An Assessment of the Impact of Information Communication Technology on Secondary School Teachers in Kebbi State, Nigeria

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ABSTRACT

In the world today, technology has been a powerful tool for growth, and the basis for numerous economic and social transformations. New technologies, if properly harnessed by exploiting the positive opportunities provided, is capable of bridging the development and educational divides among and within educational sector in any nation. Information Communication Technology (ICT) is one of such new technologies that have brought about digital revolution. This paper is focused on the impact of ICT on secondary school teachers in Kebbi State with Birnin kebbi as the case study. A research has been conducted making use of structured questionnaires to get the views of the teachers. A sample of eight hundred and fifty (850) questionnaires was distributed to selected secondary school teachers, out of which six hundred and eighty-five (685) copies of the questionnaires were completed and returned by the respondents. The responses from the questionnaires have been analyzed and interpreted. The findings from the result show that ICT has contributed immensely towards teaching-learning process amongst secondary school teachers in Kebbi State. Also, there is need for training and retraining of teachers, proper supervision of teachers to enhance full utilization of ICT facilities available in schools. Constant power supply should be made available to schools to further enhance steady use of the facilities.
Keywords: ICT, Secondary School, Internet, Kebbi State.

I. INTRODUCTION

Information Communication Technology (ICT) is the processing, storage, distribution of data and many others [1]. It is basically made up of the following components namely: electronic processing using computer, transmission of information using telecommunication equipment and dissemination of information in multimedia. These technologies are being utilized to restructure and reorganize the sphere of production, distribution and circulation [1]. The usage of ICTs in Nigeria and in African countries generally is increasing and rapidly growing. However, while there is a great deal of knowledge about how ICTs are being used in developed countries, there is no much information on how ICTs are being introduced into schools in developing countries [2].

The application of ICT has transformed the learning and teaching process in which students deal with knowledge in an active, self-directed and constructive way. ICT is not only employed as an instrument, which can be added

for existing teaching methods but also seen as an important instrument to support new ways of teaching-learning process. It is being integrated into the teaching-learning process in various educational institutions in Nigeria and the world in general [10]. Though, ICT is somewhat new phenomenon in Nigeria, the application of computer have been carried out in many areas of human activities, such as medicine, domestic activities, engineering, architecture, and education [10]. It is pertinent to assess the impact of ICT in the secondary school education. For the schools to be effective, computer literacy should be established through availability of computers, computer utilization, and content competencies in the schools, as well as through teachers' effectiveness in the areas of teaching and learning, record keeping, supporting student academic performance, teachers job performance, school discipline and community services.

This paper focuses on the extent to which ICT has improved the effectiveness of education sector in Kebbi State with specific reference to secondary school

teachers in Birnin Kebbi. A sample of eight hundred and fifty(850) questionnaires were distributed through random selection to secondary school teachers in the metropolis, out of which six hundred and eighty-five (685) copies of the questionnaires were duly answered and returned by the respondents. Hence, these data were analyzed using simple frequencies, percentages and chi-square methods.

Background and Literature Research

The cut throat competition facing secondary school teachers in Nigeria today requires each of them to be on the leading edge of the new technology [3]. The recent advancement in ICT components, such as computer, internet, electronic mail etc resulting in computer network, which is a connection of computers whereby data are exchanged and computing resources are shared among them as much as possible. Due to this, computer system has been applied to all field of operation; both private and public bodies have employed the use of computer in carrying out their daily business routine to replace the obsolete manual method in order to obtain high level of productivity [3]. Students that u s e ICT gain deeper understanding of complex topics and concepts, and are more likely to remember information and use it to solve problems outside the class environment [4]. In addition, students extend and deepen their knowledge, investigation, and inquiry through ICT according to needs and interest when access to information is available on multiple levels.

