Principals' Perception of Information Technology Infrastructure Management Constraints in Enugu State Seconadry Schools

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Abstract
This study investigated Principals' Perception of Information Technology Infrastructure Management Constraints in Enugu State Secondary Schools. The study adopted survey research design. One research question was answered using mean with standard deviation. One null hypothesis was tested at .05 level of significance using t − test statistic. The population for the study was 291 principals of public secondary schools in Enugu state. A sample of 186 principals was used in analysis drawn through multi stage sampling. Initially, proportionate random sampling technique followed by proportionate stratified random sampling technique and finally simple random technique. Questionnaire constructed by the researcher titled, Principals' Perception of Information Technology Infrastructure Management Constraints Questionnaire (PPITIMCQ) was used as the instrument for data collection. The reliability coefficient of the questionnaire was calculated using cronbach alpha and was found to be 0.73. Findings from the study show that the principals agreed on six Information Technology Infrastructure Management Constraints and equally agreed that there is no significant difference between the mean ratings of urban and rural school principals on how information technology infrastructure constraints affect management of public schools in Enugu state. Based on this, the study recommended among others; that government should create financial allocation for school IT infrastructure; government should organize seminars, workshops and conferences on regular basis for teachers on ICT; Principals should encourage school/community relationship and through the help of functional Parent Association procure important information technology infrastructures and fortify security outfits for them; schools wishing to adopt ICT integration in their all round school activities should procure a power generating set as a supplement to Electricity Distribution Company power supply or procure solar system power supply among others.
Keywords: Principals' Perception, Information Technology, Infrastructure Management, Constraints, Secondary Schools

Introduction
The last four decades had witnessed an amazing rapid development in information technology in the developed countries of the world and also in some developing countries. In the light of this position, Kalu and Ekwueme (2003) observed that the world is fast becoming a global village as a result of developments in information and communication technology. Thus there is an urgent need for institutions of learning to embrace these technologies to avoid being absent from the global village of internet. (Nnonah, 2013).

According to Mbam (2002), Information can be defined as the collection of (processed) data or several items put together to convey a given message. In another and broad form, information can be defined as the process of (and result of) generating, transmitting, receiving, storing, and retrieving of symbols (or signals). It can be generated as mechanical pulses, digits or bits, or as print (press). Information has been suggested to mean data that has been processed into a form that is meaningful to the recipient and is of real perceived value in current or prospective decisions. This definition of information stresses that data must be processed in some way to produce information.

Technology is the study of techniques or process of mobilizing resources (such as information) for accomplishing objectives that benefit man. In otherwords, it is the study, mastery, and utilization of manufacturing, industrial and organizational methods. It can also be seen as the systematic application of knowledge to practical tasks in industry or organization (Mbam 2002). It can be seen that the technology involved in gathering (or mobilizing), analyzing, managing (or maintaining), and utilizing information via computer or otherwise is known as information technology. That is to say, it is the technique(s) involved in dealing with information in its organized manner.

Information technology arose because of the need for organized (systematic or formalized) way of handling information for proper planning, proper

decision making, and proper management in organization and individual activities which information are meant for. It goes a long way to alleviate the numerous human efforts being wasted in our previous (unorganized or non-systematic) manner of running our organization or collecting our information and the need in today's organizational pattern to save time, cost and minimize the process of organizing and co-ordinating our big activities (Mbam, 2002).

Information technology is therefore an umbrella term that covers a vast array of computer disciplines that permit organizations to manage their information resources. Ultimately, information technology serves as a fundamental force in reshaping organization by applying investment in company and communications to promote competitive advantage, customer service, and other strategic benefits (Wange, 1994). Steve Ballmer (2008) summarizes it thus;

The number one benefit of information technology is that it empowers people to do what they want to do. It lets people be creative. It lets people be productive. It lets people learn the things they didn't think they could learn before and so, in a sense, it is all about potential.

Infrastructure is used in information system to refer to the basic systems that are shared amongst users of information systems. Infrastructure includes a range of technologies, computers and components together with applications and systems. Infrastructure is expected to provide access to data at any time, with a variety of terminal devices (Pandya, 1995). Information technology infrastructure may be seen as the basic technological platform for other systems that are used in various business activities and processes. In most organizations, technological infrastructure is the enabling foundation upon which business depends. Consequently, advancements in information technology affects the development of organization's IT infrastructure and services that are based on it (Mckay and Brockway 1987).

