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Evaluation of Information Technology Proficiency of Pupils at the Basic Level of Nigeria's Educational System

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Abstract

This study carried out a quantitative survey of the level of IT competence in about five notable public primary schools in Ilaro town, headquarter of Yewa South Local government, Ogun State, Nigeria with questionnaires distributed randomly across 250 participants. The study discovered that just 4% of the participants are vast in the use of computers and 10% are surface users while 86% are non-users and could not understand how the knowledge of IT could improve their lives as well as the nation at large. From the statistical analysis carried out, it is evident that the curriculum at this level of education is deficient of the relevant IT knowledge required to equip the pupils for the present era of Information Technology.

Keywords: Educational System, Information Technology, IT Competence, Primary school

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1. Introduction

Globalization has turned the world into a village which was made possible through the advent of Information technology (IT). At the core of IT is Artificial Intelligence (AI). IT at present is revolutionizing the world and virtually every aspect of man's life is now AI-driven. Presently, there is hardly any area or field that does not have that touch of AI or its application in it. Today, IT is the basis of productivity, competition, wealth, and comfort. Developed economies are focusing on approaches to increasing and giving better quality education using this tool (Ndou, 2004; Magoulas & Chen, 2006; Khanna, Kaushik, & Barnela 2010). A comparison between the modern world and half a century ago shows significant developments in sciences, business, medical services, communications, advertisement, and many more (Matthews, 1973; Watson, Crawford & Farley 2003; Liao, Loures, Deschamps, Brezinski & Venâncio, 2018). In order to enhance the quality of education, countries in the emerging world are engaging the innovativeness obtainable through the integration of Information and Communication Technology (ICT) (Ifinedo & Kankaanranta, 2018).

Surprisingly, this significant development has not been widely evident in the public primary and secondary education sector of Nigeria (Agbetuyi & Oluwatayo, 2012). The conventional methods of learning are still operational. There is, therefore, the need to take the full advantage of this veritable tool to the fullest. The nation is still struggling in several areas where the IT could have been used to her advantage and hence advance the nation and salvage it from the level of poverty presently experienced. Many pupils at the primary school levels have heard or seen computer system at one point or the other and are interested in utilizing the tool. However, most of the pupils at this level only think of using the computer or digital-enabled devices for playing games because of their level of

knowledge. Meanwhile, the full advantage of their interest could be engaged through this tool by developing a curriculum that is IT-driven.

In the last curriculum for primary schools, Computer Studies/ICT is part of the core subjects (Awofala & Sopekan, 2013). There is need to implement this curriculum and emphasis should be practical based IT-driven subjects where pupils have access to web-based instructional materials and can also submit their assignment through a child-protected (parental control) educational platform, in addition to the conventional teaching. Implementing this continuously gives the competence required at an early age. Government input in this regard in terms of infrastructures such as computer sets, electricity, Internet accessibility, and others will also enhance the smooth running of such a system.

Education and learning are lifetime processes, there is no limit on when to start and stop. In Nigeria's educational system, several children start primary school at the age of 5 or 6 years and spend the next six years in the school, graduating at the age of 11 or 12 years. The Universal Basic Education (UBE) programme was initially introduced into the Nigerian educational system in September 1988 (Igbokwe, 2015). It was a combination of European and American systems of education consisting of six-year primary school education, three years of comprehensive junior secondary education, three years of senior secondary school, and four years and above in higher institutions of learning depending on the course of study.

This system resulted to the structure of 6-3-3-4 which is the same as that of the United States of America, Canada, Greece, Egypt, and South Korea (Education system in Nigeria, 2017; Ifeanyi, 2015). In 2008, another structure was implemented consisting of 9-year basic education right from primary 1 to JSS 3. The old curriculum was gradually and systematically phased out, giving a structure of 9-3-4 system of education. The latest modification came in 2012 when the National Council on Education changed the Nigerian education system to five levels (1-6-3-3-4) with the inclusion of one-year pre-primary education in order to provide better access to education (Federal Ministry of Education, 2014).

The curriculum is the main cornerstone of which the learning process in the school lies. The development of contents, teacher's training, developing school plans, student evaluation, and others are all based on the curriculum (Osuji, 2009; Musa, Hafiz & Bello, 2018). It, therefore, means that without the curriculum, no school can function appropriately. It also gives focus and ensures that the same operation that is performed in a school will be performed in other schools.

