

## STRATEGIES RECOMMENDED BY EXPERTS FOR EFFECTIVE IMPLEMENTATION OF COMPUTER EDUCATION PROGRAM IN NIGERIAN SECONDARY SCHOOLS

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### Abstract

*The need to equip Nigerian youths with ICT skills has been widely acknowledged by researchers and the government as a prerequisite for national development. Governments at federal, state and local levels have responded to this need with the ICT policy and inclusion of computer education in secondary schools curriculum but research reports indicate that the implementation over the years are slow and ineffective. This study, therefore, surveyed 50 computer science lecturers in seven tertiary institutions in Anambra State to ascertain their recommended strategies for effective implementation of computer education program in Nigerian secondary schools. Three research questions and three hypotheses tested at 0.05 level of significance guided the study. A validated questionnaire was used for data collection while mean and t-test statistics were used for data analysis to answer the research questions and test the hypotheses. Findings revealed that the experts recommended thirteen school/teacher related, ten student/parent related and eleven government/supervisory agency related strategies for effective implementation of computer education program in Nigerian secondary schools. Consequently, it was concluded that the involvement of schools, teachers, students, parents and other agencies are very essential in the project. It was recommended, among others, that government should consider the recommended strategies and clearly specify the roles of the school leadership, teachers, students, parents and even communities, industries, Churches, etc., in secondary school computer education to ensure that the program is effectively implemented.*

### Introduction

Information and communication technology (ICT) has come to stay as powered by increased and widespread computerization which cuts across nations and occupational fields. Lenon and Lenn (1999) had observed that jobs in today's market require the use of hi-tech equipment and that the society depends largely on the ability of individuals to communicate, negotiate, cooperate and collaborate both locally and globally. Consequently, Babalola (2006) affirmed that the computer has permeated all facets of human activities locally, nationally and internationally. Nigerian children at different levels of education

including pre-primary, primary and secondary should be given the opportunity to acquire computer literacy and skills for different purposes as a necessary preparation for further education, realistic development and gainful employment.

Computer literacy is the awareness and enlightenment of the components of the computer system which equips the individual for skills acquisition. A skill is the ability to do something expertly as a result of adequate training. Early acquisition of computer literacy and skills will greatly increase the progress and productive power of Nigerian children and youths like their counterparts in the developed countries of the world. It will go a long way in reducing youth unemployment, delinquency and restiveness to enhance national development.

The above facts have been acknowledged by several researchers and authors in the likes of Osuala (2002) who asserted that computer education is an essential part of the preparation of youths for life and for living; Ohakwe (2004), Nwanewezi (2007), Nwana (2009), Nwanewezi and Onoh (2009) and Akinola (2011) who affirmed that without adequate computer training at the secondary school level, students would be unable to utilize ICT resources effectively in further education or employment.

Nigerian governments at both state and federal levels have also practically demonstrated their appreciation of the need for computer education in the secondary schools at different times and in different ways. For instance, the federal government, in demonstrating her acknowledgement of this need, approved the ICT policy which gave birth to the National Information Technology Development Agency (NITDA) in March 2001 with the vision to make Nigeria an ICT capable country in Africa and a key player in the information society by the year 2005 using ICT as the engine for sustainable development and global competitiveness. The goal of the ICT policy was to use ICT for education, job creation and global competitiveness and its two objectives were:

1. To empower the youth with ICT skills for global competitiveness and
2. To integrate ICT into the mainstream of education and training (Akinola, 2011).

Akinola (2011) outlined the implementation strategies of the policy which include:

1. Increasing supply of computers to schools.
2. Encouragement of massive and local ICT skill acquisition through training in public and private sectors with a view to achieving a strategic medium-term milestone of, at least, 500,000 ICT skilled personnel by the year 2004.
3. Empowerment of the labour force with ICT skills.
4. Establishment of adequate institutional framework to address implementation problems.
5. Provision of adequate curricula for trainees.
6. Improving the nation's security system.
7. Provision of adequate and regular power supply.

