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Modelling Learning Environment for Digitalization in Secondary Schools in Ibadan Metropolis

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Abstract
In Nigeria, a common unspoken beliefis that secondary schools are not technically matured to accommodate high level innovations in digitalization and modeling hence this study investigated digital readiness of secondary school environments in an in-depth study of Ibadan Metropolis as it has permeated other professions. The descriptive survey research type with total population of secondary schools in Ibadan Metropolis that sampled 483 teachers was adopted. The research instrument used for the study was validated with a Cronbach alpha reliability r=0.74. The result of the study indicated that level of ICT ubiquity had no significant relationship with level of digitalization (r=0.096, p>0.05). However, affordability (r=0.340, p<0.05), Usability (r=0.191, p<0.05), reliability (r=0.249, p<0.05), speed of using ICT (r=0.118, p<0.05) and secondary schools stakeholders' ICT skills (r=0.432, p<0.05) significantly correlated with level of digitalization in the secondary schools. Fit indexes of validated model revealed; Normed fit index (NFI) = 0.00> 0.95; Comparative fit index (CFI) = 0.99>0.90; Root mean square error of approximation (RMSEA) = 0.000<.06. The reduced model gained an incremental fitness over the hypothesized ones $\chi 2$ (8) = 12.621, p>.0.05. The proportion of direct to indirect effect of indicators in the model reveal that 89.0% of the relationship between digitization indicators and level of digitalization are direct while 11.0% are indirect. The study concluded that secondary schools learning environment could accommodate digitalization, facilities for modeling and digitalization should be provided for schools.

Keywords: digitalization, learning, environment, information and communication technology.

INTRODUCTION

With the advent of information and communication Technology and the internet facilities, the traditional function of teachers and school environment has changed dramatically. Teachers, who are expected to be dispensers of wit and elicitor of responses, are now known to provide guidance for learning activities through the use of modern ICT facilities and their role is now change from being the sole source of knowledge to mere facilitator of knowledge Fakeye (2009). Until recently,digital technology has been defined as tools developed for certain activities. Today digital technology is characterised by an overall condition in form of social infrastructures (Holm Sørensen et. al, 2010) and the Internet is the "fabric of our lives" as expressed by Castells (2000).

According to Shaffer (2008), schools face new challenges in an extended digital learning environment since pupils need to practice to solve problems that do not have easy answers. This implies that in the digital age of global competition, schools have to educate their pupils in creative thinking, collaboration and complex problem solving. Shaffer (2008), also argues that digital technology that makes innovative, creative thinking and critical skills for the future also makes it possible for pupils to prepare for that future by means of using digital learning resources, Kjällander (2001). Digitization refers to all of the steps involved in the process of making convections of historical and other materials available on line. In the world of Information and Communication Technology (ICT) and globalization, digitization of materials is fast becoming the norm among libraries schools as each seeks to contribute its quota to the world information resource, learning activities and interaction between students and teachers. Recently, there has been growing interest in the application of new digital technology to improve playing, learning and education. Advances in new digital technology indeed help in realizing authentic learning environment because more complex interactions and thus learning experiences can now be designed (Reiser, 2001).

Booz & Company (2012) found out that the pace of digitization and movement between stages is accelerating rapidly. Developed countries such as Germany, the United Kingdom, and the United States took nearly four years on average to move from the emerging to the transitional stage of digitization; now, developing countries such as the United Arab Emirates, Kuwait, Estonia and Africa at large are making that same amount of progress in less than two years. Overall, between 2004 and 2007, countries registered 39 stage leaps; in the ensuing three-year period of 2007 to 2010, 65 countries progressed to the next level of digitization development, but situation is not the same in Nigeria in which factors of digitalization(such as facilities, power supply)

remains the bottleneck for digital advancement. Moreover, not only has the pace quickened, but the jump in development has also been more marked. They also observed that from 2004 to 2007, the average growth in the digitization score was seven points. From 2007 to 2010, the average jump was 10 points.

