



Problems and Prospects of ICT Integration in Science Education

Muktar Umar

Department of Physics Federal College of Education (Special) Oyo

Author's Email: umarmuktar311@gmail.com

Abstract

This study investigated the problems and prospect of ICT integration in science education among secondary schools, the study adopted a descriptive survey design, two research questions and two hypotheses guided the study. The population of the study comprises all teachers in both public and private secondary schools in Oyo town. Simple random sampling techniques was used to select 372 teachers (Public, N=174, Private, N=198). A questionnaire with 20 items was used as the instrument for data collection. Findings of the study revealed that: the major prospects of ICT integration in science education among secondary schools is, it promote active and engaging lesson for students and the problems that hinders ICT integration in schools includes lack of interest by teachers in teaching when they use ICT tools and insufficient technical support for teachers while using ICT facilities. it was recommended among others that School managements should always encourage teachers to use ICT facilities in teaching of science concept.

Keywords: Problems and Prospects, ICT Integration, Science Education,

Introduction

Information and Communication Technology (ICT) is defined by UNESCO as forms of technology used for creating, displaying, storing, manipulating, and exchanging information (Meleisea, 2007). ICTs, in general, consist of computers, hardware and software, networks, learning management systems, e-mail, internet, telephone, television, radio and so forth. The proliferation of personal computers and the internet resulted in significant changes in the implementation of ICTs in education. ICTs included not only learning resources but also tools to facilitate interaction and collaboration (Caladine, 2008; Taylor, 1995). Learning management systems such as blackboard became widespread. Social networking sites (e.g. FaceBook, Flicker & Yahoo3600) permitted people to create profiles and upload information including text, photos, pictures, audio files and video files. The users could also add, edit and remove content.

The applications of ICTs are categorized into three groups: learning resources, instructional organization of learning and communication (Collis & Moonen, 2001). The applications of ICTs in learning resources include educational software, distributed resources via the internet and video resources. Educational software is not only learning resources for students but also tools for instructional organization of learning. Rich learning resources distributed via the internet and video resources are also considered

important. "ICT can promote students' intellectual abilities through higher order thinking, problem solving, improved communication skills, deep understanding of the learning tool and the concepts to be taught. ICT can promote a supportive, interactive teaching and learning environment, create broader learning communities, and provide learning tools for students (Aladejana, 2007).

ICT integration in education generally means technology-based teaching and learning process that closely relates to the utilization of learning technologies in schools. Due to the fact that students are familiar with technology and they will learn better within technology-based environment (Simin & Wan Athirah, 2015), the issue of ICT integration in schools, specifically in the classroom is vital. This is because, the use of technology in education contributes a lot in the pedagogical aspects in which the application of ICT will lead to effective learning with the help and supports from ICT elements and components (Jamieson-Procter et al., 2013). ICT provides the help and complementary supports for both teachers and students where it involves effective learning with the help of the computers to serve the purpose of learning aids (Jorge, 2003).

Due to ICT's importance in society as well as in the future of education, identifying the possible challe



nges to integrating these technologies in schools would be an important step in improving the quality of teaching and learning.

Balanskat, Blamire, and Kefala (2006) argue that although teachers appear to acknowledge the value of ICT in schools, they continue encountering obstacles during the processes of adopting these technologies into their teaching and learning. However, this research investigates the prospect and challenges of ICT integration in science education.

Statement of the Problem

Scholars and researchers have observed that teaching and learning in science education required skills that can arouse students’ interest and facilitate the teaching activities for teachers. However, the present interest to incorporate the use of computers in many workplaces in the world necessitate the need to encourage students on how to use it in many areas of learning including science education.

Base on the problems of the study, the study established the prospect and challenges of ICT integration in science education industry, however the specific objectives are to:

- (i) Determine the prospect of ICT integration in science education in public and private secondary schools
- (ii) Determine the challenges of ICT integration in science education in public and private secondary schools

The following research questions guided the study based on the purpose of the study

- (i) What are the prospects of ICT integration in science education in public and private secondary schools?
- (ii) What are the problems of ICT integration in science education in public and private secondary schools?