The implementation of the curricula at the public primary school visited is however not IT-driven and the level of Computer studies/IT subject included is purely theoretical, though it was stated that computers should be made available. From all the public primary schools visited, there was no evidence of computer laboratory for these pupils, no connection to electricity, not even a computer system in the office of the headteacher, talkless of having computers to teach and enhance the interest of pupils in other subject areas. A curriculum without the infrastructure to back it is not sufficient in raising the next generation of scholars and leaders who will compete well internationally. This research, therefore, carries out a study to establish the computer competence of pupils at this basic level of education in Nigeria's education system to bring a clearer picture of the present situation to bear.

2. Methodology

The study subjects were Basic 3 to 6 pupils from five notable public primary schools in Ilaro township, Headquarters of Yewa South local government, Ilaro, Ogun State, Nigeria. The quantitative research method in the survey type was adopted for the study. The population for the study comprised 50 participants per school. This was used as a sample for the study. The respondents were carefully selected through a random sampling method. Data was collected through a structured questionnaire for collating the perception of respondents of IT and their computer prowess as entrenched in primary schools. Close-ended questions were adopted which provided answers that are easy to interpret and tabulate. The survey was carried out between August-November 2019. All the questionnaires administered to the respondents were retrieved.

The reliability of the instrument (that is, the questionnaire) measured with Cronbach's alpha was 0.854. Descriptive Statistics were applied to scale statements to examine the order of importance. Ordinal logistic regression analysis was also employed to ascertain the contribution of gender, age, and a class of the pupils to IT competence coupled with their rates of exposure to computer usage. The relationship existing between the socio-demographic information of the pupils and their IT competence was also examined using the Spearman Rho technique.

3. Results

Table 1: Data Summary

VARIABLES		CODE	N	Marginal Percentage
Level of Computer Usage	Non-user	Q3=1	189	75.4%
	Surface user	Q3=2	41	16.4%
	Vast user	Q3=3	20	8.0%
Gender	Male	Sex=1	158	63.2%
	Female	Sex=2	92	36.8%
Age	≤ 10 YEARS	Age=1	106	42.4%
	>10 YEARS	Age=2	144	57.6%
Class	Basic 3	Class=3	62	24.8%
	Basic 4	Class=4	40	16.0%
	Basic 5	Class=5	67	26.8%
	Basic 6	Class=6	81	32.4%

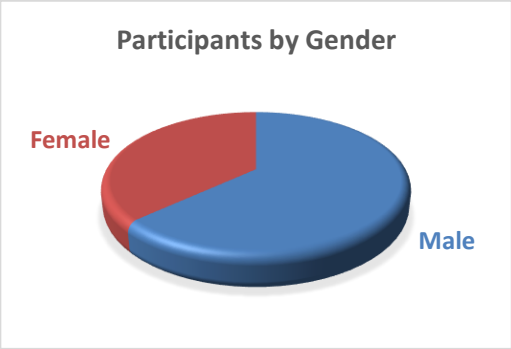

Figure 1: Participants by Gender

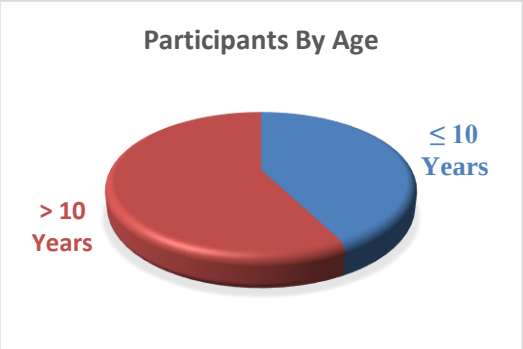

Figure 2: Participants by Age

The participants comprise of 158 boys (63.2%) and 92 girls (36.8%) taking from four different classes in five schools (Table 2 and Figure 1), 42.4% are younger than 10 years old while the remaining 57.6% are older than 10 years (Table 2 and Figure 2)