According to Booz & Company (2015), digitization can be measured across six key attributes: Ubiquity, Affordability, Reliability, Speed, Usability and Skill. Accordingly, Information and communication technology (ICT) resource availability, adequacy and level of usage revolution undoubtedly remains one of the most tremendous issues that hit the global scene in this recent time. Its use and application is totally redefining the way things are being done, opening up opportunities, transforming societies, and increasing efficiency. Africa has witnessed the development of ICT in various sectors over the last decade, including education.

The search for new ICT resources, availability, adequacy and utilization are more effective ways of achieving quality education. Considering the fact that education is an instrument for the social, political, cultural and economic development of every nation, both developed and developing nations strive to create opportunities within the system to actualize the intended learning outcomes. Access to appropriate technology means that affordances and constraints (Chen, 2010) of a technological tool need to be carefully considered when the tool is incorporated in lesson.

Also a quantitative study was conducted by Albirini (2006) to collect evidence from high school English teachers' views on computer attribute cultural perceptions, computer competence, computer access, and personal characteristics. The respondents of the study were 63 male sand 251female teachers. The result revealed that 57% of the respondents had computers at home and 33.4% had access to computers at school. This is an indication of teachers' inadequate access to computers.

Further the National Centre for Education Statistics (2000 as cited in Afshari, Bakar, Luan, Samah, and Fooi 2009) report revealed that over 50% of the respondents used computers for research and lesson preparation in their schools. About 78% of the respondents complained of inadequate access to computers in classroom. Of this percentage, 38% of the respondents stated that inadequate computers were not great barriers to ICT use in their teaching, but improved availability and fairness of access to technology resources by teachers, students and administrative staff is essential. Access to hardware and software is not only important, but also the use of suitable kind of tools and program to support teaching and learning (Tondeur, Valcke, and van Braak, 2008).

At the turn of the millennium digital competence was referred to as the fourth basic skill in school discourse, after reading, writing and arithmetic (Riis et al.2000). In 2007 The European Parliament (2006) issued a recommendation about eight key competences of special importance for lifelong learning; one of these is digital competence. This competence is described as the use of digital learning resources to retrieve, assess, store, produce, present and exchange information. The focus was on the communicative aspect of digital learning resources, which were often used for collaborative learning. The digital learning resources have not changed schooling as was predicted, partly because they are not pedagogically supported and also because some digital learning resources are not designed for the educational setting (Riis, 2000). The implementation of ICT in schools at this time was seen as part of a general development process in schools and motivation for preparation for using digital learning resources in schools (Riis, 2000).

According to Bordbar (2010), teachers' computer competence is a major predictor of integrating ICT in teaching. Evidence suggests that majority of teachers who reported negative or neutral attitude towards the integration of ICT into teaching and learning processes lacked knowledge and skills that would allow them to make "informed decision" (Al- Oteawi, 2002, in Bordbar, 2010). Users' perceptions influence to a great extent the rate and the level of technology adoption. According to Van-Akkeren and Cavaye, (1999) the perceived usefulness and perceived ease of use influence the perception of the users while the perceptions predict attitudes toward the technology adoption. Then the attitude develops the intentions to use and the intentions cause actual system usage. The beliefs, attitude and intention to use come in place when a user is presented with a new technology. These influence the users' decision regarding how and when they will use it (Davis et al, 2002).

However, for ICT adoption and implementation to succeed, it must gain user acceptability, the system must be secure (both in reality and consumer perception), convenient, easy to use and be offered at little or no additional cost to the consumer (Antovski and Gusev 2003). According to Westrup et al (2003), public schools and institutions in most developing countries are increasingly facing the difficulty of managing and using the multiplicity of new ICTs, such as e-mail, voice mail, worldwide web, cell phones, and videoconferencing among others. In addition, the sheer speed and ease of use of modern ICTs only serves to amplify these challenges. Hence, ICTs is viewed as being ubiquitous in most schools and organizations. Since most public learning

institutions and other public organizations progressively intents to expand into global markets, it is critical for them to know how ICTs facilitate communication (Ross, 2001) and also to examine the level of digitization of schools across digitization indexes as stated by Booz & Company (2015).

