
Effect of Information and Communication Technology on the Performance of Teachers in Selected Secondary Schools in Nasarawa Metropolis, Nasarawa State

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Abstract

The objective of the study is to investigate the effect of information and communications technology on the performance of teachers in the selected secondary schools in Nasarawa metropolis. Survey method was used and data were analysed using descriptive statistics and regression analysis. A population of 1600 teachers with a sample of 320 using Taro Yamane's simplified formulae. The result shows that there is a significant relationship between ICT and teacher performance in the selected secondary schools in Nasarawa metropolis with a significant positive effect. The study concludes that if properly managed, ICT has potential to improve teachers' performance. In light of these, the study recommended that teachers should be trained on how to manage their attitude towards ICT to take optimum advantages, the management of the selected secondary schools should provide enabling environment to improve environmental factors, every stakeholder should use a unique strategy to solve teachers' efficiency in service delivery and teachers with passion to ICT should be encouraged to improve service quality.

Keywords: Attitude, ICT, Performance, Service Quality, Teacher.

1. Introduction

Teachers of secondary schools were using the traditional learning method prior to the coming of Information and Communication Technology (ICT) in Nigerian educational sector. All over the world, educational sector has witness changes due to paradigm shift over time that enhance or affect performance of teachers in secondary schools and what is happening in Nasarawa State, Nigeria is not an exception because evidence of change is shown in the usage of modern technology to coordinate and monitor activities such as virtual classrooms, student's verification of examination results, student's enrolment, students record keeping, etc. A teacher inspires, motivates and encourage students to acquire knowledge, to have hope through hardworking but performance of a teacher

arise from the job objectives with service requirement and knowledge of ICT is an essential requirement in this era of technology since technology is developed to solve problems and educational problems are not exempted. Also, the introduction of ICT in secondary schools has clearly changes the learning process and the extent to which teachers perform their tasks and use of ICT also paves way for a new pedagogical approach in the teaching profession. Besides, ICT provides a paperless working environment in the educational sector and connects the users to process various information for decision making and mitigating the traditional ways of solving problems in our society. Ogwuche and Ahmed (2018) asserts that information accessed through digital technologies can promote innovation,

increase productivity and enrich the quality of lives.

The concept of performance in the teaching profession has generated a lot of debates among scholars in the universe. Performance of teachers' in today's turbulent and struggle to survive the economic hardship is essential to all the stakeholders. Performance of teachers in secondary schools has several variables that determine it and if the variables are critically solve it can enhance quality of services in the secondary schools. Consider for example, virtual classroom, facilitation of information flow between all stakeholders, accessing works of other researchers can enhance performance. Performance measure actual results against the standards and any variations that arise a decision can be taken to improve it. However, performance of teachers in secondary schools can yield good results if opportunities are created for teachers to work and motivate them to come up with something good and unique through training and good conducive environment for work. Ogbu and Osanaiye (2017) asserted that performance of organization depends on the knowledge and ability of its employees toward understanding the dynamism in the market. Albu (2005) asserted that performance is an ambiguous and integrative concept. Indeed, it may be erroneous to use the same measurement instrument with the same standard in assessing different variables e.g. measuring secondary schools in the rural and urban areas in the same sector with same grades, instead it will be fair to use same measurement instrument with relative standard.

Teachers are expected to render quality services at the time that the services is seriously needed using unique strategy but the introduction of Information and Communications Technology (ICT) has changed the learning process in most-secondary school and teachers' perception about ICT, environmental factors, teachers

efficiency in service delivery and service quality influenced their performance.

The objective of the study is to investigate the effect of ICT on performance of teachers in the selected secondary schools in Nasarawa metropolis. Besides, the study seeks to attain the following specific objectives:

- (i). Determine the effect of ICT on teachers' attitude in the selected secondary schools in Nasarawa metropolis.
- (ii). Assess the effect of ICT on environmental factors in the selected secondary schools in Nasarawa metropolis.
- (iii). Investigate the effect of ICT on teachers' efficiency in service delivery in the selected secondary schools in Nasarawa metropolis.
- (iv). Examine the effect of ICT on service quality in the selected secondary schools in Nasarawa metropolis.

