

Assessment of Science Teachers' Level of Computer Literacy and Usage in Colleges of Education: Implication for Global Competitiveness

*Nneka Rita Nnorom¹ and Theresa Ugonwa Okafor²

Department of Science Education, Anambra State University, P.M.B. 02 Uli, Anambra State, Nigeria^{1,2}

*Corresponding Author E-mail: nnekannorom@yahoo.com

Abstract

The Study aimed at assessing the science teachers' level of computer literacy and usage in colleges of education and its implication for global competitiveness. A survey research design was adopted, and to guide the study, two research questions were formulated. The sample of the study comprised all the ninety-six science teachers; which consisted of Science, Technology and Mathematics (STM) teachers from the two government-owned Colleges of Education in Anambra State. The instrument for data collection was a Questionnaire on Computer Literacy and Usage (QCLU) designed by the authors. Face and content validity were ensured, while the reliability of the instrument was established using Pearson Moment Correlation and the reliability coefficient was 0.78. The data was collected and analyzed using mean and standard deviation. The results indicated low level of computer literacy and low level of computer usage in curriculum delivery among science teachers. Based on the findings, some recommendations were made and the implications of the study for Global Competitiveness were highlighted.

Key Words: Assessment, Science Teachers, Computer Literacy, Global Competitiveness

Introduction

The world is fast becoming a global village, as a result of developments in Information and Communication Technology (ICT). The key instrument in this globalization is the computer. Computer mediated communication is increasingly becoming the fact of everybody's life, particularly in the developed countries (Berenfeld, 1999). In these countries, Information and Communication Technology have changed how people live, work and play (Berenfeld, 1999). Education is not left out of this wave of change. Omolewa (2009) notes that most of the developed countries have exploited the potentials of IC to transform their education landscape at the tertiary, secondary and even primary school levels particularly the instructional process. Generally, ICT holds out the opportunity to revolutionize pedagogical methods, expand access to quality education and improve the management of education system (World Bank, 2001, p. 34).

Teachers in all nations constitute a major input in the accomplishment of educational goals and objectives. The National Policy on Education (2004) in Nigeria reiterates that no education system can rise above the quality of its teachers. Hence, teachers are indispensable within the teaching-learning process. Trained and effective teachers are also the principal assets of any educational system. Aminu (1987) aptly observes that teachers constitute not only a vital input to education but also a major drive in the production process and in the determination of the output system. Teachers touch and shape destinies. Ajayi (1997) states that teachers are the ones to make it possible for a child to be grounded in his mother tongue, acquire one or more Nigerian languages, plus English and one or more foreign languages. They are the ones to ensure a proper foundation of scientific education for the child.

In the light of this, it is impossible to think of education without the contributions of teachers. That teachers have a vital role to play is not in doubt, and this fact has been recognized by international development organization. In fact, teacher-training rates highly in the context of the Millennium Development Goals (MDGs), which has now acquired the status of a framework for measuring development (Omolewa, 2009).

However, teacher education in Nigeria is bedeviled with a lot of challenges in the modern day technology of imparting knowledge in the teaching-learning process. Information and Communication Technology (ICT) is relatively a very new

development in Nigerian educational system. ICT plays a significant role in teacher education to effectively surmount the enormous task of capacity and nation building. Adako and Aturamu (2006) opines that if Nigeria must catch up with other developing countries at a very reasonable pace, the nation builders (teachers) must keep abreast of all new development around the world more so that the world is now seen as a global village.

Computer is one of the electronic devices used in many sectors of the economy. The carriage horse of technological literacy is computer literacy. Computer literacy is the ability of the individual to have a general knowledge of what computer is all about, how it works, what it can do, what it cannot do and how it can be properly handled (Akudolu, 1997). The impact of computer in the education sector is of utmost importance. As an information technology device, computer is used for obtaining information from the web and other electronic devices, computation of results, production of textual materials and other literature. The Education Trust Fund (ETF) (2006) outlines that a computer with presentation software can provide a single tool for statistical charts and tables, images and even video clips which can be useful to both teachers, educators and their students. Therefore, for students to become comfortable and effective users of computer, their teachers should be confident in using the computer when and where appropriate.