Furthermore, there is no reason to assume that new technologies would automatically have a beneficial impact on learning and development especially in Nigerian schools. Carr (2010) pointed out that constant interruptions associated with the Internet, poor supply of electricity, inability to afford ICT facilities, lack of computer skills and competency and poor performance of network providers can reduce the level of digitization. Hence, it is imperative to model Nigerian secondary schools across indicators of digitization since those are prevailing conditions of typical Nigerian secondary schools most especially in Oyo State.

Statement of the Problem

ICT benefits have been recognized globally with rapid fragmentation in the last two decades. Researchers have vigorously pursued scholarly works in virtually all aspect of ICT especially e-learning. However, automating school activities through digital ICT has not been explored in Nigerian public schools. It is observed that classrooms environment in public secondary schools are still lagging behind in digital activities that differentiate them from being manual.

Previous attempts to measure the impact of ICT have focused primarily on assessing the economic effects of widespread access to either wireless or broadband technologies. Developing a comprehensive methodology to measure the level and impact of digitization is a current tempo in the phase of Information and Communication Technology research. The key indicators to assess the level of digitization have been established in the literature but there is dearth of empirical study conducted to assess the level of digitalization of secondary school setting especially in Oyo state, Nigeria. Therefore, the study seeks to model digitization indicators in Oyo State secondary schools using Ibadan Metropolis as a test case.

Research Questions

1. What is the magnitude and direction of relationship between digitalization indicators (Ubiquity, Affordability, Reliability, Speed, Usability and Skill) and level of digitization in Ibadan Metropolis secondary schools?
2. Is the model which describes the causal effects among digitization indicators (Ubiquity, Affordability, Reliability, Speed, Usability and Skill) and the level of digitization consistent with the observed correlations among them?
3. What are the fit indices of the hypothesized model for digitization indicators(Ubiquity, Affordability, Reliability, Speed, Usability and Skill) and the level of digitization in Ibadan Metropolis secondary schools?
4. What are the estimated direct, indirect, and total causal effects of digitization indicators (Ubiquity, Affordability, Reliability, Speed, Usability and Skill) and the level of digitization in Ibadan Metropolis secondary Schools?

METHODOLOGY

This study adopted the descriptive survey research type with the total populations of all 5,197 secondary school teachers in Ibadan metropolis area of Oyo State. (Ibadan North, North-west, Ibadan Southwest, Ibadan Northeast and Ibadan Southeast) Local Government Areas. Simple random sampling technique was adopted to select participants for the study. Out of 5 local Government Areas in Ibadan metropolis of Oyo State, 60% of the Local Government was randomly selected. The simple random sampling technique was also used to select 25% of the secondary schools from each of the selected Local Government Areas, out of which 25% of the teachers were selected from each secondary school to make the total participants of 483 teachers. The research instrument used was validated and the result revealed a Cronbach Alpha reliability coefficient of r=0.74. The information collected was analysed using Path analytical aspect of Structural Equation Modelling (SEM) and result revealed is as follows:

RESULT AND THE FINDINGS

Research Question 1

What is the magnitude and direction of relationship between digitalization indicators (Ubiquity, Affordability, Reliability, Speed, Usability and Skill) and level of digitization in Ibadan Metropolis secondary schools?

Table 1: Relationship between Indicators of Digitization and Level of Digitization of Secondary School Learning Environment

	Obliquity	Affordability	Usability	Reliability	Speed	Skill	Digitization
Ubiquity	1						
Affordability	0.302**	1					
Usability	0.197**	0.198**	1				
Reliability	0.142**	0.312**	0.220**	1			
Speed	0.068	0.071	0.331**	0.289**	1		
Skill	0.167**	0.134*	0.378**	0.050	0.296**	1	
Digitization	0.096	0.340**	0.191**	0.249**	0.118*	.432*	1

Table 1 presents the correlation matrix for the relationship between secondary schools in Ibadan Metropolis digital readiness and level of digitalization, it could be observed that level of ICT ubiquity had no significant relationship with level of digitalization (r=0.096, p>0.05). However, affordability (r=0.340, p<0.05), Usability (r=0.191, p<0.05), reliability (r=0.249, p<0.05), speed of using ICT (r=0.118, p<0.05) and secondary schools stakeholders' ICT skills (r=0.432, p<0.05) significantly correlated with level of digitalization in the secondary schools sampled.Generally, it could also be observed from Table 1 that digitization indicators influence the level of digitalization in the study area except the ubiquity of ICT materials. Thus, it could be inferred that ICT facilities in the study area is not sufficiently available. But all other factors are germane to the adoption of digitalization for teaching and learning activities.

