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SCIENCE TEACHERS'ATTITUDE TOWARDS THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY FOR TEACHING IN KWARA STATE

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Abstract

Information and Communication Technology (ICT) is playing an increasing role in many areas of activity, there are indications that it is not always incorporated into the educational process by teachers as productively as possible. The purpose of this study was to investigate science teachers' attitudes towards the use of Information and Communication Technology for teaching in Kwara State. The study was descriptive research of the survey method using stratified, proportional, purposive, and random sampling techniques to draw a sample of 200 (130 males and 70 females) science teachers from ten secondary schools in Kwara State, Nigeria. The main research instrument employed for data collection was a researcher-designed questionnaire. One research question was raised, and four research hypotheses were formulated and tested. The research question was answered using mean and standard deviation. Hypotheses one to three were tested using a t-test while hypothesis five was tested using Analysis of Variance (ANOVA), all hypotheses were tested at a 0.05 significant level, and the statistical tool used for analysis is Statistical Package for Social Science (SPSS). The findings of the study indicated that science teachers' attitude towards the use of ICT for teaching is positive since a majority of the mean value of items on the table were greater than the 3.0 benchmark, and all the teachers' variables considered in the study have no influence on science teachers' attitude towards the use of ICT for teaching it was recommended among others that teacher training and professional development-oriented policies should be put in place to support ICT.

Introduction

Science is an integral part of human society. Its impact is felt in every sphere of human life, so much that it is intricately linked to a nation's development. Nowadays, nation all over the world including Nigeria are striving hard to develop technologically and scientifically, since the world is turning scientific, and all proper function of lives depends greatly on science. Hence, there is the need to teach it effectively using necessary techniques and tools such as ICT. The use of ICT is acknowledged as being critical to the sustainable development of the economy of all nations. It is a tool that can be used to enhance good governance practice. In Nigeria, the government is adopting enabling policies and introducing programme to encourage acquisition and use of ICT. In schools at all levels, one of the factors that hinder

the effective use of ICT for teaching is the attitude of science teachers towards it use, which constitutes a critical readiness factor for the adoption and implementation of ICT policies. Teaching has gone beyond the teacher standing in front of group of students disseminating information to them without students' adequate participation (Ajayi 2008), it was observed that with the aid of ICT, teachers can take students beyond traditional limits and ensure their adequate participation in the teaching and learning process and create leverage for them to experiment and explore. This development is a strong indication that the era of teachers without ICT skills are gone, any classroom teacher with adequate and professional skill in ICT utilization will have his student performs better.

Achieving a meaningful use of ICT in the field of education can be influenced by many factors; one of these factors is teachers' attitude towards the use of technology in teaching and learning process. Research shows that the success of technology use in education largely depends on teachers' attitude towards technology use. Attitude is considered a major predictor to use new technology in education and other human endeavour, thus attitude towards ICT can play an important role in the acceptance and actual use of computer. The successful utilization of technology in the classroom depends mainly on the teacher's attitude towards those tools. Teaching and learning have gone beyond the teacher standing in front of a group of students disseminating information to them without students' adequate participation (Ajayi 2008).The author posited that with the aid of ICT, teachers can take students beyond traditional limits and ensure their adequate participation in teaching and learning process and create vital environment to experiment and explore the development, this is a strong indication that the era of teachers without ICT skills are gone, Hence, any classroom teacher with adequate and professional skill in ICT utilization will have his students perform better. Attitude is a condition of the mind with respect to responding favourably or otherwise to a given object or instance (Oskamp & Schultz,2005). Attitude is seen as a psychological tendency expressed through evaluating a given entity with some degree of favour or disfavour (Mahzarin & Larisa, 2010). Katz (1960) however identified that attitude has four functions that appeal to individuals at one time or the other. They are; utilitarian function, knowledge function, ego-defensive function, and value-expressive function.

Utilitarian function helps individual obtain reward and avoid punishment. This is done by being positive attitudinally towards an object with view to benefiting from its use. Knowledge function allows an individual to understand the situations in which he or she finds himself or herself. By this, wise decision will be taken on the situation accordingly. The ego–defensive function protects individual from psychic threats. This is the preference that keeps the confidence of an individual by believing in the success of the decision taken. The value-expressive function helps individual express their major values. This attitude particularly demonstrates being change resistant and promote commitment to relevant behaviour (Maio & Olson, 1995).

