significant difference in the mean responses of Principals, Vice Principals and teachers on the strategies for improving teaching methodologies required for the teaching and learning of Compute science in senior secondary schools in Sokoto State.

Methodology

This study adopted a descriptive survey research design with a questionnaire as the major instrument of data collection. A qualitative survey research design according to Osuala (2001) centers on individuals and their opinion, belief, motivation and behavior. Descriptive survey research design type was used. Three objectives and research questions were formulated to guide the study. A total of thirty (30) Senior Secondary Schools were randomly sampled. Principals, Vice Principals and all the Computer Science teachers were selected and a total of 120 respondents were employed to form the sample size. Data were analyzed using mean and standard Deviation while null hypotheses were tested at 0.05 level of significance. The questionnaire items were sub-divided into four sections 'A', 'B', and 'C', . While 'A' comprised of 5 items designed to find out strategies for improving adequate funding for effective teaching and learning of computer science in senior secondary schools in Sokoto. Section 'B' comprised of 5 items designed to determine strategies for improving instructional facilities required for effective teaching and learning of computer science in senior secondary schools. Section 'D' comprised of 5 items designed to assess strategy for improving methodology required for teaching computer science in some senior secondary schools in Sokoto State. It has fifteen items which were graded on four point of: Strongly Agree (SA)-4 Agree (A)-3 Disagree (D)-2 Strongly Disagree (SD) The instrument used was adapted from (Ogbazi, 1989) with a reliability, co-efficient of 0.84.

Results

Table1: Strategies for improving funding for effective teaching and learning of computer science

S/N	ITEM STATEMENTS	N	X	Std. D	Decision
1	Fund allocated to senior secondary schools offering Computer Science should be increase	120	3.77	.547	Agreed
2	Donating computers to senior secondary schools should be Involving PTA	120	3.45	.646	Agreed
3	Cash/ICT equipments received from ICT competition or debate should be invested for improving effective teaching Computer Science	120	3.21	.620	Agreed
4	Community should Involving in donating computers to senior secondary schools offering Computer Science	120	3.14	.863	Agreed
5	Apply charges on all students when collecting their certificates	120	2.70	1.06	Agreed

Table 1 revealed that the mean responses of the respondents to 5 items to be greater than the cut-off point of 2.60. This shows that majority of respondents used for the study agreed with the items as the strategies for improving the funding for effective teaching and learning of computer Science in Senior Secondary Schools.

Table 2: Strategies for improving the availability and supply of instructional facilities required for teaching and learning of computer science

S/N	ITEM STATEMENTS	N	X	Std. D	Decision
6	Government should provide training for computer science teachers in order to conversant with the basic computer skills required for effective teaching and learning.	120	3.68	.568	Agreed
7	Standard computer library should be provided by donor agencies or PTA for day to day us be teachers and students of computer science.	120	3.45	.532	Agreed
8	Government should provide training for Teachers on basic different instructional methods, using computer and ICT facilities.	120	3.38	.735	Agreed
9	Government should liaise with private organizations or NGOs modern Computer E-Library with adequate Computers/ ICT facilities for the effective teaching.	120	3.26	.824	Agreed
10	Adequate qualified computer teachers should be employed.	120	3.21	.963	Agreed

The data presented in Table 2 revealed that, items 6, 7, 8, 9, and 10, has the cut-off point of 2.60. This shows that majority of respondents used for the study agreed with the items as the strategies for improving availability and supply of instructional facilities required the effective teaching and learning of computer Science in Senior Secondary Schools.