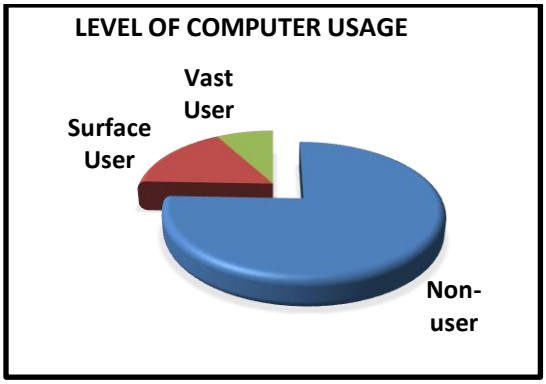

Figure 3: Participants by Classes

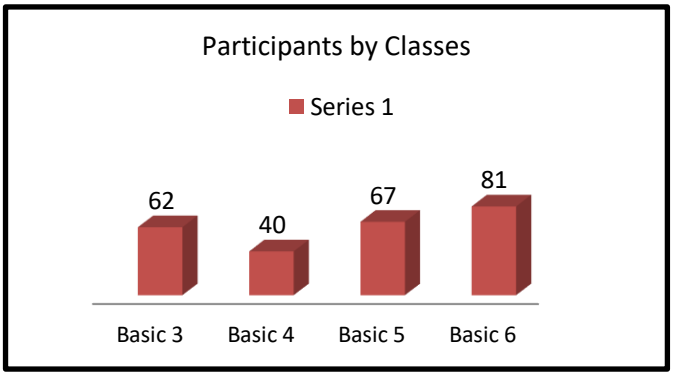

Figure 4: Level of Computer Usage

Table 1 and Figure 3 show that 24.8% of the participants are from Basic 3, 16.0% from Basic 4, 26.8% from Basic 5 and 32.4% from Basic 6. The level of computer usage is represented in Table 2 and Figure 4, with a whopping 75.4% of the participants that never used a computer or any electronic enabled gadgets for learning. Further statistical analyses were done in Tables 2 – 5.

Table 2: Ordinal Regression

		Model Fitting Information			
	Model	**-2 Log Likelihood**	**Chi-Square**	**df**	**Sig.**
Computer	Intercept Only	89.815			
Proficiency*GENDER	Final	73.261	16.554	1	.000
Computer	Intercept Only	33.788			
Proficiency*AGE	Final	25.236	8.552	1	.003
Computer	Intercept Only	53.252			
Proficiency*CLASS	Final	42.091	11.162	3	.011

Table 3: Chi-Square Test of Independence

Goodness-of-Fit

Factor	Pearson χ^2	df	Sig.	Decision
Computer Proficiency*GENDER	54.896	1	.000	Sex is dependent on Computer Proficiency
Computer Proficiency*AGE	5.668	1	.017	Age is dependent on Computer Proficiency
Computer Proficiency*CLASS	8.675	3	.034	Basic Class of Pupils is dependent on Computer Proficiency

Table 4: Measure of Determination (Pseudo R-square)

Model	Nagelkerke R^2	Cox and Snell R2	McFadden
Computer Proficiency*GENDER	0.573	0.464	0.331
Computer Proficiency*AGE	0.638	0.534	0.416
Computer Proficiency*CLASS	0.750	0.644	0.521

Table 5: Parameter Estimates

			Estimate	Std. Error	Wald	Df	Sig.
	Threshold	[Q3 = 1]	-.702	.206	11.678	1	.001
GENDER*Computer		[Q3 = 2]	.785	.207	14.370	1	.000
Proficiency	Location	[SEX=1]	-.982	.250	15.385	1	.000
		[SEX=2]	0[a]	.	.	0	.
	Threshold	[Q3 = 1]	-.434	.165	6.945	1	.008
GENDER*Computer		[Q3 = 2]	1.013	.177	32.786	1	.000
Proficiency	Location	[AGE=1]	-.717	.246	8.529	1	.003
		[AGE=2]	0[a]	.	.	0	.
	Threshold	[Q3 = 1]	-.652	.216	9.099	1	.003
		[Q3 = 2]	.809	.219	13.693	1	.000
Class*Computer	Location	[CLASS=3]	-.596	.316	3.562	1	.059
Proficiency		[CLASS=4]	-.630	.363	3.018	1	.082
		[CLASS=5]	-1.028	.319	10.395	1	.001
		[CLASS=6]	0[a]	.	.	0	.

4. Discussion

Reliability analysis made returned a Cronbach's Alpha statistic of 0.854 in Table 1, which indicates a high level of internal consistency for the scales used under study. This also shows that the scales were found to be reliable for the research work thereby showing the individual contribution of all the barrier factors for the decision-making process.