Several researches have been conducted on the impact of ICT on secondary school teachers. [5] investigated the level of awareness of primary and secondary school teachers of Oyo state invited for a capacity building workshop of Nigeria's educational policy on ICT as well as its possible influence on the use of ICT for classroom teaching and learning. Data collection was done using a self-constructed and validated questionnaire titled: 'Teachers awareness of Nigeria's educational policy on ICT'. The data was analyzed using simple percentage, t-test and ANOVA. These studies found that only a small percentage of the respondents possess a high level of awareness of the country's educational policy on ICT. Also, [6] assess secondary school teachers' use of ICT in Oyo metropolis of Oyo state. This study examines the availability and usability of Information and communication technology among secondary school teachers in Oyo Metropolis. The Research Design employed is the descriptive survey design. Data collected were analyzed using frequency tables and simple percentage. Results of the study showed that ICT facilities are not available in most of the schools covered. It was also observed that most teachers used in the sample for the study, are not competent in the use of ICT. [7] investigated skills challenges in adoption and use ICT in public secondary school, Kenya. The study explored teachers' skills that influenced the process of adoption and use of ICT in public secondary schools. It adopted a descriptive survey research design. Data collected was analyzed by use of descriptive and inferential statistical techniques after which results were presented in tables. The findings established that there was limited supply of qualified ICT teachers in Kenya. [8] conducted a study by assessing the competence of ICT of rural and urban secondary school ICT teachers for the implementation of ICT curriculum in North Eastern Nigeria. Grand mean, standard deviation and percentage were used to analyze the data. Results reveal that the competence of ICT teachers on policy, curriculum, pedagogy, technology, administration and professional development is low. Obstacles to ICT teachers' competences were identified as lack of hardware, software, and financial resources, lack of electricity in most rural schools and insufficient information and experience from teachers in ICT applications.

Furthermore, [9] conducted a research on teachers' attitude towards the use of ICT as a pedagogical tool in secondary schools in Tanzania, taking Kondoa District as the case study. The data collection method involved questionnaire and interview. This study adopted the mixed method approach which considers both quantitative and qualitative as the methodological solutions. It was found that teachers have positive attitudes towards the use of ICT as a pedagogical tool but they did not integrate it in their teaching effectively. Also, low familiarity with ICT usage as a pedagogical tool among teachers was found to be a problem.

Also, [10] carried out an investigation on the level of ICT awareness among secondary school teachers in Sokoto State metropolis, Nigeria. The Research Design employed is the descriptive survey design. The analysis

of data collected was done using frequency tables, simple percentage and ANOVA. Results of the study showed that majority of secondary schools have ICT facilities but the level of ICT training to teachers is fair. However, it was observed that some teachers were not using ICT facilities in teaching and learning as a result of improper training and lack of power supply

II. METHODS AND MATERIAL

Research design

This study is a descriptive and analytical research design. A detailed questionnaire with relevant information was employed and its aim was for identification of variables and their relationship. The questionnaire was design to sample the opinions of various secondary schools teachers in Birnin Kebbi on the impact of ICT on secondary school education in Kebbi State. Individuals in the group were selected using random sampling method. The strategy is that the researcher was able to establish validation rules for the data collected for this group so that variances in the results could be controlled.

Research (target) population and study area

The population of this research study covers both public and private secondary school teachers in Kebbi State taking cognizance of their different background, age group and educational status. While this research intends to look at Kebbi State as a whole, data investigation was limited to Birnin kebbi the state capital for logistic reasons. Thus, it was assumed that result obtained for Birnin kebbi can be generalized for the whole of Kebbi State.

Research instrument

In achieving the purpose of this study, a questionnaire was designed and used to collect the primary data analyzed. The questionnaire was tagged "The assessment on the impact of information communication technology on secondary school teachers", and questions posed related directly to the nature of data required. In testing the research questions, closed end questionnaires was used. The questionnaire was meant for teachers of various secondary schools. In the questionnaire, a point rate scale was used; Yes, No.

Study sample and sampling procedure

The samples of this study consist of six hundred and eighty-five (685) teachers (principals inclusive) of various secondary schools in Birnin Kebbi, randomly selected under the following classes: Gender, Age group (AG), Educational qualification (EQ). Questionnaire was given to them as respondent in a fair and uniform manner in order to represent the entire population of the study.