Information technology infrastructure is a concept that can further be divided into related components: Technical IT infrastructure and human IT infrastructure (Byrd and Turner, 2000). Often information technology is seen only as a combination of different technical devices. Technical component includes different devices that connect computers and systems, mainly networking devices. Also, servers, systems and devices that are commonly shared among users are considered to be part of technical information technology infrastructure. Accordingly, the human component is a critical part of infrastructure. Human component refers to management of technology development, expertise in the IT department and skills of end-users (Davenport and Linder, 1994).

Principals are the executive heads of secondary schools. They develop and implement the educational programmes of the school, keep school records as well as create conducive learning and teaching atmosphere in the school.

Management according to Ogbonnaya and Ajagbaonwu (1979) in Ozoanya (2012), is a method where a group of people at the highest level of organization plan, organize, communicate, co-ordinate, control and direct the action and activities of people who work for the organization's goals and objectives. Management is thus regarded as the process undertaken by one or more individuals to co-ordinate the activities of others to achieve results not achievable by one individual acting alone (Aguba, 2009). The management of secondary schools is therefore under the headship of principals.

Education does not exist in a vacuum; it requires a combination of various resources to work. Where resources are scarce and working conditions difficult, educational quality may fall victim and examples of inefficiency, mismanagement and poor performance will appear to be more numerous than performance (Ifedi, 2003 in Nzegbulem, 2013). Educational resource can be broadly defined as all inputs that are utilized in the business of educational production. And information technology infrastructure is a typical example of educational resource that has both technical component and human component.

The present study was anchored on the management constraints of information technology infrastructure. Secondary school principals in Enugu state appear to face a lot of constraints in the cause of managing the IT infrastructure in their schools. For instance Nnonah (2013) noted that there are general resistance to change, high level of computer illiteracy, high cost of ICT facilities among others.

As this study tried to validate the findings that tend to suggest that the principals of public secondary schools in Enugu state have constraints in management of information technology infrastructure, location as an independent variable was further considered. Location in this study relates to urban and rural areas. Urban areas according to Boodys (2005), as cited in Nnonnah (2013), are places relating to towns and cities whiles rural areas have peaceful settings and lives communally. An investigation into whether there was significant difference in the perception of information technology management constraints by principals in rural areas and their counterparts in the urban secondary schools in Enugu state was carried out in this study.

Statement of the Problem

One of the greatest challenges facing public secondary schools in Nigeria today is management of educational resources, especially in Enugu state. In situations where working conditions are made difficult because of poor management of scarce resources, the quality of education is threatened. Unfortunately, the current scenario in public secondary schools in Enugu state suggests that principals have constraints in the management of information technology infrastructure. A good number of public secondary schools do not have sufficient IT infrastructure that can enhance quality teaching and learning. The available infrastructure may not be easily accessed by the principals due to ignorance. Under this pitiable condition, human development cannot be achieved since the educational quality is not guaranteed. Therefore, this study examined; the extent information technology infrastructure constraints affected the management of public secondary schools in Enugu state.

Purpose of the Study

Specifically, the study sought to determine the constraints associated with information technology infrastructure management as perceived by the principals in public secondary schools in Enugu state as affecting their school management?

Research Question

The following research question guided the study:
What information technology infrastructure management constraints are perceived by Principals of public secondary schools in Enugu state as affecting their school management?

Hypothesis

The following null hypothesis was formulated to guide the study. It was tested at .05 level of significance.
Ho: There is no significant difference between the mean ratings of urban and rural school principals on how information technology infrastructure constraints affect management of public secondary schools in Enugu state.

Methodology

The study adopted the descriptive survey research design and it was carried out in Enugu state. The study covered all the public secondary schools in Enugu state (both urban and rural). Enugu state is made up of six education zones, namely Agbani, Awgu, Enugu, Nsukka, Obollo-Afor and Udi.