Also, the following null hypotheses were tested at 0.05 level of significance

H₀₁-There is no significant difference in the prospect of ICT integration in science education among public and private secondary schools

H₀₂-There is no significant difference in the mean ratings of the problems of ICT integration in Science Education in public and private secondary schools

Method

This study adopted descriptive survey design, the population of the study comprises of teachers in both public and private secondary schools in Oyo town. Simple random sampling techniques was used to select 372 teachers comprises of (Public, N=174 and Private, N=198). A questionnaire with 20 items was used as the instrument in this study. The items of the questionnaire were graded based on 4-Likert scale type ranged from 4=Strongly Agree (SA), 3= Agreed (A), 2= Disagree (D) and 1= Strongly Disagree (SD). This is in-order to have a criterion mean value of 2.50, where items with the mean value above 2.5 is considered accepted, while the one with value below 2.5 is considered as rejected. The face validity of the instrument was determined by experts in the relevant areas. The internal consistency method was used to determine the reliability of the items using Cronbach Alpa statistical techniques. 40 teachers that were parts of the study population but not part of the sample was used for this purpose and a reliability coefficient of 0.86 was computed. The descriptive statistics of mean and standard deviation were used to answer the research questions while z-test statistics was used to test the null hypotheses at 0.05 level of significance.

Results

Research Question One

Table 1: Weighted mean and standard deviation of Prospect of ICT Integration in Science Education Industry

SN	ITEMS	Public Schools		Private Schools	
		\bar{x}	Sd	\bar{x}	Sd
1	The use of ICT encourages students to communicate more with their classmates	2.81	1.03	2.54	0.67
2	The use of ICT helps students to find related knowledge and information for learning.	2.51	1.04	2.86	1.02
3	ICT allows students’ to be more creative and imaginative.	2.68	0.64	3.01	0.95



4	Students learn more effectively with the use of ICT.	2.37	1.02	2.43	1.10
5	The use of ICT helps to broaden students' knowledge paradigm.	2.70	0.94	2.56	1.00
6	The use of ICT helps to improve students' ability specifically in reading and writing.	3.20	1.04	2.96	1.03
7	Students are more behaved and under control with the use of ICT.	2.46	1.03	2.86	1.04
8	The use of ICT enables students to express their ideas and thoughts better.	2.36	0.94	2.54	1.01
9	The use of ICT increases students' confidence to participate actively in the class.	2.37	1.06	2.73	0.98
10	The use of ICT promotes active and engaging lesson for students' best learning experience.	2.76	1.04	2.67	1.09
Total Mean and standard deviation		26.22	9.78	27.16	9.89

Table 1 shows that mean value of items 1, 2, 3, 6 and 10 are above the criterion mean of 2.5 which shows that, the major prospects of ICT integration in the science education industry includes: improve students' ability in reading and writing, encourages students to communicate with their class mate, promote active and engaging lesson for students' best learning experience, allows students' to be more creative and imaginative

and helps students to find related knowledge and information for learning.

Research Question two

Table 2: Weighted mean and standard deviation of challenges of ICT Integration in Science Education Industry

S/N	ITEMS	Public schools		Private schools	
		\bar{x}	Sd	\bar{x}	Sd
1	Students understand sciences concept when they are taught using ICT tools	3.20	0.92	2.56	1.04
2	Students concentrate more on their Learning using ICT tools	2.73	1.20	2.54	1.10
3	Teachers Lack interest in teaching when they use ICT tools	2.43	1.00	2.32	1.02
4	It is too difficult to integrate ICT Into science curriculum	2.76	0.87	2.56	1.06
5	There is insufficient technical support for teachers while using ICT facilities	3.20	0.89	2.92	0.95
6	Our school have available computers for teaching	2.32	1.13	2.68	1.03
7	Electricity is always available when we are in computer class	2.25	0.78	2.03	1.11
8	Most teachers have good knowledge of using ICT facilities in my school	2.16	1.20	2.32	0.96
9	The classroom management is out of control if ICT is used in teaching.	2.49	0.79	2.56	1.01