Examining the result in Table 1 shows the ordered coding and marginal percentage of the variables used for predicting the odds. It is evidenced that most of the respondents (75.4%) were non-users with only 16.6% and 8% representing surface and vast users respectively. From Tables 2 and 3, the model for primary school pupil's computer proficiency on gender does give a significant improvement over the baseline intercept-only model. This tells that the model gives better predictions than guessing based on the marginal probabilities for the outcome categories. All other models of age and class also give significant improvement over the baseline intercept-only model which also serves as a contributory improvement in computer proficiency of the respondents. From the measure of determination in Table 4, Nagelkerke R-square is mostly reported since it has the highest value of Pseudo R-square in measuring the goodness of fit. There are approximately 57.3%, 63.8%, and 75% variation in the level of computer usage for the achievement of economic advancement through Information Technology competence based on gender, age, and class.

Table 5 describes the parameter estimates of the variables used in predicting the IT competence of the pupils at the primary school level. The Wald values with their associated P-values < 0.05 indicates that sex is a contributing factor to the competency of the primary school pupils in Information Technology computer usage. Taking the gender of respondents as a measure of computer proficiency in Nigeria primary schools, an estimate of -0.982 ($exp^{-0.982}$) indicates that the odds of a female primary school pupil being vast in computer usage and thus advancing the economy of the nation is 0.3746 more likely compared to the opposite sex as at the time of schooling. This means that male ($exp^{0.982} = 2.6698$) pupils tend to develop more passion for Information Technology (IT) than their female counterparts. Besides, the analysis also revealed that age is a contributing factor in harnessing the economy through a technologically driven curriculum from the grassroots since its P-value < 0.05 significance level. An estimate of -0.717 ($exp^{-0.717} = 0.4882$) indicates that the odds of a primary school pupil to be vast in computer usage in advancing the economy of the nation whose age is less than or equal to (£) 10 is 0.4882 more likely compared to those whose age is above 10 years old at the time of schooling. This means that pupils of age >10 years ($exp^{0.717} = 2.0483$) tend to develop a passion for Information Technology (IT) than those of £10 years of age.

It can also be vividly seen from Table 5, that Basic Class of pupils as a measure of IT competence in primary schools shows that respondents in basic 3 and 4 does not significantly contribute to the measure of computer proficiency as a measure of IT competence p > 0.05 compared to those in basic 5 (P-value<0.05) taking basic 6 as the reference category. An estimate of -1.028 with odds ratio CLASS6/CLASS5 = $exp^{-1.028} = 0.3578$ shows that the odds of the respondents to be sound in I.T through the introduction of computer and practical applications for vastness is 0.3578 more likely than either non-users or surface users respectively. Although, primary 3 and 4 pupils tend to have higher odds ($exp^{-0.596} = 0.5510$, $exp^{-0.630} = 0.5326$) in their levels of computer proficiency but the estimates were found to be statistically insignificant.

Based on the empirical analysis of the research study, it is opined that the government should legislate and fund public primary schools for I.T compliance through a well-structured curriculum for economic advancement to increase their skills from non-users and surface users to vast users irrespective of gender, age, and class.

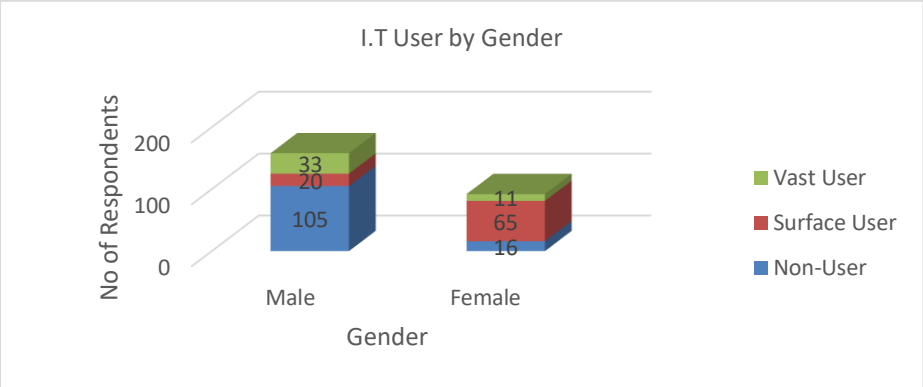

Figure 5: I.T User by Gender

Figure 5 illustrates the I.T users by their gender. 105 (66.46%) of the male respondents are non-user, compared to 16 (17.39%) of the female. This shows that a substantial number of male respondents do not use the computer at all, even the mobile device. This can be attributed to the background of the pupils that attended the public primary schools. There are more I.T surface users among the female (65; 70.65%) than the male (20; 12.66%). The vast I.T users by gender have 33 male (20.89%) and 11 female (11.96%). One major factor the surface and vast users attributed to their usage was using it from other places other than the school and their parents' mobile sets.