The Educational Reforms Act of 2007 (FME, 2007) also highlights the need to: improve the quality of instruction in Nigeria schools, provide enriched learning environment, provide more access and quality to education as well as provide the students with knowledge and relevant skills that are necessary for the 21st century work place and this can be enabled using ICT. Studies have shown that ways of using ICT by teachers can result in differences in teaching and learning process which implies being effective (Atanda, Ayeni & Akintayo, 2010; Harun, 2001). On the other hand, some studies have also indicated that even though teachers eagerly accept technological novelties, very few use them effectively (Odogwu, 2007; Oke, Adenle, Esiobu & Alade, 2010). Furthermore, some studies also showed that the use of ICT at a personal level transcends other uses like instructional and managerial purposes (Holden, Ozok & Rada, 2008; Mumeu & Ushel, 2011).

In Nigeria, several efforts have been made by the government, as well as some professional bodies like Science Teachers Association of Nigeria (STAN), to create awareness and provide computer literacy to science teachers and science teacher educators. In many of the Nigerian tertiary institutions, almost every Science Technology & Mathematics (STM) departments of Faculties of Education and Colleges of Education have been provided with computer sets; both for office use and as an instructional materials for teaching and learning of science (Achufusi & Ezenduka (2008). The federal government in collaboration with Education Trust Fund (ETF) now TETFUND, have also been running and organizing computer workshops for teachers and teacher educators on different computer packages. All these efforts are geared towards improving science learning through the use of computer.

It is pertinent to note that despite all the efforts made to improve and popularize computer literacy of science teachers, the impact of computer education is not yet sufficiently felt in many science department of tertiary institutions (Achufusi & Ezenduka, 2008; Akudolu, 2001). According to World Bank (2002), low education and literacy levels, lack of awareness about the capabilities of the technology and absence of skills to develop and use ICT application represent significant obstacle to adoption even when the physical and institutional infrastructure is available. Iroha and Ekwueme (2003) also report that the current education programmes in the university do not provide enough computer training for their teachers, to be able to use computer confidently in their lessons.

However, the usage of ICT in facilitating teacher education is still a myriad in Nigeria as many of the teachers are not ICT literate and those under training in Colleges of Education, Institutes of Education and Faculties of Education in Nigerian universities are not fully exposed to the use of ICT in the acquisition of skills and practical teaching (Oyewole, 2011). Hence, determining the readiness of science teachers therefore involves a needed assessment of science teachers' level of computer literacy and status of computer usage in Colleges of Education in Anambra State.

The main purpose of the study is to assess the science teachers' level of computer literacy and usage in colleges of education in Anambra State.

Materials and Methods

The study was a survey research. The population of the study comprised all 96 science teachers which consisted of both Technology and Mathematics teachers in the government owned colleges of education in Anambra State. All the 96 STM Education lecturers were used for the study since the population was not too large.

The instrument for data collection was a questionnaire titled ‘_Questionnaire on Computer Literacy and Usability (QCLU)’ which was structured by the authors. The structured four-point scale of Always (4), Sometimes (3), Rarely (2) and Never (1) was adopted as the response mode. Face and content validity was established for the instrument. The reliability of the instrument was also established through the Pearson Product Moment Correlation and the reliability coefficient was 0.78.

The authors administered the questionnaire to all the 96 lecturers and the questionnaire was collected on the spot which resulted in high rate of return. The Mean (x) and Standard Deviation (SD) were used for data analysis. The acceptable mean score was 2.5 and above. Such a mean score would indicate high level of computer literacy and usage while a mean of less than 2.5 would indicate low level of computer literacy and usage.

Results

The study sought to find out the extent to which science teachers had acquired computer literacy. The findings were as shown in Table 1 below.

