

## BENEFITS AND CHALLENGES OF INFORMATION AND COMMUNICATION TECHNOLOGY IN THE TEACHING OF SCIENCE IN SECONDARY SCHOOLS IN ONDO STATE

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### Abstract

*The study examined the benefits and challenges of using Information and Communication Technology (ICT) in the teaching of science subjects in secondary schools in Ondo State. The research design was descriptive of the survey type. Two hundred and ten science teachers randomly selected from secondary schools in the 18 local government areas of Ondo State were used for the study. A 15 -Item Teachers' questionnaire on Information and Communication Technology (TQICT) was used. Experts in Tests and measurements and science education ensured the face and content validity of the instrument. A test-retest method of reliability was used to ensure the reliability of the instrument and a reliability co-efficient of 0.81 was obtained for TQICT using Pearsons Product Moment Correlation statistics. The data collected were analysed using frequency Counts and percentage. The result indicated that ICT is of immense benefit when applied into the teaching of science subjects, and that it makes teaching easier and more interesting. However there are some challenges to the effective application ICT in teaching of science. These include weak infrastructure, low funding and, high cost of purchasing computer systems. Based on the findings, it was recommended that the government should provide ICT facilities in the public secondary schools and also provide the basic amenities needed for the smooth application of ICT in the teaching of science subjects. It was also recommended that the government should increase the financial allocation to schools to enhance the school purchase the needed ICT facilities.*

**Keywords:** Information and Communication, Technology, Science teaching, Funding

### Introduction

Education is regarded as a tool for achieving moral intellectual, cultural and social development of the society. The importance of education to the individual and society cannot be over emphasised. It is in recognition of the role of education in promoting technological re-awakening of the society that individuals and the government have been investing financial resources in education sector.

The enrolment explosion in the secondary schools in recent times requires the use of Information and Communication Technology (ICT) in the teaching learning process. In addition, its adoption will promote effective interaction between students and teachers and will also enhance effective teaching and learning (Holley 2002). Issues like good course organisation, effective classroom management, content creation, self-assessment and self-study besides, process and research activities will be enhanced by the use of ICT based technology.

UNESCO (2002) observed that, in the more industrialised countries, a lot of researches have been carried out for the purpose of advancing knowledge on ICT to be used in education. Perhaps, this is why many countries voted a lot of resources on the purchase of ICT infrastructure.

Ajayi (2008) noted that teaching and learning have advanced beyond the teacher standing in front of a group of pupils and disseminating information to them without the students' active participation. The author emphasised that with the aid of ICT, teachers can take students beyond traditional limits, ensure their active participation in teaching and learning process and create conducive environment to experiment and explore. Fry (2001) reposed that if countries are to compete in a global education market, they must embrace the technological advancements and use them as a strategic tool capable of transforming educational and business practices. This new development is a strong indication that the era of teachers without ICT skills are gone. Any classroom teacher with adequate and professional skills in ICT utilization will definitely make his students perform better in classroom learning.

The revolution implies that information and communication technology is placing different demands on education in particular. Darling(2002) further advocated that the use of ICT is a valuable strategic tool, that when used properly could modernize secondary education.

A critical look at the secondary schools in Nigeria has shown that many teachers in the system still rely much on the traditional "chalk and talk" method of teaching rather than embracing the use of ICT. According to Okebukola (1997), computer is

not part of classroom technology used in over 90% of public schools in Nigeria and this accounts for why the chalkboard and textbooks continue to dominate classroom activities. This is an indication that the students are still lagging behind in trend of changes in the world. This presupposes that there is the tendency for the teachers and students to be denied the opportunities which ICT offers in the teaching-learning activities.

Generally, ICT hold out the opportunity to revolutionize pedagogical methods and expand access to quality education system (World Bank, 2002). This is even more important for science, technology and mathematics education. Unfortunately, in Nigerian classrooms, traditional patterns of science education have remained largely unchanged (Adamu, 1992).

In some secondary schools, science teaching is essentially textbook-centred due to lack of adequate laboratory equipments. Obviously, this pedagogical pattern does not prepare students for the information age and globalization. In other words, the system is not equipping students to live effectively in the modern age of science and technology as stipulated in the National policy on Education (Federal Republic of Nigeria, 2004).