The following questions are formulated to guide the study:

- (i). To what extent does the effect of ICT on teachers' attitude in the selected secondary schools in Nasarawa metropolis?
- (ii). How does the effect of ICT on environmental factors in the selected secondary schools in Nasarawa metropolis?
- (iii). To what extent does the effect of ICT on teachers' efficiency in service delivery in the selected secondary schools in Nasarawa metropolis?
- (iv). How does the effect of ICT on service quality in the selected secondary schools in Nasarawa metropolis?

The following hypotheses were developed and tested:

H₀₁: Teachers' attitude towards ICT has no significant effect on teachers' performance in the selected secondary schools in Nasarawa metropolis.

H₀₂: Environmental factors towards ICT has no significant effect on teachers' performance in the selected secondary schools in Nasarawa metropolis.

H₀₃: Teachers' efficiency in service delivery towards ICT has no significant effect on teachers' performance in the

selected secondary schools in Nasarawa metropolis.

H₀₄: Service quality towards ICT has no significant effect on teachers' performance in the selected secondary schools in Nasarawa metropolis.

2. Literature Review

Technology has reduced a lot of uncertainties about information and makes the world a global village by allowing access to information to enhance performance in an organization. Prior to the introduction of ICT, the teaching profession faced challenges such as teachers' efficiency in service delivery and service quality but technology has eased the challenges and made service delivery faster due to a paradigm shift. Ahmed et al. (2020) asserts that ICT is a new phenomenon that revolutionized every profession in the

as stipulated by the model below:

world and a key driver to performance in every organization. Ogwuche and Ahmed (2018) asserts that ICT is a computer-based tools and techniques that can convert information, images and sound into common digital form. Ani et al. (2015) opined that the advent of ICT and electronic information resources has changed the landscape of research at university which brought about the migration of information from print to electronic format. Mohammad et al. (2014) asserts that ICT is a new technology that have influenced organizational and industrial environment around us. Atuenyi (2009) opined that ICT is a set of components for analysing, processing, transmitting and sorting data in order to deliver information for action. The framework was formed to show the effect of independent variables and dependent variable

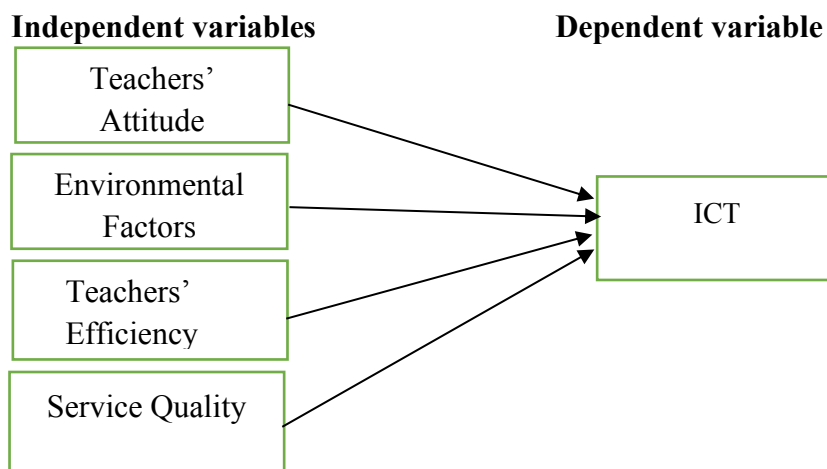


Figure 1: Conceptual framework

Service organizations are leveraging on technology to innovate their services and the influence

of ICTs on teachers' attitude is pervasive, as service organizations were among the early adopters of ICTs using internet to allow teachers and students to demonstrate their competencies towards learning in their various schools. The environmental factors go a long way to influence the performance of teachers' either internally or externally

and teachers are irrational in their behaviours. Karimi and Abdulkadir (2012) asserted that it is holistic to describe the qualities of individual or group of employees passing from generation to generation. The students' perception is an issue of great concern as learning is necessary but perceived adequacies or

inadequacies of students' conscious understanding of the usage of ICT and psychological states of students will definitely give different descriptions about the usage of ICT which posed a great threat to learning process. Besides, service quality is needed to enjoy the use of ICT at each level of learning process and students must acquire the skills to use it.

