

Effectiveness of ICT on Teachers' Science teaching to Secondary Schools in Irepodun Local Government Area, Kwara State, Nigeria

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Abstract: *This study examined the effectiveness of ICT on teachers' science teaching to secondary schools in Irepodun Local Government Area, Kwara State. A questionnaire was used to elicit information from respondents. Frequency counts and t-test statistics were used to analyse the data. Findings of this study revealed that the effect of ICT to science teaching by science teachers was significant. It also revealed that there were no significant differences on the effect of using ICT to science teaching by science teachers towards teaching based on the gender and experience but significant on the school type. Based on the findings, the following recommendations were made; that; ICT Education should be compulsory in all secondary schools in Irepodun LGA Kwara State in order to improve more in their science teaching, the Teacher Registration Council of Nigeria should provide ICT for both the male and female teachers, there should be opportunity to be ICT literate through in-service education for both the experience and less experience science teachers, Government should ensure provision of ICT facilities in the public secondary schools and encourage science teachers to go to seminars and workshops so that they can improve in their science teaching.*

Key Word: Effectiveness, ICT, teachers, science teaching, secondary schools

Introduction

Information communication Technology (ICT) is an indispensable part of the contemporary world. The field of Education has certainly been affected by the penetrating influence of information and communication technology worldwide in particular developed countries. Moreover, ICT has made an impact on the quality and quantity of teaching, learning and the application of ICT in Education has revolutionized teaching and learning in schools. Therefore it is essential to implement ICT in teaching science subjects in secondary schools due to the complex and the abstract nature of some of the subjects (Aina, 2013). The place of ICT in teaching science education in schools cannot be over emphasized considering its promises in effective teaching and learning. This project examines the effectiveness of ICT on

teaching and learning science subject in secondary schools. ICT plays a major role in human activities in everyday living in order to cope and adapt to the demand of the demand of the environment. If the vision of science education is to bring socio-economic development, the role of ICT in science education cannot be over-emphasized (Hannaatu, 2013).

Omorogbe and Ewansiha (2013) said that there is needs qualitative science education in our schools especially in senior secondary schools because of the advancement in science and technology for Nigeria to realize accelerated development in the 21st century, Over the last two decades, there have been repeated calls for reforms and innovations aimed at improving science education in Nigeria. This suggests that there are issues in science education that needs to be improved upon. Science is an organized body of knowledge in form of concepts, laws, theories and generalization.

Education is the total process of human learning by which knowledge is impacted, faculties trained and skills developed. Science education is a field of study concerned with producing a scientifically literate society. It acquaints students with certain basic knowledge, skills and attitudes needed for future work in science and science related fields. There are several issues in science education in Nigeria that needs to be addressed (Omoifo, 2012).

Science is defined as a study of nature and natural phenomena in order to discover their principle and laws. Science has three interrelated aspects: content, process and attitude. Content can be separated into physical, life and earth science. Process involves the fifteen inquiring skills proposed by the American Association for the Advancement of Science (AAAS) which include observing, classifying, experimenting, measuring, inferring, organizing data etc. Attitude concerns openness and objectivities (Urevbu, 2001).

Science is a field of study which probes into the nature of living and non-living things and uses the information to transform, synthesize, analyze, interpret and solve day to day problems in the society. Science has contributed in no small measure in making life worthwhile, interesting, conducive and suitable for mankind. Through the application of science, man ensures the longevity of his existence, science in general affects the society as a result of the interaction that exists between science and technology (Akinkunmi, 2007). Science subjects such as chemistry, physics and biology as basis science subjects still suffer set back in the teaching and learning process. The incorporation of ICT in the study of science subjects is not gathering impressive momentum when compared with other subjects

such as government, economics, mathematics, and English (Akinkoye, 2007).

The rate at which students in our senior secondary schools performance dropped in some of science subjects in favour of other subjects with the type of teachers handling the subjects is a matter that needs urgent attention. When questions are asked from the students on why they did not show interest in offering some science subjects unlike others discipline, the general answer is that the subject is too difficult to comprehend even when some of the students have not attended lesson class once, the wrong notion has been inculcated into them by their seniors they believe without bothering to verify whether it is true or not (Adelokun and Eyengho, 2010) .