10	Students' makes no effort for their lesson if ICT is used in teaching.	2.32	1.10	2.42	1.03
Total Mean and standard deviation		25.86	9.88	24.91	10.31

In table 2, analysis shows that in public schools, items 1,2,4 and 5 have mean value above the criterion mean of 2.50 which means some of the challenges of ICT integration in science education includes: lack of interest by teachers in teaching when they use ICT tools, Students' makes no effort for their lesson if ICT is used in teaching, difficulty in integrating ICT in the

curriculum and insufficient technical support for teachers while using ICT facilities.

Hypotheses

Table 3: z-test of significant difference in the prospect of ICT integration in science education among public and private secondary school

School Category	N	\bar{X}	SD	df	z-value	P-value	Remark
Public	174	26.22	9.78	370	0.92	0.36	Not statistically significant
Private	198	27.16	9.89				

In table 3, the z-value of 0.92 which has a p-value of $0.36 > 0.05$ indicate that the difference in the prospect of ICT integration is not statistically significant which implies that the null hypothesis which states that there is no significant difference in the prospect of ICT

integration in science education among public and private secondary schools is retained

Table 4: z-test of significant influence of ICT integration in science education among public and private secondary schoo

School Category	N	\bar{X}	SD	df	z-value	P-value	Remark
Public	174	25.86	9.88	370	0.906	0.36	Not statistically significant
Private	198	24.91	10.31				

Table 4 revealed that the z-value of 0.906 and the p-value $0.36 > 0.05$ indicate that the influence of ICT integration in science education among public and private secondary schools is not statistically significant which shows that the null hypothesis which states that there is no significant influence of ICT integration in science education among public and private secondary schools is retained.

most of teachers agree that ICT helps to improve classroom management as students are well-behaved and more focused. Moreover, this study proved that students learn more effectively. This may be due to the fact that ICT and science education are interrelated which provides opportunity for teachers to use in the teaching and learning process.

Findings also indicate that some of the challenges of ICT integration in science education includes: lack of interest by teachers in teaching when they use ICT tools, students' makes no effort for their lesson if ICT is used in teaching, difficulty in integrating ICT in the curriculum and insufficient technical support for teachers while using ICT facilities. This result agrees with Türel and Johnson's study (2012) which reveals that technical problems become a major barrier for teachers while using ICT in schools. These problems include low connectivity, virus attack and printer not functioning.

Discussion

The findings show the prospects of ICT integration in the science education industry includes: improve students' ability in reading and writing, encourages students to communicate with their class mate, promote active and engaging lesson for students' best learning experience, allows students' to be more creative and imaginative and helps students to find related knowledge and information for learning. This is in agreement with the findings of Finger & Trinidad, 2002 which shows that use of ICT in teaching enhances the learning process and maximizes the students' abilities in active learning. Also, research findings by Macho (2005) proved that using ICT in education would enhance students' learning. However,

Conclusion

Base on the findings of this study the major prospects of ICT integration in science education among secondary schools are, improve students' ability in



reading and writing, encourages students to communicate with their class mate, promote active and engaging lesson for students’ and the problems that hinders ICT integration in schools are lack of interest by teachers in teaching when they use ICT tools, students’ makes no effort for their lesson if ICT is used in teaching, difficulty in integrating ICT in the curriculum and insufficient technical support for teachers while using ICT facilities.

Recommendations

In view of the findings of this study, the following recommendations were made:

- (i) Schools management should always encourage teachers to use ICT facilities in teaching of science concept
- (ii) Adequate technical supports should be provided in schools to equip teachers with the necessary skills in using ICT facilities.
- (iii) Teachers should encourage students in the classroom while using ICT in the schools

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