Babalola (2006) reported the efforts made by Ondo State Government to train all its civil servants on computer literacy and skills acquisition in two batches (first batch 75% and

second batch 25%) in 2005 which cut across all occupations from the Governor to messengers/cleaners and drivers. The training consultants, as reported by Babalola, explained that the coverage or content was developed with due consideration to the immediate needs of the Nigerian computing environment and asserted that the most successful program in Nigeria and 90% of the world is the MS office suit comprising Word, Excel, Power Point, Access, Works, Publisher, etc., and the Internet. Following the training, Babalola quoted the Head of Service of Ondo State as declaring that any civil servant in the state who was not computer literate by January 1, 2006 had voluntarily withdrawn from service as would be no typewriters on the desks of any workers.

Babalola (2006) further reported that Ondo state government extended its computer training to the immediate future workforce by preparing secondary school students to use computers in their chosen fields. Consequently, the government supplied 210 out of 282 state owned secondary schools with five computers each while the remaining 72 were supplied with 10 computers each. Some of the schools were connected to the Internet, provided with servers and power generating sets while one school used solar energy. Babalola reported that the implementation of computer education program of the Ondo state government in secondary schools witnessed such challenges as inadequacy of equipment and facilities, erratic and epileptic power supply and poor maintenance culture which inhibited full realization of its aim. Finally he recommended, among others, that adequate number of computers and other telecommunication equipment should be supplied to secondary schools as a prerequisite for effective computer education at the level and necessary step towards transforming the workforce for greater productivity at the state and national levels.

Corroborating the report of Babalola on the implementation of computer education at the secondary school level by the Ondo State Government, two different authors, Akere and Agu in Akinola (2011) reported that implementation of the nation's ICT policy is a distant cry. The authors acknowledged the policy document as good with bright ideas but concluded that its implementation was crude and that the agency (NITDA) was ineffective despite the huge sums of money sunk into it by the government. Akinola, therefore, outlined challenges to effective ICT training and utilization in Nigeria to include (1) acquisition of computers and communication equipment, (2) power supply (3) manpower development, (4) infrastructural and consumable facilities, (5) security and supervision. Finally, she recommended strategies for coping with the challenges to include (1) provision of adequate curricula for trainees, (2) increased funding (3) procurement of adequate number of computer units for trainees, (4) improved security system in the nation and (5) provision of adequate and regular power supply.

Osuala (2002) had noted that there are numerous developments in Nigeria today that affect computer education such as curriculum contents and trends, rapid industrial globalization, social and economic forces, national and international new methodologies in teaching and learning. Regarding curriculum content, he observed that in the past,

educational curriculum planning was done by special persons and the document was handed down for implementation which resulted in ineffectiveness due to poor implementation. Consequently, he posited that to achieve effectiveness, educational curriculum planning and implementation in any fields of study including computer education should involve subject teachers, students, parents, administrators (school leadership and staff of supervisory agencies) and employers.

The foregoing clearly confirms that computer education is a necessity in Nigerian secondary schools. The recognition accorded to this need by governments at the state and federal levels who have enacted policies, established and funded relevant agencies is highly commendable but reports show that the implementation over the years has not yielded positive results. To effectively implement any policies, programs or projects, there is need to develop workable strategies to clearly show what should be done by who, how and when and such strategies should be developed by experts or in consultation with them. Consequently, this study sought to identify and document the strategies considered suitable by computer science experts for effective computer education in Nigerian secondary schools covering school/teacher related, student/parent related and government/ supervisory agency related strategies.

### Research Questions

Three research questions were raised to guide the study, namely:

1. What are the school/teacher related strategies for effective computer education in Nigerian secondary schools?
2. What are the student/parent related strategies for effective computer education in Nigerian secondary schools?
3. What strategies are to be adopted by government/supervisory agency for effective computer education in Nigerian secondary schools?

### Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance:

1. Respondents will not differ significantly in their mean ratings on school/teacher related, student/parent related and government/supervisory agency related strategies for effective computer education in Nigerian secondary schools as a result of gender (male/female).
2. Qualification will not significantly affect respondents' mean ratings on school/teacher related, student/parent related and government/supervisory agency related strategies for effective computer education in Nigerian secondary schools.
3. Respondents will not differ significantly in their mean ratings on school/teacher related, student/parent related and government/supervisory agency related strategies for effective computer education in Nigerian secondary schools as a result of length of teaching experience (1-5 years/6 years and above)

### Method

The design adopted for the study is survey as recommended by Whawo (2000) and Osuala (2001) for studies aimed at exploring opinions of a given population or its representative sample on existing practices and conditions. The study was conducted in Anambra State which is one of the five states in the south east zone and carved out of the old Anambra State by the Babangida Administration in 1991. The state is noted for industrial and commercial activities plus notable value for education as evidenced by large number of primary and secondary schools spread in six education zones and several tertiary institutions. Anambra State is located east of the Niger River and bounded by Delta, Enugu, Imo and Abia states. Population of the study consisted of 50 computer science lecturers drawn from seven publicly and privately owned tertiary institutions (four universities, one polytechnic and two colleges of education). The entire population was studied without sampling due to its size.

A structured questionnaire containing 37 items in four sections (sections A, B1, B2 and B3) was used for data collection. Section A sought for demographic data of the respondents with three items while sections B1 to B3 covered the three research questions with 34 items and five response options of SA (strongly agree) = 5 points, A (agree) = 4 points, U (undecided) = 3 points, D (disagree) = 2 points and SD (strongly disagree) = 1 point. The instrument was validated by two computer science lecturers from the Institute of Management & Technology (IMT), Enugu. Test re-test method was used to establish the reliability of the instrument. Copies of the instrument were administered twice to eight computer science lecturers in two tertiary institutions in Enugu State who were not included in the study population within an interval of two weeks. The data generated were analyzed with Chronbach alpha and reliability co-efficients of .0.86, 0.65 and 0.72 were obtained for sections B1 to B3 of the instrument respectively. Fifty copies of the instrument were administered personally by the research team with the help of their professional colleagues in the institutions. This helped to achieve a hundred percent response rate as all the copies were duly completed and retrieved.

Data collected for the study were analyzed with the arithmetic mean and t-test statistics to answer the research questions and test the three hypotheses at 0.05 level of significance. Items with mean scores 3.0 and above are taken as recommended by the experts while items with mean scores below 3.0 are regarded as not recommended by them. Where the t value is greater than the significance level of 0.05, it means that the respondents do not differ significantly in their mean ratings and the hypothesis will be upheld. Conversely, where t value is less than the significance level of 0.05, it means that there is significant difference in respondents' mean ratings and the hypothesis will not be upheld.

**Results**

**Table 1:** Mean ratings of respondents on school/teacher related strategies for effective computer education in Nigerian secondary schools - N = 50

S/N	School/teacher related strategies	Mean	Remark
1.	Each stream should have a computer laboratory	4.58	Agreed
2.	Ensure that the computer lab has enough space	4.50	Agreed
3.	Ensure that lab furniture is suitable for age	4.48	Agreed
4.	Ensure that number of computer teachers is adequate	4.62	Agreed
5.	Effectively use excursion to business offices to stimulate students' interest	4.38	Agreed
6.	Computer teaching should be more of practical than theory	4.60	Agreed
7.	Students should use the lab for individual practice	4.40	Agreed
8.	Ensure adequate maintenance of laboratory equipment	4.60	Agreed
9.	Provide relevant consumables like printer, toner/ink, white board and marker, paper, etc.	4.34	Agreed
10.	Ensure adequate lesson supervision	4.46	Agreed
11.	Encourage discovery learning method	4.38	Agreed
12.	Procure supplementary instructional equipment like projector, scanner, internet connectivity, etc.	4.42	Agreed
13.	Boldly display rules and regulations for use of lab	4.58	Agreed

**Grand Mean = 4.50**

Data in Table 1 show that all the strategies (Nos 1-13) have mean scores ranging between 4.34 and 4.62 which show that they are all recommended by the experts as suitable for effective computer education in Nigerian secondary schools.