Teaching is deliberate intervention that involves the planning and implementation of instructional activities and experience to meeting intended learner outcomes according to a teaching plan. It is also perceived as stimulating, directing, guiding the learner and evaluating the learning outcomes of teaching (Jasper, 2013). Teachers' motivation to use ICT in the classroom is at present adversely influenced by a number of constraints including: lack of time to gain confidence and experience with Technology, limited access to reliable resources, a science curriculum overloaded with content assessment that requires no use of the technology and lack of subject specific guidance for ICT to support learning. This technology can be employed in diverse ways to support different curriculum goals and pedagogy.

Such constraints have often stifled the science teachers the use of ICT in ways, which effectively exploit its interactivity. Consequently, well integrated and effective classroom use of ICT is currently rare. The use of ICT in school science laboratory is driven by rather than transformative of the prescribed curriculum and pedagogy. However, the science teachers tend to use ICT largely to support, enhance and complement existing classroom practice rather than reshaping subject contents, goals and pedagogy. Generally, teachers' motivation and commitment are high and practice is gradually changing. Training teachers in the using ICT in the classroom appears to have had more success in science than in other subjects (Osborne and Hennessey, 2013).

Shedd (2004) examines the incorporating technology in the classroom and the result suggested that anyone preparing to be become teachers must incorporate technology into their class. To become great in Nigeria must need to change her method of teaching and learning of science education

from traditional way of talk and chalk method and reading by carrying books around. The world is in the era of Information and Communication

Technology (ICT) where information is not restricted by time, space and channel (Ajayi and Ojo, 2010). This study observed from previous reviewed that for science teachers to be effectiveness in teaching they have to make use of ICT. In order to determine whether they make use of the ICT in teaching, the moderating variables such as the gender, years of teaching experience and school type were determined. This study, therefore, determined the effectiveness of ICT on teachers to science teaching in secondary schools in Irepodun Local Government Area, Kwara State, Nigeria. Specifically, this study examined the effect at which science teachers uses the ICT to science teaching; the effect of gender of the science teachers towards the use of ICT to science teaching; the effect of years of teaching experience of the science teachers towards the use of ICT to science teaching and the effect of school type of the science teachers towards the use of ICT to science teaching. The study answered four research questions which are what is the effect at which science teachers uses the ICT in science teaching? Does the gender of the science teachers have effect towards the use of ICT to science teaching? Is there effect on the years of teaching experience of the science teachers towards the use of ICT in science teaching? Does the school type have effect on science teachers towards the use of ICT in science teaching? Further more, the study had the following hypotheses (i) There is no significant difference in the effect of gender of the science teachers towards the use of ICT in science teaching. (ii) There is no significant difference on the years of teaching experience of the science teachers towards the use of ICT in science teaching. (iii) There is no significant difference in the effect of school type on science teachers towards the use of ICT in science teaching.

Scope of the study

This study has been carried out in Irepodun Local Government Area, Kwara State, Nigeria which includes science teachers in all Secondary Schools located in Irepodun, Kwara State, Nigeria. The studies were carried out among science teachers in Secondary Schools. Teachers of Biology, Chemistry, Physics, Agricultural science and Mathematics were involved in the study. Variables that were tested in the study were: gender, years of teaching experience and school type and how effectiveness is ICT in Science teaching.

A minimum of eighty (120) science teachers were involved in the study from 24 secondary school purposive sampled from both public and private s

schools. A researcher-designed teachers' questionnaire was used as the instrument for the collection of data from science teachers in the sampled schools.

Methodology

The study type for this research was investigative survey method to explore the effectiveness of ICT on science teachers in science teaching to secondary schools in Irepodun Local Government Area, Kwara State. Target population was Science teachers from selected senior secondary schools in Irepodun LGA. The study was carried out in twenty-four (24) secondary schools in Irepodun LGA. One hundred and twenty (120) Science teachers both male and female were randomly selected for the study. Questionnaire was tool for data collection. Effectiveness of ICT on science teachers' science teachers was also determined in this study with respect to Science teaching. Data was analysed using frequency count, simple percentage and t-test.