Research Question 2

Is the model which describes the causal effects among digitization indicators (Ubiquity, Affordability, Reliability, Speed, Usability and Skill) and the level of digitization consistent with the observed correlations among them?

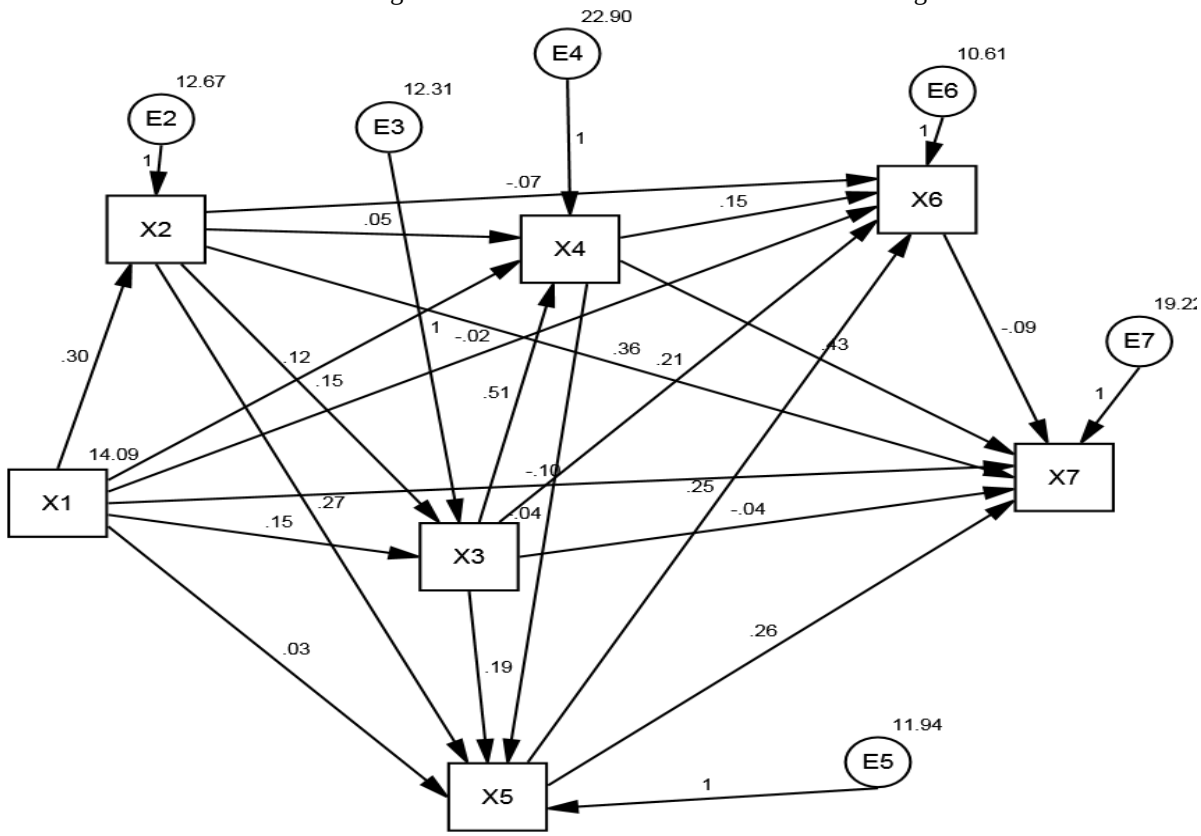

Figure 1: Hypothesized Model of Secondary School Learning Environment and Digitalization

Key: $X_{1=}$Ubiquity $X_{2=}$Affordability, $X_{3=}$ ICT/Internet Skill, $X_{4=}$Usability, $X_{5=}$ Reliability of ICT/Internet Service, $X_{6=}$ Speed of Service Provided, $X_{7=}$Level of Digitization