**Table 2:** Mean ratings of respondents on student/parent related strategies for effective computer education in Nigerian secondary schools - N = 50

S/N	Student/parent related strategies	Mean	Remarks
14.	Students should procure recommended textbooks	4.38	Agreed
15.	Students should demonstrate interest by punctuality	4.44	Agreed
16.	Students should replace lab equipment they damage	3.90	Agreed
17.	Students should tackle assignments promptly	4.58	Agreed
18.	Parents should donate computers to schools to enhance instruction	4.26	Agreed
19.	Parents should donate computer textbooks to schools	4.08	Agreed
20.	Parents should support their children's learning by permeating them to stay back and use the lab	4.10	Agreed
21.	Parents should buy laptops for their children	4.30	Agreed
22.	Parents should ensure that their children have teacher recommended computer textbooks	4.46	Agree
23.	Parents should undertake to replace lab equipment damaged by their children	4.00	Agreed

**Grand Mean = 4.25**

Data in Table 2 show that all the strategies (items 14-23) have mean scores ranging from 3.90 to 4.58 which means that they are all recommended by the experts involved in the study as suitable for effective computer education in Nigerian secondary schools.

**Table 3:** Mean ratings of respondents on government/supervisory agency related strategies for effective computer education in Nigerian secondary schools N = 50

S/N	Government/supervisory agency related strategies	Mean	Remarks
24.	Involve computer science lecturers in developing content	4.38	Agreed
25.	Recruit only computer graduates with practical background to teach Subject in the secondary schools	4.16	Agreed
26.	Employ computer teachers for each stream	4.42	Agreed
27.	Content should cover appreciation and competence	4.56	Agreed
28.	Computer education should start at JSS 1	4.38	Agreed
29.	Provide adequate computer units for class strength	4.64	Agreed
30.	Ensure effective contents implementation in schools through adequate supervision	4.52	Agreed
31.	Provide adequate ICT resources for schools	4.44	Agreed
32.	Provide alternative power source for computer labs	4.52	Agreed
33.	Improve funding for adequate maintenance/repair of equipment	4.60	Agreed
34.	Supply locally authored computer textbooks for school libraries	4.50	Agreed

**Grand Mean = 4.47**

Data in Table 3 show that all the strategies (Nos. 24-34) have mean ratings above 4 points which indicate that they are recommended by the experts as suitable for effective computer education in Nigerian secondary schools.

**Table 4:** t-test analysis of the effect of gender on respondents' mean ratings of school/teacher, student/parent and government/ supervisory agency related strategies for effective computer education in Nigerian secondary schools

Sum of Clusters	Gender	N	Mean	SD	T	df	Sig level	Remarks
1	Male	29	58.90	4.87	.79	48	0.05	NS
	Female	21	57.81	4.58				
2	Male	29	42.34	5.68	.24	48	0.05	NS
	Female	21	42.71	4.72				
3	Male	29	48.93	4.54	.35	48	0.05	NS
	Female	21	49.38	4.50				

Data in Table 4 show that the t value for the three clusters are greater than the significance level of 0.05 which means that the respondents' mean scores do not differ significantly as a result of gender and the hypothesis is upheld.