Data Analysis and Results

Table 1: Number and Percentages of Teachers' Responses

Variable	Number of teachers	Total	Percentage distribution
Male	78		65
Female	42	120	35
Experience	64		53
Less -Experience	56	120	47
Public	62		52
Private	58	120	48

Table 1 shows the distribution of one hundred and twenty (120) respondents involved in the study. One hundred and twenty (120) respondents were distributed into three variables i.e. gender, experience and school type. There were 78 Male and 42 Female respondents, under experience there were 64 experienced and 56 less-experienced. Under school type, there were 62 public and 58 private schools Science teachers involved.

Research Question 1

What is the effect at which science teachers uses the ICT in science teaching?

Table 2: Mean Score and t- test for testing effect of Science Teachers' using ICT in Science Teaching in Irepodun Local Government Area Kwara State, Nigeria

	Number of respondents	Mean Score	Std. Deviation	T	Df	p-value
Total	120	81.21	8.9	14.31	119	0.00

Table 2 shows the numbers of responses of science teachers towards the ICT in science teaching in senior secondary schools in Irepodun Local Government, Kwara State, Nigeria. The total number of respondents was 120 science teachers. The mean score was 81.21. The effect of science teachers' using ICT in science teaching was significantly positive since p-value (0.00) < 0.05 (t =14.31; df 79 and p-value 0.00). Thus, the Science teachers had positive effect towards the use of ICT in science teaching generally in the Irepodun Local Government, Kwara State, Nigeria,

Research Question 2:

Does the gender of the science teachers have effect towards the use of ICT in science teaching?

Table 3: Mean Scores and t-test for testing effect of Science Teachers' using ICT to Science Teaching based on Gender in Irepodun Local Government Area Kwara State, Nigeria

Gender	No of Respondents	Mean Attitudinal Score	Standard Deviation	Std. Error Mean	t value	df	p-value
Male	72	73.46	5.6	0.3	59.76	79	0.66
Female	48	72.71	5.8	0.3			

Table 3 shows that the mean scores for male was 73.46 and for female was 72.71 and that no significant difference existed between the score of male and female science teachers using ICT in science teaching since the p-value (0.66) > 0.05. The null hypothesis 1 (H₀₁), which states that there is no significant difference in the score of science teachers towards the using of ICT in science teaching based on gender, is not rejected.

Research Question 3:

Is there effect on the years of teaching experience of the science teachers towards the use of ICT in science teaching?

Table 4: Mean Scores and t-test for testing effect of Science Teachers' using ICT to Science Teaching based on years of teaching experience in Irepodun Local Government Area Kwara State, Nigeria

Experience	No of Respondents	Mean Score	Standard Deviation	Std. Error Mean	T	Df	p-value
Less experience (0-5)	36	83.74	5.9	0.2	1.8	79	0.057
Experience (above 5years)	44	82.94	5.7	0.3			

Table 4 shows the mean scores and reveals that there was no significant difference between the experienced and less experienced science teachers towards the using of ICT to science teaching in Irepodun Local Government Area Kwara State, Nigeria since the p-value (0.057) > 0.05. The mean scores range between 82.94 and 83.74. The null hypothesis 2 (H_{02}), which states that there was no significant difference on the years of teaching experience of the science teachers towards the use of ICT to science teaching based on years of experience, is not rejected.

Research Question 4:

What are the attitudes of science teachers towards science teaching based on their school type?

Table 5: Mean Scores and t-test for testing effect of Science Teachers' using ICT in Science Teaching in Irepodun Local Government Area Kwara State, Nigeria based on School Type

School type	No of respondents	Mean Attitudinal	Standard Deviation	Std. Error Mean	T	Df	p-value
Public	42	72.76	6.55	0.25	-2.43	79	0.02
Private	38	74.87	7.17	0.38			

The results in Table 5 shows the mean score and reveals that there was significant difference in the school type of science teachers towards the using of ICT in science teaching in senior secondary schools in Irepodun Local Government Area Kwara State, Nigeria, based on school type. The mean score ranged between 72.76 and 74.87. The P-value (0.02) is less than 0.05 (p-value < 0.05). The null hypothesis 3 (H_{03}), which states that there are no significant difference in the effect of school type of science teachers towards the use of ICT to science teaching based on school type, is rejected.