Teachers' use different forms of ICT in discharging their responsibilities such as e-learning. Also, different theories underpinnings from which the study is grounded is adopted as theoretical framework and these include Theory of Human Service Delivery, Scientific Management Theory and Technology Acceptance Model (TAM) were used.

The theory of human service delivery asserted that services cannot be touch or handle but exist as an event and delivering it to a person involves satisfying the needs and servers must be capable of interacting in a positive and effective manner. The quality of one service to another differ immensely and organizations can improve

the quality and consistent of their services through their great effort (Casey, 2009). Indeed, ICT has a theoretical linkage with theory of human service delivery since service exist as an events and quality is required. The scientific management theory focused on improving efficiency and elimination of waste in order to ensure effective and efficient performance, it makes the user of ICT to be creative and innovative. The theory is relevant because it aimed at improving performance through the use of technological innovations. Also, Technology Acceptance Model (TAM) asserted that whenever the user perceives an innovation in the technology the user believed in a positive direction that the technology can perform. It explores the factors that influence behavioural intention to use ICT and suggests a linkage between perceived usefulness and perceived ease of use (Davis, 1989). Besides, ICT has a theoretical linkage with TAM since the attitudes and intentions in the minds of users is useful. The TAM is depicted below:

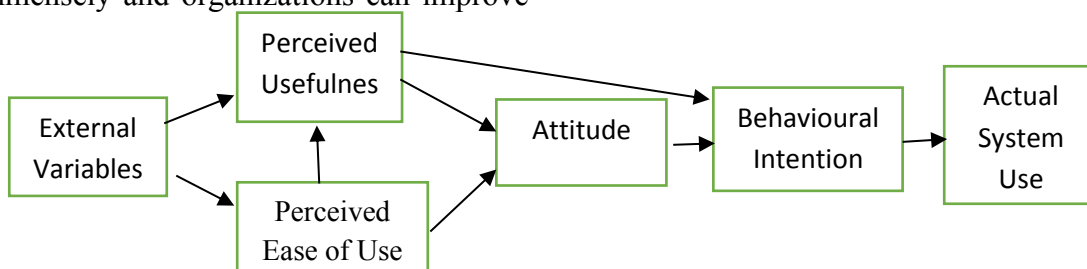


Figure 2: Technology Acceptance Model (TAM) - Source: Davis (1989)

Empirical studies carried out over the years in different places, using various methodologies and variables showed mixed or inconclusive results which give room for further research using different variables and methodologies. Certain factors such as the study objectives, the constraints, the location, etc. accounted for the similarities and differences. Also, most of the research findings on training of employees used inappropriate statistical tools and the challenges of quality performance in the healthcare service demands continuous review. Some other empirical studies such

as Gilbert (2022), Ahmed et al. (2020), Omiola et al. (2020), Ahmed and Abdulkarim (2020), Ogwuche and Ahmed (2018), Adewoye and Abioro (2017) and Oshi et al. (2016) were also carried out on ICT to improve performance.

Gilbert (2022) investigated the importance of ICT on academic productivity of librarian in Federal Polytechnic, Bali (FPB) with the objective to investigate the importance of ICT on academic productivity of librarian in FPB. Survey method was used with a sample of 40 employees and a population of 40

employees. The study revealed that majority of librarian indicates that the level of use of ICT facilities in FPB is very poor and most of the librarian lack knowledge of ICT. One major shortcoming with Gilbert (2022) as observed by the current study was the use of simple percentage instead of using regression analysis.