**Table 5:** t-test analysis of the effect of qualification on respondents' mean ratings of school/teacher, student/parent and government/supervisory agency related strategies for effective computer education in Nigerian secondary schools

Sum of Clusters	Qualifications	N	Mean	SD	T	df	Sig level	Remarks
1	HND/first degree	18	51.50	4.31	.75	48	0.05	NS
	Higher degree	32	60.42	4.29				
2	HND/first degree	18	45.21	5.13	.56	48	0.05	NS
	Higher degree	32	40.83	4.93				
3	HND/first degree	18	47.82	4.23	.85	48	0.05	NS
	Higher degree	32	48.91	4.37				

Data in Table 5 show that the t value for the three clusters are greater than the significance level of 0.05 which means that the respondents' mean scores do not differ significantly as a result of qualification. The hypothesis is, therefore, upheld.

**Table 6:** t-test analysis of the effect of experience on respondents' mean ratings of school/teacher, student/parent and government/ supervisory agency related strategies for effective computer education in Nigerian secondary schools

Sum of Clusters	Experiences	N	Mean	SD	T	df	Sig level	Remarks
1	1-5 years	15	58.20	5.09	.18	48	.05	NS
	6 years and above	35	58.47	4.69				
2	1-5 years	15	42.73	4.91	.19	48	0.05	NS
	6 years and above	35	42.41	5.54				
3	1-5 years	15	49.40	4.10	.18	48	0.05	NS
	6 years and above	35	49.14	4.63				

Data in Table 6 show that the t value for the three clusters are greater than the significance level of 0.05 which means that the respondents' mean scores do not differ significantly as a result of their length of teaching experience. The hypothesis is, therefore, upheld.

### Discussion

In respect Research Question 1, the respondents recommended thirteen school/teacher related strategies such as provision of adequate number of computers, laboratory with adequate space, furniture and consumables as well as use of suitable teaching methods by teachers to ensure effective implementation of computer education program in the secondary schools. These are in line with the reports of Babalola (2006) on the efforts of Ondo State Government and the views of Akinola (2011) on the objectives of the federal government's ICT policy.

On Research Question 2, the respondents recommended the involvement and high level commitment of the students and their parents/guardians towards the study and provision of textbooks and computers for effective implementation of the computer education program in

the secondary schools. Research Question 3 focused on strategies to be adopted by the government/supervisory agencies towards implementation of computer education program at the secondary school level. The findings revealed that the respondents recommended involvement of computer science lecturers in content development, funding improvement, adequate maintenance and supply of locally authored textbooks, among others. These will reverse the report of Babalola (2006) on the implementation constraints witnessed by the Ondo State computer education program as well as facilitate the achievement of the objectives of the ICT policy as outlined by Akinola (2011). The fact that all the three hypotheses tested were upheld indicate that the respondents were of the same view and shows that they all consider the issues very relevant to effective implementation of computer education program in Nigerian secondary schools.

### Conclusion

Based on the findings of the study, it is concluded that effective implementation of computer education program at the secondary school level is very vital and that in order to achieve it, schools/teachers, students/parents and government/supervisory agencies all have specific but vital roles to play. Government, through its supervisory agencies and the school management should focus on building the capacity of the program, teachers should adopt suitable teaching methods while students and their parents/guardians should appreciate government's efforts with active involvement.

### Recommendations

In view of the findings and conclusion of the study, it is recommended that:

1. Roles of the school leadership, teachers, students, parents and even communities, industries, Churches, etc. in secondary school computer education should be clearly specified in order to ensure their collective and active participation towards effective implementation of the program.
2. Any government, state, federal or local, that truly desires to equip students and workers with ICT skills should ensure that computer education at the secondary schools level is effectively implemented through the recruitment of competent teachers, supply of relevant equipment and facilities as well as adequate supervision.
3. Computer science experts should be involved in developing the content of secondary school computer education curriculum to ensure adequate coverage and suitable emphasis.
4. Government and school management should ensure that adequate number of computers and relevant facilities plus internet connectivity, alternative power source, etc. are provided in schools for use by teachers and students.

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