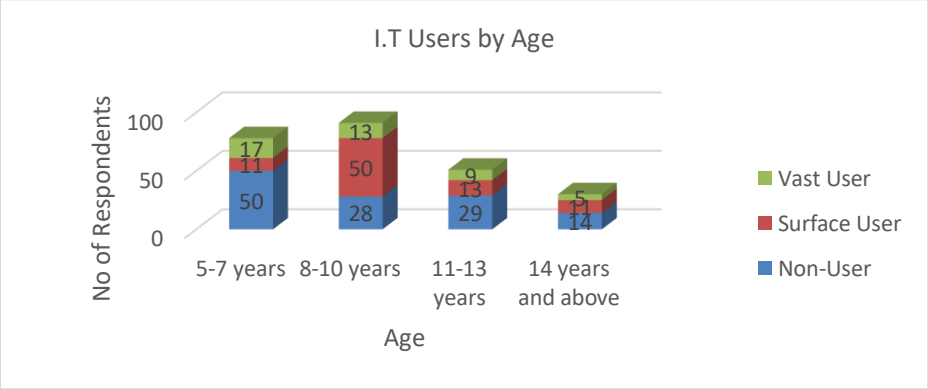

Figure 6: I.T Users by Age

A further illustration of the results is provided in Figure 6. It displays I.T users by age. 64.10% of the early age (5-7 years) are non-users of I.T while older pupils (14years and above) have 46.67% non-users. The highest I.T vast users are the early age (5-7 years) with 21.79% while the least vast users are the 8-10 years with 14.28%. The surface users are most among the ages 8-10 years with 54.95%. By the responses of the respondents, the usage is largely dependent on the number of respondents in each age group.

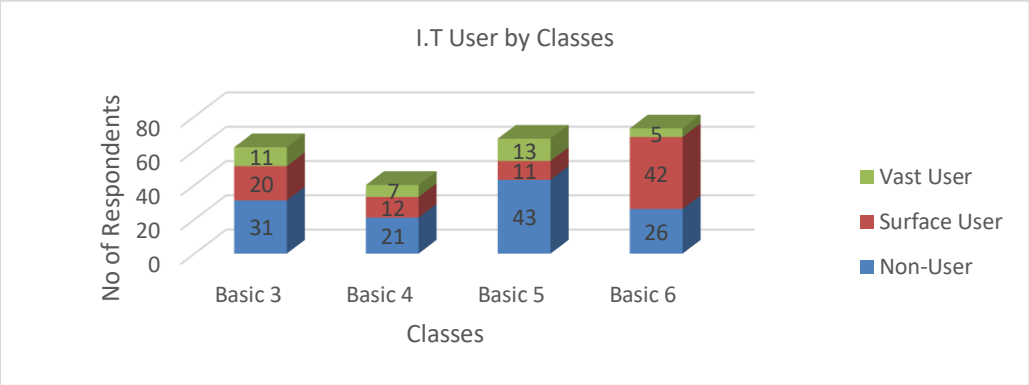

Figure 7: I.T Users by Classes

Figure 7 further indicated the extent of computer usage by the participants based on classes. Basic 5 has the majority of non-user of computers (64.18%) while the Basic 6 has majorly of surface users. It can also be deduced from the figure that Basic 5 has the highest vast users with 19.4% of respondents compared to Basic 6 with 6.85%.

Table 4.3: Correlations

Correlated variables	Spearman Correlation	Approx. T	p-value
Sex * IT competence	0.326	5.433	.000
Age * IT competence	0.054	0.847	.398
Class * IT competence	0.099	1.567	.118

Confirmatory analysis of the ordinal logistic model fitted can be evidenced from table 4.3. Result indicated that sex of participants is dependent on IT competence (r= 0.326, p-value.<0.05) while age and class do not dependent on their competence (r = 0.054 and 0.099 respectively with p-value > 0.05.

5. Conclusions

From the study and statistical analysis conducted, it is evident that the level of IT use at the public primary school level in Ilaro Town of Yewa South Local Government of Ogun State is still in its infancy with no practical conduct or even the core computer subject carried out talk less of incorporating IT curriculum delivery in other courses. Education is the bedrock of national growth and development; and today, Information technology is the basis of productivity, competition, wealth, and comfort. Incorporating this powerful tool into the pupils at the public primary school level of education will go a long way to produce highly competitive, up-to-date, IT competent pupils that will advance in this knowledge to be a national asset that will contribute to the growth and development of the nation through their creativity, knowledge, and exposure.

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