Investigating the attitude of teachers as regard the use of ICT in teaching and learning may not be complete without putting into consideration the teachers' variables such as gender, school type, teaching qualification and years of teaching experience that are likely to influence the outcome of the study. It is because of this that the study deems it necessary to investigate the influence of the teachers' variables on their attitude towards use of ICT in teaching of science. The incorporation of ICT to teaching and learning of science at the 21st century is as important as science itself because the use of ICT is one of the attributes of the century. Also, because of recent occurrence of the pandemic that disrupted the normal classroom setting and many resulted to use of online teaching methods that has much to do with ICT, is enough to leave no stone unturned as regards the attitude of science teachers towards the use of ICT. Due to the general belief of researchers that use of ICT in teaching and learning is of utmost importance many studies have been carried out such as Sanchez, Marcos, Gonzalez and Guanlin (2012). They investigated attitude of In-service teachers towards the use of ICT in the classroom. The result of the analysis of the study showed positive attitude on the part of the teachers but the usage in class was minimal.

Onwuagboke, Nzeako and Eziaghighala (2018) on attitude of teachers towards use of ICT in the teaching of Basic Science and Technology in secondary schools. The findings from the study also reported positive attitude of teachers towards the use of ICT but there was no difference in their attitude towards the use of ICT when gender was considered. Belay, Khatete and Mugo (2020) also carried out study on attitude of teachers towards integrating ICT in classroom instruction of Biology in secondary schools. When the data was analysed, it was found that the attitude of the teachers were positive. Based on the above background, present study incorporated the teachers teaching all the science subjects irrespective of area of specialization. This is thought to be appropriate since all science subjects are important and deserved to be taught using ICT. The study also considered the teachers variables which are likely to influence the outcome of the study.

Objective of the Study

1. What is the attitude of science teachers towards the use of ICT for teaching?

Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. there is no significant difference in the science teachers' attitude towards the use of ICT for teaching based on gender.
2. there is no significant difference in the science teachers' attitude towards the use of ICT for teaching based on school type
3. there is no significant difference in the science teachers' attitude towards the use of ICT for teaching based on teaching qualification
4. there is no significant difference in the science teachers' attitude towards the use of ICT for teaching-based on teaching experience

Methodology

This study adopted a descriptive survey research design. The population for the study comprised all science teachers in Kwara State. The target population was all science teachers in selected public and private secondary schools in Kwara State, Nigeria. Stratified sampling technique was used to classify the secondary schools into Public and Private. From each stratum using year of establishment, five secondary schools were selected making a total of ten secondary schools (public and private) sampled. Purposive sampling technique was used to sample all science teachers from each secondary school.

However, 250 respondents were randomly sampled for the study to cater for attrition and experimental mortality using proportional sampling technique to allocate number of respondents to each secondary schools based on the numbers of science teachers and only200 teachers adequately responded to the questionnaire items, their responses were analysed in the study. The research instrument that was used to obtain data for this study was a researcher designed questionnaire with two sections A and B. Section A deals with respondents' demographic information such as: gender, school type, year of teaching experience and educational qualification; while section B Science Teachers' attitude towards the use of ICT for teaching containing 30 items that required respondents to tick appropriate option that best explain their opinion and was graded using likert scale response modes of Strongly Disagree (SD); Disagree (D); Uncertain (U);Agree (A); and Strongly Agree (SA).The validity of the instrument was ensured by five experts from the faculty of Communication and Information Science (CIS), University of Ilorin and three experts from the department of Computer Science, Kwara State College of Education (Technical), Lafiagi. The reviewers helped to review the questionnaire to check the clarity of language and ensured it is relevant to the study. Their suggestions and corrections were noted and effected on the final draft of the instrument administered. The reliability of the research instrument was determined by administering thirty copies of the questionnaire to randomly selected secondary school science teachers in Edu Local Government area of Kwara State. After the administration and retrieval of the completed instrument, their responses to the items were subjected to statistical analysis using Cronbach alpha reliability statistics to check for the instrument's internal consistency. The Cronbach's alpha value obtained was 0.85 at 0.05 level of significance. This indicates that the instrument is reliable. The copies of the research questionnaire were administered to the study samples through personal contact by the researchers to ensure the questionnaire items were properly filled without delay. The completed copies of the questionnaire were collected, and data obtained from the questionnaire were analyzed using mean and standard deviation for the research question 1, while independent t-test was used to test hypotheses 1 to 3 because they consist of variables which occurred at two levels and hypothesis 4 was tested using ANOVA because it consists of a variable that exist at more than two levels.

Results

Research Question 1: What is the attitude of science teachers towards the use of ICT for teaching?