Ahmed et al. (2020) conducted a study on information and communications technology and employee performance, evidence from Federal Polytechnic, Nasarawa (FPN) with the objective to investigate the effect of information and communications technology on employee performance in FPN. Survey method was used with a sample of 273 respondents and a population of 855 employees using Taro Yamane's simplified formulae. The results showed that there is a significant relationship between ICT and employee performance in FPN with a strong significant positive effect. One major shortcoming with Ahmed et al. (2020) as observed by this study was tertiary institution they used was not clearly justified.

Omiola et al. (2020) carried out a study on assessment of the effect of digital info-graphics illustration on the academic achievement of students' in digestive system biology concept in Dutsin-Ma metropolis with the objective to find out how effective is the use of digital info-graphics illustration on the academic achievement of students' in digestive system biology concept in Dutsin-Ma metropolis. The study used a non-randomized pre-test control group with a sample size of 82 students, 42 students for experimental and 40 for control group. The study revealed that students taught with digital info-graphics illustration learning strategy in digestive system biology have higher mean achievement than their counterpart taught with conventional method. One major shortcoming with Omiola et al. (2020) as observed by the

current study was the study sample was not clearly justified.

Ahmed and Abdulkarim (2020) carried out a study on effect of ICT on the performance of estate surveyors and valuers during covid-19 pandemic in Federal Capital Territory (FCT) Abuja with the objective to investigate the effect of ICT on the performance of estate surveyors and valuers during covid-19 pandemic in FCT Abuja. Survey method was used with a sample of 306 respondents and a population of 1300 respondents. The study revealed that access to ICT services negatively affects the performance while reliability and attitude positively affects the performance. One major shortcoming with Ahmed and Abdulkarim (2020) as observed by the current study was the use of one professional body to represent other professional bodies without justification.

Ogwuche and Ahmed (2018) carried out a study on impact of ICT on teaching and learning in Nigerian tertiary institutions with the objective to determine the positive and negative influence and challenges of ICT on teaching and learning in Nigerian tertiary institutions. The study revealed that integrating ICT into teaching and learning process in all institutions of learning is long over-due. One major shortcoming with Ogwuche and Ahmed (2018) as observed by the current study was they did not specify the methodology they used and the tertiary institution they used was not clearly justified.

Adewoye and Abioro (2017) carried out a study on ICT and employees job security in selected manufacturing companies in Nigeria with the objective to examine the effect of ICT on job security of employees in Nigeria. Descriptive statistics was used to analyze the data and Pearson Product Moment Correlation was used to test the hypotheses. The study revealed that implementation of ICT provides higher productivity, security of employee job and more value creation. One major shortcoming with Adewoye and Abioro

(2017) as observed by the current study was the used of two manufacturing companies from among the existing firms in Nigeria was not clearly justified.

Oshi et al. (2016) studied impact of ICT on employee productivity in selected public enterprises in Rivers State with the aim to look at how perceived ICT belief and task-technology fit affects employee productivity. The study used personal characteristics as a moderating variable. The study found out that there is a high regression weight existing between task-technology fit and employee productivity while a negative regression weight existing between perceived ICT belief and employee productivity. One major shortcoming with the study as observed by the current study was, they used selected public enterprises in Rivers State and the choice was not clearly justified and they did not explain how the sample size was arrived at.

3. Methodology

Survey method was used because the respondents were spread all over the secondary schools in Nasarawa metropolis. The survey population of this research consists of 1600 teachers of secondary schools selected at random in Nasarawa metropolis. The choice of selected secondary schools was based on number of teachers, availability of ICT facilities and their proximity. The primary instrument used for the collection of data for this study is the questionnaire which was administered

and retrieved the same manner from a sample of 320 respondents.