Validation of research instrument

The content and construct validity of the research instruments was conducted by the researcher in order that the reliability of inferences drawn from such instrument is guaranteed. The validation of the questionnaire was done by one computer scientist, and one educationist. This exercise assisted in informing some of the questions in the research instrument, in other to maintain the face and content validity. The reliability of the questionnaire was then conducted through a pilot test conducted on a number of co-researchers. The questionnaire was distributed along with error log. Error log is a sheet of paper on which the participants were asked to record details of any typographical error, contest error or ambiguous language. The participants were encouraged to make suggestions as to how the questionnaire could be improved to eliminate ambiguity.

Method of Data collection

The researcher personally administered questionnaire to respondents from the various secondary schools visited in Birnin Kebbi through random selection of teachers. The information supplied by these respondents constitutes the primary source of information for the study.

Method of Data Analysis

The data collected from the study were analyzed using simple frequencies, percentages and chi-square methods.

III. RESULT AND DISCUSSION

For the purpose of this research, Eight hundred and fifty

(850) copies of questionnaires were distributed to teachers in various secondary schools in the metropolis, out of which six hundred and eighty-five (685) were completed and returned by the respondents. The data were analyzed and presented using tabular, percentage and chi-square methods for easy understanding.

Table 1.0: Gender of the Respondents

Gender	Frequency	Percentage	Valid percentage
Male	300	43.8	43.8
Female	385	56.2	56.2
Total	685	100.0	100

Source: *Questionnaire administered 2015*

From statistical table 1.0, 43.8% of the total respondents are male while the remaining 56.2% are females. The analysis shows that most of the respondents are females based on the gender distribution in table 1.0

Table 2.0 Age of respondents

Age (years)	Frequency	Percentage	Valid percentage
20-29	230	33.6	33.6
30-39	307	44.8	44.8
40-49	99	14.4	14.4
50 and above	49	7.2	7.2
Total	685	100.0	100

Source: *Questionnaire administered 2015*

Table 2.0, indicates that majority of the respondents fall between the ages of 30-39 representing 44.8%. This shows that a lot of the respondents are in their prime age.

Table 3.0 Educational Qualification of the respondents

Qualification	Frequency	Percentage	Valid percentage
ND	23	3.4	3.4
NCE	151	22	22
HND	42	6.1	6.1
B.ED	130	19	19
B.ED TECH	68	9.9	9.9
B.TECH	20	2.9	2.9
B.A	17	2.5	2.5
B.SC	94	13.7	13.7
B.SC ED	110	16.1	16.1
M.SC	17	2.5	2.5
M.ED	13	1.9	1.9
Total	685	100	100

Source: *Questionnaire administered 2015*

Statistical Table 3.0, it shows that 3.4% of the entire population representing 23 respondents is ND holders, 22% of the entire population representing 151 respondents is NCE holders, 6.1% of the entire population representing 42 respondents is HND holders, 19% of the entire population representing 130 respondents is B.Ed holders, 9.9% of the total population representing 68 respondents is B.Ed.Tech holders, 2.9% of the entire population representing 20 respondents is B.Tech holders, 2.5% of the entire population representing 17 respondents is B.A holders, 13.7% of the entire population representing 94 respondents is B.Sc holders, 16.1% of the entire population representing 110 respondents is holders of B.Sc.Ed. 2.5% of the entire population representing 17 respondents is holders of M.Sc, while 1.9% of the entire population representing 13 respondents is holders of M.Ed. From the analysis, it shows that respondents whose qualifications are NCE ranks high, followed by respondents with B.Ed qualifications and B.Sc,Ed, respectively.

Table 4.0 Marital status of respondents

	Frequency	Percentage	Valid percentage
Single	374	54.6	54.6
Married	311	45.4	45.4
Total	685	100	100

Source: *Questionnaire administered 2015*

Table 4.0 shows that 54.6% of the total population representing 374 respondents is not married, while 45.4% of the population representing 311 respondents is married. This indicates that large numbers of the respondents are still single.

Table 5.0 Teaching Experience of the Respondents

Age (years)	Frequency	Percentage	Valid percentage
0-5	243	35.5	35.5
6-10	200	29.2	29.2
11-15	132	19.3	19.3
16-20	64	9.3	9.3
21-25	27	3.9	3.9
26-30	11	1.6	1.6
31 and above	8	1.2	1.2
Total	685	100	100

Source: *Questionnaire administered 2015*

The analysis in Table 5.0 shows that 35.5% of the total population representing 243 respondents with teaching experience between 0-5years constitutes the majority of the entire population.