The science teachers have positive attitude towards the use of ICT for teaching

Table 1: Attitude of science teachers towards the use of ICT for teaching

S/N	ITEMS	Mean	SD
1	I feel worried anytime I must use ICT for teaching	1.97	1.190
2	Teaching with ICT helps me to have good relationships with my students	3.31	1.430
3	When I know of a student in my class with great ICT skill, I feel uncomfortable	1.93	1.091
4	The use of ICT for teaching helps me to improve my personality	3.67	1.269
5	I put off my ICT class as much as possible	2.51	1.280
6	I am not relaxed whenever I must use ICT for teaching	2.57	1.324
7	I feel embarrassed to use ICT to teach in front of my students	1.96	1.088
8	I like to practice the use of ICT for teaching anytime I am less busy	3.50	1.407
9	When I miss the class where I am to use ICT to teach, I feel bad	3.13	1.312
10	I do not feel enthusiastic to come to class and teach using ICT	2.46	1.263
11	Being good in the use of ICT for teaching help me to have class control	3.66	1.278
12	I feel more confident when using ICT to teach	3.63	1.327
13	Frankly, I use ICT just to entice the students	2.55	1.333
14	In my opinion, teachers who use ICT to teach are very knowledgeable	3.39	1.299
15	Using ICT to teach helps me communicate effectively in the class	3.43	1.339
16	I cannot apply the knowledge of using ICT for teaching in my professional career	2.24	1.308
17	Teaching with ICT makes me able to create new thoughts	3.53	1.256
18	I am not satisfied with my performance when using ICT to teach	2.22	1.103
19	In my opinion, ICT is difficult and complicated to use	2.12	1.238
20	The use of ICT for teaching allows teachers cover many areas of the syllabus	3.55	1.318
21	I prefer teaching with ICT rather than the conventional method	3.47	1.215
22	To be honest, I really have little interest in the use of ICT for teaching	2.63	1.233
23	I don't get anxious when I teach a class using ICT	2.82	1.263
24	Teaching with the use of ICT is enjoyable	3.71	1.294
25	I feel proud when teaching with the use of ICT	3.54	1.363
26	Teaching using ICT makes me feel more confident	3.73	1.159
27	I am interested in teaching with ICT	3.82	1.271
28	Knowing how to use ICT for teaching is an important goal in my teaching career	3.70	1.224
29	I look forward to the time I spend teaching in a class using ICT	3.65	1.247
30	Teaching with the use of ICT makes me have good emotions (feelings)	3.72	1.033

As can be deduced from table 1, the teachers have positive attitude towards the use of ICT for teaching. This is because the items with mean values greater than or equal to 3.0 which is the average mean value are more than those with less than 3.0. This is because any value greater than or equal to 3.0 translate to positive attitude on the part of the teacher. While mean values less than 3.0 reveals negative attitude to use of ICT by the teachers. Hence, items 2, 4, 8, 9, 11, 12, 14, 15, 17, 20, 21, 24, 25, 26, 27, 28, 29 and 30 have mean values greater 3.0. While the remaining 12 items have mean values less than 3.0 which translate to negative attitude. Gender did not influence the attitude of the science teachers towards use of ICT for teaching

$H0_1$: there is no significant difference in the male and female science teachers' attitude towards use of ICT for teaching

Table 2: Gender Influence on the Attitude of Teachers

Gender	N	Mean	Std	T	df	Sig	Decision
Male	130	92.03	17.37	0.094	198	0.925	Not Significant
Female	70	92.28	19.86				

It is shown in table 2 that there is no significant difference in the attitude of male and female science teachers towards use of ICT for teaching. This is because Male (M= 92.03, SD=17.37) and Female (M=92.28, SD=19.86), t(198) =0.094, p=0.925. Since the p-value is greater than 0.05, this means that the null hypothesis formulated is not rejected. School type had no influence on attitude of science teachers towards use of ICT for teaching.

$H0_2$: there is no significant difference in the public and private school science teachers' attitude towards use of ICT for teaching

Table 3: Attitude of Science Teachers towards Use of ICT for Teaching Based on School Type

School Type	N	Mean	Std. Dev.	T	df	p	Decision
Public	128	90.45	17.21	-1.73	198	0.085	Not significant
Private	72	95.68	19.69				

Table 3 reveals that there is no significant difference in the attitude of Public school science teachers (M= 90.45, SD=17.21) and Private school science teachers (M=95.68, SD=19.69), t(198) =-1.73, p=0.085. This is because the p-value is greater than 0.05. It means that the null hypothesis formulated is not rejected

Science teachers' qualification did not influence their attitude towards use of ICT for teaching.

$H0_3$: there is no significant difference in the qualified and unqualified science teachers' attitude towards use of ICT for teaching

Table 4: Attitude of Science Teachers Towards Use of ICT for Teaching Based on their Academic Qualification

Academic Qualification	N	Mean	Std. Dev.	T	df	p	Decision
Unqualified	130	91.57	19.21	-0.58	198	0.562	Not significant
Qualified	70	93.14	16.34				

Table 4 shows that there is no significant difference in the attitude of unqualified science teachers (M= 91.57, SD=19.21) and qualified science teachers (M=93.14, SD=16.34), t(198) =--0.58, p=0.562. This is because the p-value is greater than 0.05. It means that the null hypothesis formulated is not rejected

Research Question 5: What is the influence of years of teaching experience of science teachers' on their attitude towards the use of ICT for teaching?