Table 1. Mean and Standard Deviation Scores of Science Teachers on Level of Computer Literacy

S/N	Level of Computer Literacy	$\bar{x}$	SD
1	I have learnt the parts of computer and can manipulate computer without assistance.	2.70	1.25
2	I have attended ICT related workshops, seminar conference in the last 5 years.	1.70	1.00
3	I attend computer workshops if sponsored	2.00	1.08
4	Refresher courses are given to teachers in my school on computer application and word only	2.06	1.88
5	My knowledge have gone beyond Microsoft word and excel.	2.02	1.08
6	I can learn many packages on my own without assistance.	1.30	0.07
7	I know how to install some computer accessories like CD, CD Roms and Scanners	2.00	1.31

From Table 1 result, it is clear that only item 1 has mean score of 2.7 which indicate that many science teachers can handle parts and manipulate computer without assistance. But item 2 to 7 has mean score below average, that is teachers are not sponsored to workshops neither do they know how to install computer packages and learning many packages on their own. Average mean score shows that the level of computer literacy is still low.

The study also sought to ascertain the extent to which the Science Teachers utilized computer in preparation and delivery of lessons. The results were as shown in Table 2.

Table 2. Mean and Standard Deviation Score of Science Teachers on the Use of Computer

S/N	Use of Computer	$\bar{x}$	SD
8	I make use of computer in teaching some topics in my subject area	1.71	0.50
9	I can use computer in lesson preparation.	1.90	1.00
10	I can use computer in laboratory practicals.	1.57	0.88
11	I do use computer for research.	2.20	1.71
12	I can use computer to compute project results.	1.80	0.81
13	I can store relevant information in computer	2.30	1.41

The results in Table 2 show that all the items, 8-13, have the mean scores below 2.5, which means that the level of computer usage in curriculum delivery by the STM teachers is very low.

Discussion

From the findings of the study, it is clear that the level of computer literacy of Science Teachers is low. This result is in agreement with what Iroha and Ekwueme (2003) and Oyewole (2011) aver in their studies, that only a few science teachers are computer literate. The science teachers low literacy level may not be unconnected with the low ICT content level of their tertiary education curriculum.

In addition, from Table 2, it is shown that there is a low level of computer usage in curriculum delivery by science teachers. This is also in line with what Achufusi and Ezenduka (2008) and Oyewole (2011) recorded; that there is low level of computer usage in acquisition of skills and practical teaching among science teachers in tertiary institutions.

The implication of these findings is continued poor performance and lack of transfer of knowledge and necessary skills to students upon graduation. This is dangerous for sustainable development and global challenges and can lead to shortage of resources especially human resources.

Another implication is that effective decisions with regards to social and economic matters will be logically affected; hence the nation can no longer compete in global economy.

Recommendations

The following recommendations were made:

- Government should try to sponsor teachers to workshops and conferences especially computer workshops.
- Government and non government agencies should provide computer wares to schools as to enable teachers gain easy access to computer when need be.
- Teachers training programme should be reviewed in line with Science and Technology concepts of the curriculum.
- Adequate and proper monitoring and evaluation should be employed to ensure that computer sets supplied to institutions are used for the purpose for which they were made.
- Each STM Education Department should try to organize training of the trainers workshops periodically so as to help professionals to grow and up date their knowledge and proper usage of computer.
- There is urgent need to review our educational policy strategies and techniques as well as the teaching methodology of developing our teachers.
- ICT as a course should be made compulsory for lecturers and students of teacher education programme as these students will graduate to teach our school children in schools.

- Supportive infrastructures such as electricity and telecommunication services should be improved and adequately enhanced for effective services.
- ICT facilities should be made available at affordable price to be procured by teachers at government subsidized rates.
- ICT centers should be established at all strategies and governmental levels to provide services to people especially the teachers. While there are clarion calls on the government to get connected to the internet, non governmental organizations should be encouraged to assist in connecting the nation to the internet (Adako & Aturamu, 2006).

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