Figure 1 presents the hypothetical model for explaining level of digitization of secondary school in the sampled schools; the result shows the beta weights and standard error of the possible paths in the model. The model consists of 12 significant paths and 9 non-significant paths. The beta coefficient and correlation coefficient of the significant and non-significant path was presented in the Table 2 below,

Table 2: Correlation and Path Coefficient of the Model that Explain Digitizarion of Secondary School Learning Environment

	Path		ß	r	Sig
X2	<---	X1	.300	0.302*	S
X3	<---	X1	.146	0.167*	S
X3	<---	X2	.148	0.134*	S
X4	<---	X3	.507	0.378*	S
X4	<---	X2	.052	0.198*	NS
X4	<---	X1	.119	0.197*	NS
X5	<---	X2	.272	0.312*	S
X5	<---	X3	.186	0.15*	S
X5	<---	X1	.033	0.142*	NS
X5	<---	X4	-.044	0.22*	NS
X6	<---	X1	-.024	0.068	NS
X6	<---	X3	.213	0.296*	S
X6	<---	X4	.152	0.331*	S
X6	<---	X5	.254	0.289*	S
X6	<---	X2	-.072	0.071	NS
X7	<---	X2	.361	0.340*	S
X7	<---	X4	.433	0.191*	S
X7	<---	X5	.257	0.249*	S
X7	<---	X1	-.098	0.096	NS
X7	<---	X3	-.038	0.432*	NS
X7	<---	X6	-.095	0.118*	NS

Key: S= Significant Path, NS= Non-Significant Path, (*)= significant correlation coefficient.

Table 2 presents the significant and non-significant paths for 20 paths that show the causal relationship among the indicators of digitization and the level of digitalization of teaching and learning activities in the study area. The 12 significant paths were retained and non-significant causal relationship was trimmed off to arrive at meaningful causal model to explain digitization indicators and level of digitalization in the study area, as shown in Figure 2.

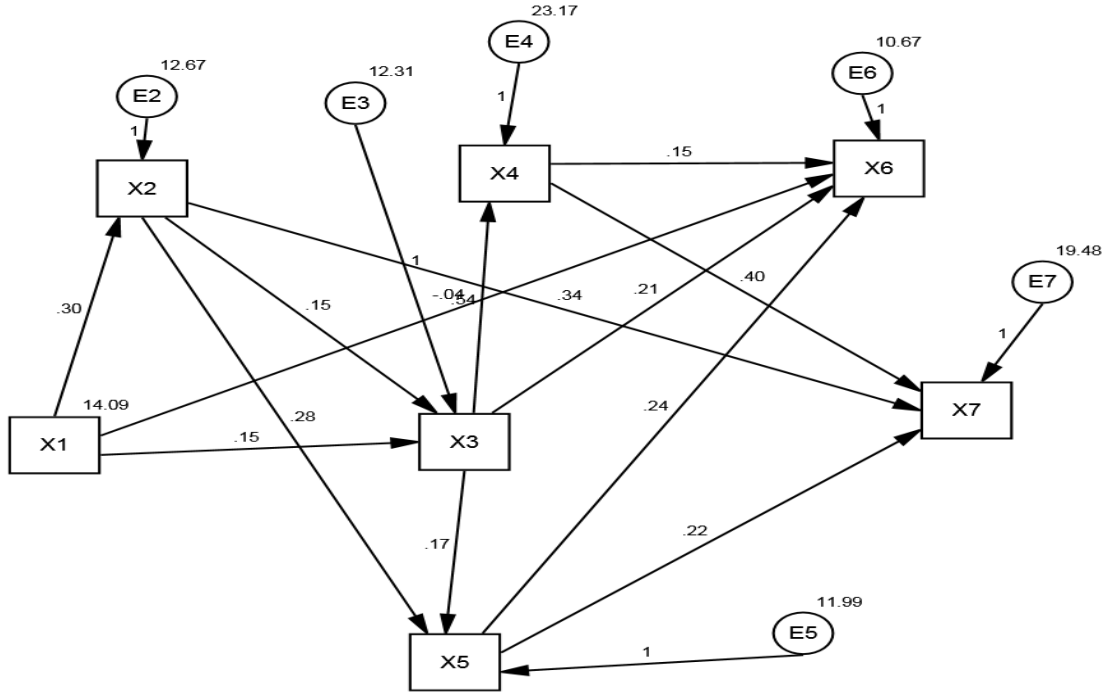

Figure 2: Validated Model of the Model that Explain Digitization of Secondary School Learning Environment

Research Question 3

What are the fit indices of the hypothesized model for digitization indicators (Ubiquity, Affordability, Reliability, Speed, Usability and Skill) and the level of digitalization in Metropolis secondary schools?