Science teachers' years of teaching experience did not influence their attitude towards use of ICT for teaching.

$H0_4$: there is no significant difference in the science teachers' attitude towards use of ICT for teaching based on their years of teaching experience

Table 5: Descriptive Analysis of Science Teachers' Attitude Based on their Years of Teaching

Years of Teaching	N	Mean	Std. Dev.
0-5	52	90.85	12.79
6-11	84	90.88	20.92
12 and above	64	94.78	18.17

Table 6: ANOVA of Science Teachers' Attitude Based on Years of Teaching Experience

Years	Sum of Squares	df	Mean Square	F	P
Between Groups	666.604	2	333.302	1.003	0.369
Within Groups	65462.516	197	332.297		
Total	66129.120	199			

It can be deduced from table 5 and 6 that there is no significant difference in the science teachers' attitude towards use of ICT for teaching based on their years of teaching experience. 0-5 years (M= 90.85, SD=12.79), 6-11 years (M= 90.88, SD=20.92) and 12 years and above (M= 94.78, SD=18.17), F (2, 197) = 1.003, P= 0.369. it means that there is

no difference in the mean values of the three set of years of teaching experience of the teachers and since p is greater than 0.369 it means the null hypothesis formulated is rejected.

Discussion

The first finding from the study indicated that science teachers have positive attitude towards the use of ICT for teaching. The result is not in line with the study conducted by Harrison and Rainer (1992) on An examination of the factor structures and concurrent validates for the computer attitude scale, the computer anxiety Rating scale, and the computer-self-efficacy scale who found out that some teachers had negative attitude towards the use of ICT for teaching due to their less skill in computer use and are not willing to accept its use for teaching, while Albirin (2004); Sanchez et al. (2012); Onwuagboke et al. (2018) studies confirmed teachers' positive attitudes towards the use of ICT for teaching. This may be because the teachers with positive attitude towards the use of ICT for teaching have knowledge of how to use the ICT whereas those with negative attitude may be lacking ideas of use of ICT for teaching. Another finding from the study revealed that gender did not influence the science teachers' attitude towards the use of ICT for teaching. The finding agrees with that of Berveli, Ahiatrogah, Laryea and Essilfie (2013) finding which showed that their significant difference was not recorded when gender was considered in their study titled integrating information technology into pedagogy from the gender perspective. The study is also in support of the Gebhardt, Thomson, Ainley ans Hillman (2019) study that confirmed that there was no significant difference in the position of male and female secondary school teachers when integration of ICT into teaching and learning was investigated.
It was also discovered that other teachers' variables such as school type, teaching experience and teaching qualification had no influence on attitude of science teachers towards use of ICT for teaching. This finding disagreed with that of Chebette, Githua and Ng'eno (2020) who submitted that these teachers' variables were predictors of teachers' attitude towards integration of ICT in Mathematics instruction. This shows that influence of teachers' variables on attitude of teachers towards integration of ICT to teaching is inconclusive. Although even though many researchers have work in this area of research many did not consider the influence of teachers' variables on attitude of teachers.

Conclusion

Attitude is an important variable in contemporary days' research because, it signaled either the acceptance or rejection of an innovation by users of the innovation. Finding from the study showed that majority of the teachers have positive attitude towards the use of ICT. Therefore, it can be concluded as a good signal which is very necessary for the implementation of ICT for teaching and learning by the science teachers. The result of the study also indicated that all the variables under consideration for the study had no influence on science teachers' attitude towards the use of ICT for teaching. Hence, it can be concluded that all the science teachers were of positive attitude irrespective of the category of variable they belong to in term of gender, years of teaching experience and qualification. This will also help to boost the inclusion of ICT into teaching and learning of science that will go a long way to improve the standard of education in our country (Nigeria).

Recommendations

The study recommended that:

1. Government at all levels and all educational stake holders should endeavour to finance ICT facilities for teachers especially, science teachers to further sustain their positive attitude towards using it for teaching.
2. Policies that are not gender bias should be maintained in our secondary schools to sustain teachers' attitude to use ICT for teaching irrespective of their gender.
3. Proprietors of all schools should invest honestly to procure and maintain ICT facilities in their various schools for science teachers' use and other teachers as well.
4. Teachers should be encouraged to proceed on further study and they should be well remunerated for their effort while discharging their professional duties and make all facilities (especially ICT) available for them to use when needed.
5. Both the experienced and in-experienced science teachers should be encourage to use ICT while teaching science for effective teaching and learning to take place

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