Sample of the study was determined by Yamane’s simplified formulae, the Yamane (1967) formulae is $n = \frac{N}{1 + Ne^2}$. Where: **n** is the calculated sample size, **N** is the population size, and **e** is the acceptable sampling error and the choice of 0.05 level of significance is purely and exclusive decision of researchers. Thus, $n = \frac{1600}{1 + 1600(0.05)^2}$

$$n = \frac{1600}{1 + 1600(0.0025)} \quad n = \frac{1600}{1 + 4} \quad n = \frac{1600}{5} \quad n = 320 \text{ respondents.}$$

The regression model is:

$$ICT = \beta_0 + \beta_1TA + \beta_2EF + \beta_3SP + \beta_4SQ + \mu_i$$

Whereas:

ICT = Information and Communication Technology, TA = Teachers’ Attitude, EF = Environmental Factors, SP = Students’ Perception, SQ = Service Quality, b_0 = Intercept or Constant, β = Slope of the regression line with respect to the independent variables, μ = error term and *i* denotes cross-sectional dimension.

4. Results and Discussion

This section contains the presentation and the analysis of data as well as the discussion of the findings. The administered copies of questionnaire were designed in line with the research questions, objectives and hypotheses in order to ascertain the relationship among the different adopted variables of ICT and performance of teachers’ in the selected secondary schools in Nasarawa metropolis.

Table 1 Return Rate of Respondents

Responses	Questionnaire Administered	Questionnaire Not Returned	Questionnaire Returned	Percentage of Total Questionnaire Returned
Al-Birr Acad.	32	3	29	10
Al-Iman Sch.	32	5	27	9.4
Asssul Islam	32	2	30	10.4
Baptis College	32	6	26	9
Com. Sec. Sch.	32	5	27	9.4
Destiny Kings	32	7	25	8.7
Govt. College	32	0	32	11.1
Govt. Sci.Sch.	32	1	31	10.8

Govt. Day Sec.	32	1	31	10.8
Poly. Acad.	32	2	30	10.4
Total	320	32	288	100

Source: Field Survey, 2022

The return rate of respondents on Table 1 displays the response rate on the numbers of questionnaires administered to each secondary school in Nasarawa metropolis whom were the respondents for this study. It revealed that 32 questionnaires were administered to all the selected secondary schools in Nasarawa metropolis. Furthermore, 10.0% of the total questionnaires returned were from Al-Birr Academy, 9.4% were from Al-Iman School, 10.4% were from Asssul Islam School, 9.0% were from Baptis College, 9.4% were

from Community Secondary School, 8.7% were from Destiny Kings and Queens College, 11.1% were from Government College, 10.8% were from Government Science School while, 10.8% were from Government Day Secondary School and 10.4% of the respondents were from Polytechnic Academy. This table also shows that out of a total of 320 questionnaires administered, 288 representing 90% were retrieved or returned and it is sufficient enough for the continuation of analysis.

Table 2: Demographic Characteristics of Respondents

Variables	Respondents' Category	Freq.	Percentages
Gender	Male	208	72.2
	Female	80	27.8
	Total	288	100
Age	Below 30 years	32	11.1
	31-40 years	129	44.8
	41-50 years	54	18.8
	51 years and above	73	25.3
	Total	288	100
Qualification	NCE	49	17
	B. Sc. and Equivalents	187	64.9
	Postgraduate	52	18.1
ICT Experience	Total	288	100
	Below 1 year	125	43.4
	2 – 4 years	92	31.9
	Above 5 years	71	24.7
	Total	288	100

Source: Field Survey, 2022

Table 2 shows the demographic characteristics of the respondents of this study, 208 respondents representing 72.2% are male while 80 of them representing 27.8% are female. The responses showed preponderance of male more than female in the selected secondary schools in Nasarawa

metropolis. The age brackets of these respondents showed that 32 are Below 30 years of age representing 11.1% while 129, representing 44.8% are between the ages of 31 and 40 years. 18.8% and 25.3% of the respondents are between the ages of 41 and 50, and above 51 years respectively. Further

revelation by the table showed that 49 of these respondents representing 17.0% are NCE holders, 187 of these respondents representing 64.9% are B.Sc and equivalent holders while, 52 of these respondents representing 18.1% are postgraduate

holders. Besides, 125 of them representing 43.4% have below 1 year of ICT experience, 92 of them representing 31.9% have 2 – 4 years of ICT experience while, 71 of them representing 24.7% have above 5 years of ICT experience.