Table 6.0: Have you heard of ICT before?

Response	Frequency	Percentage	Valid percentage
Yes	670	97.8	97.8
No	15	2.2	2.2
Total	685	100.0	100.0

Source: Questionnaire administered 2015

Table 6.0 shows that 97.8% of the total population representing 670 respondents have heard about ICT, while 2.2% of the population, representing 15 respondents have never heard about Information Communication Technology. This indicates that the awareness of ICT amongst teachers are considerably high.

Table 7.0: How did you hear about ICT?

Responses	Frequency	Percentage	Valid percentage
Library	67	9.8	9.8
Media	194	28.5	28.5
Schools	299	43.5	43.5
Friends	103	15.3	15.3
Others	22	2.9	2.9
Total	685	100.0	100.0

Source: Questionnaire administered 2015

Table 7.0 shows that 67 respondents of the entire population representing 9.8% heard of ICT through Library, 28.5% of the total population which is 194 respondents heard of it via Media, 43.5% of the total population which is 299 respondents heard of it via Schools, 15.3% of the total population representing 103 respondents heard about it via Friends, while 2.9% of the total population heard of it via other means. This clearly indicates that considerably very high number of respondents got the awareness through schools.

Table 8.0: Do you know what ICT means?

Response	Frequency	Percentage	Valid percentage
Yes	650	94.9	94.9
No	35	5.1	5.1
Total	685	100.0	100.0

Source: Questionnaire administered 2015

Table 8.0 shows that 650 respondents constituting 94.9% of the entire population knows the meaning of ICT, while only 35 respondents representing 5.1% of the population do not know what it means. This indicates that most of the Secondary School teachers in Birnin Kebbi understand the meaning of ICT.

Table 9.0: Do you have Internet facilities in your school?

Response	Frequency	Percentage	Valid percentage
Yes	420	61.3	61.3
No	265	38.7	38.7
Total	685	100.0	100.0

Source: *Questionnaire administered 2015*

Table 9.0 shows that 420 respondents which constitute 61.3% of the total population have Internet facilities in their various schools while 265 respondents representing 38.7% of the total population do not have Internet facilities in their schools. Thus, indicating that very large number of respondents have Internet facilities in school.

Table 10.0: Do you use ICT facilities in teaching-learning process?

Response	Frequency	Percentage	Valid percentage
Yes	645	94.2	94.2
No	45	5.8	5.8
Total	685	100.0	100.0

Source: *Questionnaire administered 2015*

Table 10.0 shows that 94.2% of the population which represents 640 respondents use ICT facilities in teaching-learning process in their schools, while 5.8% of the total population representing 45 respondents do not use ICT facilities in teaching-learning process. This indicates that greater percentage of the respondents make use of the available ICT facilities in teaching-learning, in their various schools.

Table 11.0: Have you undergone any form of training on the use of ICT facilities?

Response	Frequency	Percentage	Valid percentage
Yes	376	54.9	54.9
No	309	45.1	45.1
Total	685	100.0	100.0

Source: *Questionnaire administered 2015*

Table 11.0 shows that 54.9% of the population representing 376 respondents has undergone training on the use of some ICT facilities, while 45.1% of the total population representing 309 respondents has not undergone any form of training. This indicates that larger percentage has gone for training for some use of ICT facilities but not all apply same in teaching-learning process.

Hypothesis Testing

The hypothesis for the research is stated as follows;
H_0: Has ICT not improved teaching-learning process among teachers?
H_1: Has ICT improved teaching-learning process among teachers?

The Chi-square test is used for the hypothesis testing and Table 10.0 is used to analyze the hypothesis.