Summary of Major Findings

The research findings of this study as obtained from t-test based on the Research questions and hypotheses are summarized as follows:

- (i) Science teachers had positive effect towards science teaching using ICT to science teaching in the secondary school in Irepodun Local Government Area, Kwara State Nigeria
- (ii) The effect of science teachers towards science teaching using ICT to science teaching in the secondary school based on gender was not significant.
- (iii) The effect of science teachers towards science teaching using ICT to science teaching in the Secondary school based on their years of teaching experience was not significant.
- (iv) The effect of science teachers towards science teaching using ICT to science teaching in the secondary school based on their school type was significant.

Discussion of Results on the effectiveness of science teachers towards science teaching using ICT to science teaching in the secondary school

In this study, it was found out that effect of Science Teachers' using ICT to Science Teaching in Irepodun Local Government Area Kwara State, Nigeria was significant based on their responses. Science teachers had positive effect towards the use of ICT in science teaching. They are the key to students' success because they play an important role in imparting the knowledge and equipping the students to be useful to themselves and the society. This is in agreement with the findings of Okeke & Onocha (1986) that examined the patterns of relationship between home and school factors and pupils' project and reported that teachers' attitude towards science is a significant predictor of pupils' science achievement as well as their attitude. It is also in agreement with Afolabi (2007) who examined the influence of the science teachers' attitude and gender factor as determinant of pupils' performance in primary science and found out that the attitude of science teachers have greater effect on the students' academic performance. It was established in this study that there was no significant difference in the effect of science teachers towards science teaching based on their gender. The males and the female had similar mean attitudinal score; the reason that alluded to this finding may be due to the fact that, male and female science teachers have realized more the importance of science teaching for their future. This study was in agreement to the study of Abimbola & Abidoje (2013) on the views of Kwara State senior school Biology teachers on the status of ecology teaching in which they reported that there is no significant different between the teaching of male and female science teachers.

It was also revealed in this study that there was no significant difference in the effect of science teachers towards science teaching based on their years

of teaching experience. It may be due to the fact that, the experienced and less experience science teachers are able to concentrate on the most appropriate way to teach particular topics to students who differ in their abilities, prior knowledge and backgrounds. This finding is in agreement with the finding of Abidoeye (2017) who observed the influence of gender and experience of senior school Biology Teachers on their Ecology teaching in Kwara State. The findings showed that no significant difference existed in the experience and less experience biology teachers.

It was also found in the study that there was significant difference in the effect of science teachers towards science teaching based on their school type. This shows that private schools' science teachers had more positive attitude toward science teaching than the public science teachers because they feel that is acquaints them with the wealth of knowledge in different areas of life. Since, the mean score of private schools science teachers being greater than that of public schools science teachers in senior secondary schools towards science teaching. It may be due to the fact that private schools are on profit, where the proprietors were up and doing. This is in agreement with the findings of Maliki, Ngban and Ibu (2009) who that analyzed Students' performance in junior secondary school mathematics examination and found out that the students from the rural school performed better than student from urban schools in mathematics examination and also students from private schools performed better than those from public schools.

Conclusions

Based on the findings of the study, the following major conclusions can be drawn. Science teachers had positive effect towards science teaching using ICT in Irepodun Local Government Area, Kwara State Nigeria. The effect of science teachers towards the using of ICT to science teaching based on their gender and years of teaching experience was not significant in the analysis conducted, but it was revealed that the effect of science teachers in private schools are more positive effect than the science teachers in public schools.

Recommendations

Based on the findings of this study, it is hereby recommended that;

- (i) ICT Education should be compulsory in all secondary schools in Irepodun LGA Kwara State in order to improve science teaching.
- (ii) The Teacher Registration Council of Nigeria should provide ICTs for both the male and female teachers.
- (iii) There should be opportunity to be ICT literate through in-service education for both the experienced and less experienced science teachers.

- (iv) The government should ensure provision of ICT facilities in the public secondary schools and encourage science teachers to go to relevant seminars and workshops so that they can improve in their science teaching.

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