Table 3 Fit Indices of Model that Explain Digitalization of Teaching Learning Activities in the Sampled Secondary Schools

Model	$\chi 2$	**Df**	**P**	**GFI**	**NFI**	**CFI**	**RMSEA**
Initial Model	0.00	0	0.000	.738	0.00	0.00	0.216
Validated	12.621	8	0.162	0.99	0.966	0.981	0.04

Table 3 reveals that the initial (hypothesized) model have a value; $\chi 2$ (0)= 0.00, p<0.00, but inferior to the validated model which $\chi 2$ (8)= 12.621, p>.0.05. The non-significant Chi-square of the validated model indicates that the difference between the hypothesized model and the data is not significant; hence, the validated model is fit. This inference is made based on the affinity goodness of fit estimate.

χ2GoF, interest is in the difference between the observed data and hypothesized model.. Based on the recommendation by Cohen, (2000) and Tabachnik and Fidel (2007), the lesser the chi-square value the better the model. To further ascertain the fitness of the reduced model over the hypothesized model other fit indexes were considered: Normed fit index (NFI) = 0.00> .95; Comparative fit index (CFI)= 0.99> .90; Root mean square error of approximation (RMSEA)= .000<.06. This implies that the reduced model gained an incremental fitness over the initial (hypothesized) model, satisfying all the criteria for a good model. This indicates that significant path ways are possible paths that predict the variation observable in level of digitalization in the studied area. Therefore the reduced model is a true representative of the data.

Research Question 4

What are the estimated direct, indirect, and total causal effects of digitization indicators (Ubiquity, Affordability, Reliability, Speed, Usability and Skill) and the level of digitization in Ibadan Metropolis secondary Schools?

Table 5: Direct, Indirect and Total Effect of Digitization Indicators on Level of Digitalization in Studied Area

Path			Direct	Indirect	Total
X2	<---	X1	0.300	0.00	0.30
X3	<---	X1	0.146	0.044	0.19
X3	<---	X2	0.148	0.00	0.148
X5	<---	X2	0.277	0.025	0.302
X4	<---	X3	0.542	0.00	0.542
X5	<---	X3	0.168	0.00	0.168
X6	<---	X1	-0.041	0.082	0.041
X7	<---	X2	0.336	0.098	0.434
X6	<---	X3	0.208	0.121	0.328
X6	<---	X4	0.149	0.00	0.149
X7	<---	X4	0.395	0.00	0.395
X6	<---	X5	0.236	0.00	0.236
X7	<---	X5	0.218	0.00	0.218
Total			**3.082**	**0.37**	**3.451**

Table 5 shows the decomposition of total effects of digitization indicators on level of digitalization of Ibadan Metropolis secondary school teaching and learning activities. Indirect and the direct effect of each of the indicators were explained as follows

Direct Effects

The direct effects presented in the Table 5 are the changes in standard deviation unit of criterion variable (level of digitalization) in the validated model. The coefficient give change (increase or decrease) in the level of digitalization in standard deviation units when there is one full standard deviation (above the mean) change in any of the indicators. Table 5 shows that there was positive direct effect (0.336) of affordability of ICT/Internet facilities on level of digitalization of secondary teaching and learning activities. Again, the direct effect of usability of ICT/Internet facilities was also positive (0.395), as well as direct effect (0.218) of reliability of available ICT/Internet service/network, This implies that for every one standard deviation change in level of affordability of ICT facilities by secondary school stakeholders, usability and reliability of ICT/Internet service/network providers there is corresponding 0.336, 0.395 and 0.218 change in level of digitalization of secondary schools in the studied area. The direct effect of other digitization indicators (Ubiquity, Skill and Speed of network service available), which implies that the level of affordability of ICT facilities, it usability as well as reliability will directly influence the level of digitalization of the study secondary schools

Indirect Effect

The indirect effects are traced out from the validated model in figure 2. The tracing for the indirect effect of each digitization indicator on the level of digitalization is shown in Table 4.6.