There is need to improve the academic training for science education in Nigerian secondary schools; and ICT has been identified worldwide as a way out for this. There is need to brace up to the new challenges and system of education through the development and use of ICT in Nigerian schools.

According to World Bank (2008), low education and literacy levels, lack of awareness about the capabilities to develop and use ICT represent significant obstacles to the adoption of ICT, even when the physical and instrumental infrastructure are available. Observation has shown that there are no functional internet facilities in most of the secondary schools in Ondo State. Teachers, as well as students appear not to be knowledgeable in the use of ICT because there seems not to be any official training for both the teachers and the students on ICT utilization for teaching and learning in the schools.

Furthermore, inadequate basic infrastructure, lack of connectivity, lack of hardware and software, high internet fees, lack of technical support, fund for operations and maintenance and even lack of space to install computers could pose serious factors to the use of ICT in the teaching of science subjects. Aduwa-Ogiegbaen & Iyamu (2005) have identified major factors militating against the use of ICT in secondary schools as lack of hardware and software, weak infrastructure, lack of human skills and knowledge in ICT and lack of software that is appropriate and culturally suitable in Nigeria. The authors posited that secondary schools in Nigeria

are not given adequate funds to provide furniture, relevant textbooks and adequate classrooms let alone being given adequate fund for high technology equipment. It has also been observed that most secondary schools in Ondo State lack literate teachers in ICT; and irregular power supply appears to the thrive in the schools. Moreover, it seems the schools could not purchase computers for use because of inadequate fund.

It is against this back drop that this present study seeks to examine the benefits and challenges of using ICT in the teaching of science subjects in secondary schools in Ondo State.

### **Purpose of the Study**

The purpose of this study was to investigate the benefits of using ICT in the teaching of science in secondary schools, as well as the challenges militating against the use of ICT in teaching of science in secondary schools. The study made some recommendations based on the findings.

### **Research Questions**

Two research questions were raised to pilot the study:

1. What are the benefits of using ICT in the teaching of science in secondary schools?
2. What are the problems faced by the science teachers in the application of ICT in the teaching of science?

### **Methodology**

A descriptive research design of the survey type was adopted for this study. The population consisted of all the teachers of secondary schools in Ondo State. The sample for the study was made up of 210 science teachers selected using simple random sampling technique. One research instrument tagged "Teachers Questionnaire on Information and Communication Technology (TQICT)" was used for the study. The instrument had two sections. Section A of the instrument was the bio-data of the respondents. Section B contained 15 items designed to elicit information on the benefits and challenges of ICT in the teaching of science. This was structured on 4 -point linkert scale of strongly agree (4), Agree (3), Disagree (2) and Strongly Disagree (1).

The instrument was validated by research experts in Tests and Measurement and science education in Ekiti State University, Ado unit. Test re-test method of reliability was adopted for the instrument and Pearson Product moment correlation statistics was used to determine the reliability co-efficient which stood at 0.81. The data collected for the study were analysed using frequency counts and percentage scores.

### **Results**

**Research question 1:** What are the benefits of ICT in the teaching of science in secondary schools?

**Table 1:** Frequency and percentage distribution of the benefits of ICT in the teaching of science

S/N	Items	Agreed		Disagreed	
		F	%	F	%
1	ICT helps in making teaching more interesting	137	65	73	35
2	ICT enhances quality of work of teachers	165	78.6	45	21.4
3	It makes the science teachers to be up to date in their various disciplines	166	79	44	21.0
4	ICT helps teachers reach out to colleagues in other parts of the country	162	76.1	48	22.9
5	Using ICT makes it easy to control large class	165	78.6	45	21.4

The results in table 1 indicated that 166 (79%) of the respondents indicated that ICT makes the science teachers to be up-to-date in their various disciplines while 165 (78.6%) agreed that ICT enhances qualities of work of teachers as well as makes it easy to control large class. One hundred and sixty-two (76.1%) of the respondents indicated that ICT helps teachers reach out to colleagues in other parts of the country,

while 137 (65%) agreed that ICT helps in making teaching more interesting.