Table 3: Strategies for improving the methodologies required for teaching and learning of computer science

S/N	ITEM STATEMENTS	N	X	Std. D	Decision
11	Computer science students Participation should be encouraged among student in project work.	120	3.65	.568	Agreed
12	Discussion, Demonstration and practicum method should be used.	120	3.44	.532	Agreed
13	More time should be allocated to practical approach	120	3.25	.735	Agreed
14	Teaching and learning materials such as				

	computer printers. scanner etc. may be used in teaching computer to help learning objective	120	3.26	.824	Agreed
15	More computer studies should be introduced to secondary schools in other to increase number of computer teachers	120	3.14	.963	Agreed

Table 3 indicated that all 5 suggested strategies (items, 11, 12, 13, 14 and 15) had their mean ratings above the cut-off point of 2.60. This indicated that majority of respondents used for this study agreed with these items as strategies for improving the methodologies required for Teaching and Learning of Computer Science in Senior Secondary Schools in Sokoto State.

Table 4: Strategies for improving the availability and supply of instructional facilities required for teaching and learning of computer science

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	146.413	2	73.207	.436	.210
Within Groups	820.712	117	7.015		
Total	967.125	119			

Table 4 Revealed the result of F-ratio not to be significant at 0.05 level of significant: $F(2,279) = .436$; $p > 0.05$. The F-ratio of 436 with a p-value as .210 calculated at 0.05 level of significance and at 117 degree of freedom to be greater than 0.05. The null hypothesis was therefore accepted as postulated not to have any significant difference in the mean ratings among respondents on the strategies for improving the availability and quality of instructional facilities.

Table 5: strategies for improving the methodologies required for Teaching and Learning of Computer Science in Senior Secondary Schools in Sokoto State.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	247.879	2	123.939	6.156	.003
Within Groups	2355.713	117	20.134		
Total	2603.592	119			

Table 5 it revealed the result of F-ratio not to be significant at 0.05 level of significant. $F(2,279) = 6.150$; $P > 0.05$. The F-ratio of with a p-value as .003 calculated at 0.05 level of significance and at 117 degree of freedom to be less than 0.05. The null hypothesis was therefore rejected because we have statistically significant on the strategies for improving the methodologies required for Teaching and Learning of Computer Science in Senior Secondary Schools in Sokoto State.

Discussion

The study in table 1 reveal that, through funding, physical facilities such as computers and other ICT resources and infrastructure

required for teaching and learning are procured, maintained, and man-power employed. Without adequate funding of any project no matter how laudable it maybe, it becomes extremely difficult to actualize the objectives of such as program. Teaching and learning of computer science at the secondary school level required adequate funding by the government and other stake holders of our education system.

The data presented in Table 2, provided answers to research question The findings revealed that the availability and supply of instructional facilities such as computers, internet modern software, printers, generators, scanners joy stick, Laptops, server systems etc will help to improve the understanding of students in learning of computer science. The use of computers for instruction can be classified into computer assisted instruction and computer managed instruction which helps to improve the design and delivering of individualized instruction required to take care of individual differences in the teaching and learning process.

The result in the research question, which was analysed and presented in table 3 indicated that the teaching and learning of computer science can be improved by improving the teaching methodology adopted by computer science teachers. This findings in line with Etuk (2007) who remarked that teachers need to be properly educated to be morally responsible enough to ensure that ICT is not adopted in the classroom as surrogate teaching but as a means to enhance innovations in teaching and learning, creativity, building confidence and sense of self-reliance in both the teachers and the students. The findings further revealed that computer science teachers and other subject teachers in general should be retrained to become computer literate since a good number were not exposed to computer and its skills during their years of straining (Etuk, 2007).

The results in the null hypothesis 1, analysed and presented in table 4, show accepted as postulated not to have any significant difference in the mean ratings among respondents on the strategies for improving the availability and quality of instructional facilities.

The results in the null hypothesis 2, analysed and presented in table 5, show rejected because we have statistically significant on the strategies for improving the methodologies required for Teaching and Learning of Computer Science in Senior Secondary Schools in Sokoto State.