Key: $X_{1=}$Ubiquity $X_{2=}$Affordability, $X_{3=}$ ICT/Internet Skill, $X_{4=}$Usability, $X_{5=}$ Reliability of ICT/Internet Service, $X_{6=}$ Speed of Service Provided, $X_{7=}$Level of Digitization

Table 6: Path tracing of the Indirect Effects

Determinants	Path tracing for the indirect effects of Digitization Indicators on the Level of Digitalization
$X_{1=}$Ubiquity	$P_{21,}P_{32,}P_{43}$ $P_{54,}P_{75;}$ $P_{21,}P_{32,}P_{43,}$ $P_{74,}$
$X_{2=}$Affordability	$P_{32,}P_{43}$ $P_{54,}P_{75,}$ $P_{32,}P_{43,}$ P_{74}
$X_{3=}$ ICT/Internet Skill	$P_{43}P_{54}P_{75;}$ $P_{43}P_{74}$
$X_{4=}$Usability	$P_{54}P_{75}$
$X_{5=}$ Reliability of ICT/Internet Service	No indirect effect
$X_{6=}$ Speed of Service Provided s	No indirect effect

Table 6 presents the values of the indirect effects of each of the digitization indicators on the level of digitalization of secondary schools in Ibadan Metropolis, Table 4.6 as well shows the indirect influence of the indicators the by paths. The indirect effect of ubiquity of ICT facilities was traced as ($P_{21,}P_{32,}P_{43}P_{54,}P_{75;}$ $P_{21,}P_{32,}P_{43,}$ $P_{74),}$ This shows that level of digitalization was indirectly influence by ubiquity of ICT facilities through level of affordability of ICT facilities, ICT skills of the secondary school stakeholders, level of usability of ICT facilities, reliability of ICT/internet service as well as speed of internet services provided.

In the same vein, level of digitalization of secondary schools in the studied area could also be influence by affordability of ICT facilities through ($P_{32,}P_{43}P_{54,}P_{75,}$ $P_{32,}P_{43,}$ $P_{74)}$ ICT skills of the secondary school stakeholders, usability of ICT facilities as well as reliability of ICT/internet network, or stakeholders' ICT skills and usability of ICT by the stakeholders. More so, stakeholders' ICT skills could influence level of digitalization through ($P_{43}P_{54}P_{75;}$ $P_{43}P_{74)}$ usability of ICT facilities and reliability of Internet network provided: and usability of ICT facilities could influence the level of digitalization through ($P_{54}P_{75}$) reliability of internet network provided. Thus inference could be made that reliability and the speed of internet network provided in secondary school have no indirect effect on level of digitalization in the studied area.

Table 7: Proportion of Direct to Indirect Effect of Indicators of Digitization on School Environment and Level of Digitization

Effect	Value	Percentage
Direct	3.082	89.0
Indirect	0.37	11.0

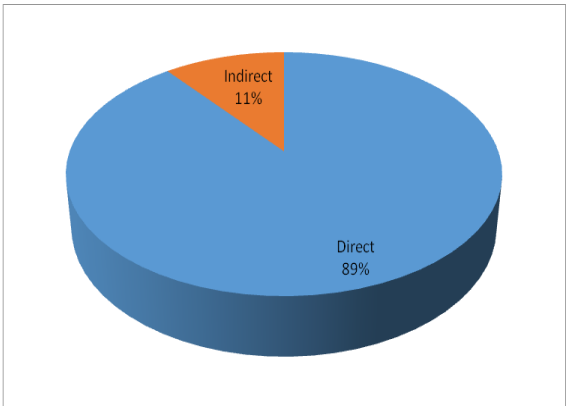

Figure 4.3: Proportion of Direct to Indirect Effect of Digitization Indicators on Level of Digitalization of Secondary School in Oyo State

Table 5 and Figure 3 shows the proportion of direct to indirect effect of indicators in the model. The result reveal that 89.0% of the relationship between digitization indicators and level of digitalization are direct while 11.0% of the causal relationship among the variables in the model are indirect. This result is in line with recommendation that, it is better for variables in the model to be directly influenced the criterion variable than for the effects to be indirect (Blalock 1961 in Kerlinger and Lee; 2000).