Table 3 Model Summary

Indicator	Coefficient
R	0.679
R ²	0.461
Adjusted R ²	0.453
Std. Error of the Estimate	1.225

Source: *Field Survey, 2022*

The regression results in Table 3 showed that the goodness of fit for the regression between ICT and teachers' attitude, environmental factors, teachers' efficiency in service delivery and service quality are adequate. The value of $R = 0.679$ represents simple correlation which shows the relationship between the variables also indicates a high degree of correlation while the value of $R^2 = 0.461$ represents the four variables studied and other factors not studied in this work contribute to 53.9%. It shows that holding other factors constant

46.1% of the variances in teachers' attitude, environmental factors, teachers' efficiency in service delivery and service quality are explained by the variations in ICT of teachers' performance in selected secondary in Nasarawa metropolis. The value of adjusted $R^2 = 0.453$ represents the coefficient of determination that explains the variation in the dependent variable due to changes in the independent variables. The value of standard error of estimate which is 1.225 represents the effect of the factors outside this study.

Table 4 Analysis of ANOVA Variance

Indicator	Sum of Squares	Df	Mean Square	F	Sig.
Regression	362.984	4	90.746	60.442	0.000
Residual	424.891	283	1.501		
Total	787.875	287			

Source: *Field Survey, 2022*

The ANOVA results in Table 4 revealed that the processed data had a significance level of 0.000 which shows that the data is optimal and the model is acceptable this was supported by F statistics of 60.442 and reported probability was less than the

conventional probability of 0.05 significance level is a clear indication that teachers' attitude, environmental factors, teachers' efficiency in service delivery and service quality influenced ICT in selected secondary in Nasarawa metropolis.

Table 5 Regression Coefficient Results

Variable	Beta	Std. Error	T	Sig.
Constant	1.098	0.163	6.717	0.000
TA	0.429	0.126	3.417	0.001
EF	0.384	0.142	2.698	0.007
TE	-0.493	0.126	-3.943	0.000
SQ	0.403	0.122	3.294	0.001

Source: Field Survey, 2022

The regression coefficient in Table 5 indicates that the relationship between ICT in selected secondary schools on teachers' attitude, environmental factors, teachers' efficiency in service delivery and service quality as depicted in the regression equation: $ICT = 1.098 + 0.429TA + 0.384EF + -0.497TE + 0.403SQ$. It provides the constant value and the beta values for each factor variable studied. Indeed, there was a strong positive relationship between the study variables as indicated by a positive constant value of 1.098.

The regression equation indicated a positive relationship between teachers' attitude with a value of 0.429, environmental factors with a value of 0.384, teachers' efficiency in service delivery with a value of -0.497 and service quality with a value of 0.403 if one variable increases the other variable increases.

5. Conclusion and Recommendations

The results and analyses showed that, teachers' attitude, environmental factors and service quality were positively related to ICT in FPN with statistical significance while, teachers' efficiency in service delivery was negatively related to ICT. The findings showed that there is a significant relationship between ICT and teachers' performance in selected secondary schools in Nasarawa metropolis with a significant positive effect. The study concluded that if properly managed, ICT has potential to improve teachers' performance.

In light of these, the study recommended that teachers should be trained on how to manage their attitude towards ICT to take optimum advantages, the management of

the selected secondary schools should provide enabling environment to improve environmental factors, every stakeholder should use a unique strategy to solve teachers' efficiency in service delivery and teachers with passion to ICT should be encouraged to improve service quality.

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