Conclusion

The study concludes that there are some basic strategies that could be adopted in order to improve the Teaching and Learning of Computer science in Senior Secondary Schools in Sokoto State. Computer science should provide sound basis for further training in computer science at the post- primary education thus should be relied upon to enable students acquired basic and knowledge needed to either secure a job and earn a living or to pursue further studies in the area of computer science. Evidence from the study also revealed that funding strategies for computer studies could be used to improve the Teaching and Learning of Computer science in Senior Secondary Schools in Sokoto State offering computer studies. It is also found that strategies for improving the availability and supply of instructional facilities as well as teaching methodologies strategies could be used to enhance the teaching of computer studies in secondary schools. It is evident in the study that students are adequately trained under an improved learning environment where instructional facilities are provided and qualified teachers engage for the services of teaching and learning applying by proper teaching techniques there is no doubt that the performance of students in computer science studies will improve considerably and as such they are bound to develop a remarkable interest in computer studies and develop the necessary skill required to secure and succeed in the workplace.

Recommendations

1. School administrators (Education Secretaries and Principals) should ensure that computer science teachers are sponsored on retraining programmes through workshops, seminars and conferences to enable them learn the modern computer science skills for effective and efficient teaching.
2. Government and private organizations should liaise and provide adequate computers, modern E-library and other instructional materials needed for effective and efficient teaching of computer science.
3. Parent Teacher Association and other major stakeholders can assist secondary schools by donating instructional facilities like leptons, desktop computers, internet facilities to enable students acquire modern skills of computer science in our senior secondary schools

Reference

- Adeyegbe, S.O.(2012).The Secondary School science curricula and candidates' performance. An appraisal of the first cycle of operation. *Journal of the Science Teachers Association of Nigeria*,28 (1 &2),102-108
- Ajala, J.A. (2002). Students perceived difficulties in the content of secondary syllabus unpublished M.Ed. thesis, *University of Jos*.
- Andrews A. (2017). Implications of the achievement motivation theory for school management in Ghana: A literature review. *Research on Humanities and Social Sciences*7(5). Retrieved from <http://www.researchgate.net/publication/>
- Awotunde, P.O. & Ugodulunwa, C.A. (2004). *Research Methods in Education*. Jos: Fab Anieh (Nig) Ltd.
- Effiom, 1. and Ntibi, E. (2000). Optimization of common laboratory equipment in the teaching of Computer Science. In M.A.G.
- Eguabor,V.O. (2000). Improvement and use of computer science teaching aids in the Secondary school. A paper presented at a national workshop for teachers of secondary school, Kaduna.
- Etim, (2007) Education for sustainable Development: *The Junior Secondary School in Nigeria*
- Etuk, G.K. (2006). Education financing for college and university. Uyo: Abam.
- Jebe, O.I. (2001). Improving the quality of secondary education III Nigeria: issues, problems and prospects. Makurdi: *Benue state University Press*.
- G. A. Kosoko-Oyedeko, A. Tella(2010). The teacher's perception of the contribution of ICT to the pupil's performance inCRE : *Published 1January 2010 Psychology Journal of Social Sciences*
- Magaji, M.A. (2006). *Fundamentals of Research Methodology*. Lagos: *Mo Hasmel Ventures*
- Obanya, P. (2007). *Thinking and talking education*. Ibadan: *Evans Brothers Evans brothers Nigeria publishers Ltd*.
- Ogbazi, J.U. (1989) Strategies for Planning and Coordinating Mass Transportation Efforts in Nigeria. *Paper Presented at the National Workshop on Mass Transportation Organised by the Nigerian Institute of Transport Technology, Zaria at Federal University of Technology, Owerri, Imo State. Oct 4-5, 19*.
- Ojo, O. (2008) Organizational Culture and Performance: *Empirical Investigation of Nigerian Insurance Companies. Manager Journal*,8, 118-127

- Olayiwole, M.A. (1999). Achieving effective science, technology and mathematics (S.T.M.) delivery in the 21st century; *some areas for consideration. Journal of STAN, 34(1&2), 16 –19.*
- Osuala, E.C. (2001). Foundations of vocational education. Onitsha: *Cape Publishers*
- Zahra, S.A. (2013). Governance ownership and cooperative entrepreneurship: The moderating impact of industrial technological opportunities. Georgia State University. *Academic Magnet Journal 39(6), 1713-17145.*