DISCUSSION

The result of Table 1 shows the relationship between indicators of digitalization and level of digitalization in the sampled schools, it could be observed that of all the variable of digitalization, it was only obliquity of ICT resources that has no significant relationship with digital readiness of secondary schools in the study area. This implies that stakeholders in the studied school need to provide enough ICT facilities to be digital ready. The result further reveals that ICT obliquity is the only factor that is prominent indicator that is directly and indirectly influenced the level of digitalization or digital readiness of the sampled secondary schools. It was also revealed that the proportion of direct effect of the indicators is more than indirect This was the observation of Carr (2010) who reported that constant interruptions associated with the Internet, poor supply of electricity, inability to afford ICT facilities, lack of computer skills and competency and poor performance of network providers can reduce the level of digitization.. More so, the result is in alliance with the fact that access to appropriate technology means that affordances and constraints (Chen, 2010) of a technological tool need to be carefully considered when the adoption digital technology is in view.

CONCLUSION AND RECOMMENDATION

Based on the results of the findings, it could be concluded that there is no enough facilities to provide digital learning environment in the study areas. Therefore, it was recommended that government and other stakeholder in education should make efforts to provide the appropriate facilities to accommodate such innovation.

REFERENCES

Afshari, M., Bakar, K.A., Luan, W.S., Samah, B.A., & Fooi, F. S.(2009). Factors affecting teachers' use of Information and Communication Technology. *International Journal of Instruction*, vol. 2, no. 1, pp.78-98

Booz & Company (2012).The Global Information Technology Report 2012: "Living in a Hyperconnected World," World Economic Forum, 2012.

Bordbar, F. (2010). English teachers' attitudes toward computer-assisted language learning.

Carr, N. (2010). *The shallows: How the internet is changing the way we think, read and remember*, London, UK: Atlantic Books Ltd.

Castells, M. (2000). The rise of the network society. Oxford: Blackwell.

Chen, R.-J. (2010). Investigating models for preservice teachers' use of technology to support student-centered learning. *Computers & Education* in Press.

Davis J., Foxall G. and Pallister J. (2002).*Beyond the intention-behavior mythology*: An integrated model of recycling, Marketing Theory 2 (1), pp.29-113.

Fakeye, D.O. 2009. Open and distance Learning Students Perception of E-learning; *Journal of Sociology and Education in Africa Vol. 8, No 2. International Journal of Language Studies*, vol. 4, no. 3, pp. 27-5

Kerlinger, F.N and Lee H.B. (2000).Foundations of Behavioural Research. Califonia; Thomson Learning International.

Kjällander, S. 2001. Designs for Learning in an Extended Digital Environment. Case Studies of Social Interaction in the Social Science Classroom. Stockholm University, ISBN 978-91- 7447-254-7

Nadkarni, A., & Hofmann, S. G. (2012), *Why do people use Facebook?* Personality and individual differences, 52(3), 243-249.

Reiser, R. A. (2001). A history of instructional design and technology: Part I: A history of instructional media. *Educational Technology Research and Development*, *49*, 53-64. doi:10.1007/BF02504506.

Riis, U. (2000). (Ed.) IT iskolanmellan vision ochpraktik – en forskningsöversikt. Stockholm: Skolverket.

Ross, D. N. (2001). *Electronic communications*: Do cultural dimensions matter?" *American Business Review,* pp. 75-81. June.

Tondeur, J., Valcke, M., & van Braak, J. (2008). A multidimensional approach to determinants of computer use in primary education: Teacher and school characteristics. J*ournal of Computer Assisted Learning*, vol. 24, pp. 494–506.

Westrup, C, Liu, E., El Sayed, H., & Al Jaghoub, S. (2003). *Taking culture seriously*: ICTs, cultures and development. In: S. Krishna & S. Madon (Eds.), ICTs and Development:

New Opportunities, Perspectives and Challenges, Ashgate (forthcoming).