**Research question 2:** What are the problems faced by the science teachers in the application of ICT to the teaching of science?

**Table 2:** Frequency and Percentage distribution on the challenges faced by science teachers

S/N	Items	Agreed		Disagreed	
		f	%	F	%
1	Lack of computer literate teachers in the schools	150	71.4	60	28.6
2	Lack of computers in the secondary schools	161	76.7	49	23.3
3	Irregular power supply	169	80.4	41	19.6
4	Fear of exposing too much information on the institution to public	116	55.6	94	44.8
5	Cost of purchasing computers in the schools is high	150	71.4	60	28.6
6	Inadequate facilities to support full application of the information and communication technology	145	69.1	65	30.9
7	The non-inclusion of ICT programmes in teachers training curriculum	143	68.1	67	31.9
8	Teachers are very reluctant to adapt to the use of ICT in teaching process	99	47.1	111	52.9
9	Lack of fund hinders schools in embracing ICT	141	67.1	69	32.9
10	Insufficient knowledge of how to use ICT equipment	115	54.8	95	45.2

Results in table 2 showed that of the respondents one hundred and sixty-nine (80.4%) agreed that irregular power supply hinders the use of ICT in schools, while one hundred and sixty-one (76.7%) are of the-view that there is lack of computers. One hundred and fifty (71.4%) of the respondents indicated that there is lack of computer literate teachers in schools as well as cost of purchasing computers in the school is high.

Further, one hundred and forty-five (65.1%) believed that there is inadequate facilities to support full application if ICT in schools and one hundred and forty-three (68.1%) indicated that the non-inclusion of ICT programmes in teachers training curriculum affects its adoption in school. one hundred and forty-one (67,1%) of the respondents claimed that lack of fund hinders schools in embracing ICT. On the issue of fear of

exposing too much information on the institution, one hundred and sixteen (55.8%) indicated that there is insufficient knowledge of how to use ICT equipment and ninety-nine (47.1%) indicated that teachers are very reluctant to adopt the use of ICT in teaching process.

### Discussion

The results have shown that almost all the science teachers believed that ICT is of immense benefit when applied into the teaching and learning of science subjects. The perceived benefits as revealed in the study include enhancing the quality of work of the teachers, making teaching more interesting and making teachers to be up-to-date in their various disciplines. This is in concord with the findings of Mohammed (2006) and Nwite (2007) who believed that ICT is of immense benefit to the

teachers and make teaching less cumbersome and interesting.

Moreover, the study showed that irregular power supply in schools, lack of computer literate teachers, high cost of purchasing computers, inadequate facilities to support the utilization of ICT and the non-inclusion of ICT programmes in the teacher training programmes constitute the major problems facing the application of ICT in secondary schools. This finding is in agreement with Akubuilu (2007) who asserted that funding is a major constraint to making Nigerian schools ICT compliant. The finding is also in agreement with Uche (2007) who asserted that low level of budgetary allocation and poverty among Nigerians to procure ICT equipments for their private use. The finding also corroborates the findings of Aduwa-Ogiegbaen & Iyamu (2005) who found out that the government is not funding the provision of ICT facilities up to expectation in the public secondary schools.

### Conclusion and Recommendations

Based on the findings of this study, it could be concluded that effective application of ICT in the classroom by the science teachers makes science lesson interesting, easy to teach and leads to effective teaching and learning thereby, improving the performances of the science students. However, factors such as low funding, weak infrastructures, lack of basic infrastructures, lack of skills, low level of internet connectivity, low budgetary allocation, non-inclusion of ICT in teachers' training programme, lack of computer are some of the factors affecting the application of ICT by science teachers in the teaching of science.

Based on this, it was recommended that government should provide adequate ICT facilities to the secondary schools. Government should also ensure that there is ICT skills development and this should be integrated into the teacher training programme. The problems inherent in the usage of ICT could be surmounted if there is adequate power supply in the schools. Government should also increase the financial allocations to schools to enable the schools provide necessary ICT facilities for usage in the schools.

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