Response	Yes	No	Row Total
Yes	645	0	645
No	0	45	45
Total	645	45	685

Source: *Questionnaire administered 2015*

Chi-square statistic is estimated using the following equation.

$$X^2 = \sum_{i=1}^{k} (o_i - e_i)^2 / e_i$$

where;

X^2 = Chi-square

O_i = Observed frequency

e_i = expected frequency

K = total number of cells (category)

Therefore;

$e = (RT * CT)/GT$

where;

RT = RowTotal

CT = Column Total

GT = Grand Total

Table 12.0: Computations using Chi-square statistic

Observed	Expected	o_i-e_i	$(o_i$-$e_i)^2$	$X^2 = (o_i$-$e_i)^2/e_i$
645	607	38	1444	2.4
0	42	-42	1764	42
0	42	-42	1764	42
45	3	42	1764	588
				674.4

Source: *Computation by Researcher 2015*

The degree of freedom = d.f = (r – 1) (c – 1) $\Rightarrow$ (5-1)(5-1) $\Rightarrow$ 16 $\Rightarrow$ d.f
5% significance level $\Rightarrow \infty = (0.05)$

Table 12.0 shows that X^2 calculated = 674.4, and the critical table (X^2 tabulated) = 26.296, at $\infty = (0.05)$.

Decision Rule

Based on the analysis, since X^2 calculated = 674.4, while the critical table (X^2 tabulated) = 26.296 at ∞

(0.05). This shows that (X^2 calculated) > (X^2 tabulated), therefore we reject the null hypothesis H_o, and accept the alternative hypothesis that ICT has improved teaching-learning process among secondary school teachers.

Hypothesis 2;
H_o: Has ICT not improved teaching-learning process among teachers?
The responses from Table 8.0 is used for analysis and test for the hypothesis H_o

Response	Yes	No	RowTotal
Yes	650	0	650
No	0	35	35
Total	650	35	685

Source: *Questionnaire administered 2015*

Chi-square statistic is used to test the hypothesis.

$$X^2 = \sum_{i=1}^{k}(o_i - e_i)^2 / e_i$$

where;

X^2 = Chi-square

O_i = Observed frequency

e_i = expected frequency

K = total number of cells (category)

Therefore;

$e = (RT * CT)/GT$

where;

RT = RowTotal

CT = Column Total

GT = Grand Total

Table 13.0: Computations using Chi-square statistic

Observed	Expected	o_i-e_i	$(o_i$-$e_i)^2$	$X^2 = (o_i$-$e_i)^2/e_i$
650	618	32	1024	1.7
0	33	-33	1089	33
0	33	-33	1089	33
35	2	-33	1089	545
				612.7

Source: *Computation by Researcher 2015*

The degree of freedom = d.f = (r – 1) (c – 1) $\Rightarrow$ (2-1)(2-1) $\Rightarrow$ 1
5% significance level $\Rightarrow$ ∞ = 0.05

Table 13.0 shows that X^2 calculated = 612.7, and the critical table (X^2 tabulated) = 3.841 at ∞ = (0.05)

Decision Rule

Our analysis show that X^2 calculated > the value on the critical table (X^2 tabulated), at degree of freedom, ∞ = (0.05), we therefore reject the null hypothesis H_o, and accept the alternative hypothesis that ICT has impact on the respondents.

IV. CONCLUSION AND RECOMMENDATION

For the schools to be effective, computer literacy should be established through availability of computers, computer utilization, and content competencies in the schools, as well as through teachers' effectiveness in the areas of teaching-learning, record keeping, supporting student academic performance, teachers job performance, school discipline and community services. The application of ICT has transformed the learning and teaching process in which secondary school teacher's deal with knowledge in an active, self-directed and constructive way. ICT is not only employed as an instrument, which can be added for existing teaching methods but also seen as an important instrument to support new ways of teaching-learning process. It is being integrated into the teaching-learning process in various educational institutions in Nigeria and the world in general.

This research revealed that the emergence of ICT have greatly improved the teaching-learning process in many secondary school teachers in Kebbi State, Nigeria. ICT facilities are available in most schools. However, there is still need for more training and retraining of teachers. Also, it is recommended that constant power supply should be made available in schools so as to avail teachers, more opportunity of using these facilities.

Finally, Non-Government Organizations', Parents Teachers Association, Religious Organizations, etc. should provide the required ICT infrastructure in schools.

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