The population for the study was 291 principals of public secondary schools in Enugu state (PPSMB, Enugu 2014/2015). A sample of 168 principals was used in analysis. The sample size was statistically determined using "Yaro yamane" formula. The choice of this formula was supported by Uzoagulu (2011) who stated that "Yaro Yamane" formula can be used to determine statistically the sample size of a finite or known population. Multi – stage sampling was employed in drawing the sample. Initially, proportionate random sampling technique was used to obtain samples of schools from each local government area in each education zone in the ratio of each education zone to the population. Secondly, within each local government area, schools were stratified into locations (urban and rural). Through proportionate stratified random sampling technique, samples were drawn from the stratum in the ratio that the stratum existed in the population (1:2). Finally, the entire strata were selected by simple random sampling technique (balloting). In all, 54 principals were drawn from urban and 114 principals were drawn from rural secondary schools. The instrument for data collection was a questionnaire constructed by the researcher titled: Principals' Perception of Information Technology Infrastructure Management Constraints Questionnaire (PPITIMCQ). The instrument contained items the respondents were expected to indicate their responses on four – point scale of Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD) with nominal values of 4, 3, 2, and 1 respectively.

The instrument was face validated by three experts; two in the field of educational management and one in measurement and evaluation. Using chronbach alpha coefficient, a calculated internal consistency reliability coefficient of 0.73 was obtained. In order to analyze the data, the criterion of 2.50 was adopted as follows: SA = 4, A =3, D = 2 and SD = 1 (i. e 10/4) = 2.50. Therefore any item whose mean is equal to or greater than 2.50 was interpreted as agree, while item, whose mean score fall below 2.50 was interpreted as disagree. When the standard deviation is below 1, it is interpreted as low indicating that the respondents did not differ in their perceptions of the items, whereas when it is above 1, it is interpreted as high indicating that the respondents differ in their perceptions of the items. Regarding the null hypothesis; when the calculated t – value was greater than or equal to the critical value, the null hypothesis was rejected, while the null hypothesis was not rejected if the calculated t – value was less than the critical value.

Results

The findings of the study based on the research question and hypothesis are presented in the following tables.

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Research Question

What information technology infrastructure management constraints are perceived by principals of public secondary schools in Enugu state as affecting their school management?

Table 1: Mean ratings of public secondary schools principals regarding the constraints associated with information technology infrastructure management in public secondary schools in Enugu state.

N = 168

The following are constraints to effective information technology infrastructure management in public secondary schools.	SA	A	D	SD	X	SD	DECISION
Lack of trained ICT operators	60	89	13	6	3.21	0.73	A (Agree)
High cost of ICT facilities	35	74	54	5	2.83	0.73	A
Insufficient fund	70	83	10	5	3.30	0.71	A
General resistance to change	20	34	66	48	2.15	0.97	D (Disagree)
High level of computer illiteracy	56	65	36	11	2.99	0.90	A
Lack of electricity	62	74	20	12	3.11	0.88	A
Poor belief and attitude of teachers	19	55	68	26	2.40	0.88	D
Lack of ICT parts & accessories for maintenance	35	65	52	16	2.71	0.81	A
Grand mean and SD					**2.83**	**0.81**	**A (Agree)**

Table 1 shows that high mean ratings of 3.21, 2.83, 3.30, 2.99, 3.11 and 2.71 were obtained by the respondents for items 1, 2, 3, 5, 6 and 8 respectively, indicating their agreement with the items as constraints associated with information technology infrastructure management in public secondary schools in Enugu state. On the other hand, a low mean rating of 2.15 was obtained for item 4, and 2.40 for item 7 respectively, thereby indicating that the respondents did not perceive general resistance to change and poor belief and attitudes of teachers as constraints associated with information technology infrastructure management. A grand mean of 2.83, with standard deviation of 0.81, was however, obtained for all the eight items, thereby indicating that the principals generally agreed with all the items as constraints associated with information technology infrastructure management in public secondary schools in Enugu state. The overall standard deviation (0.81) is relatively low, implying that the correspondents (public secondary school principals) did not differ remarkably in their opinions regarding the items as constraints associated with information technology infrastructure management in the schools.

Testing of Hypothesis

Ho: There is no significant difference between the mean ratings of urban and rural school principals on how information technology infrastructure constraints affect management of public secondary schools in Enugu state.

Table 2: t – test of difference between the mean ratings of urban and rural school principals on how information technology infrastructure constraints affect management of public secondary schools in Enugu state

Location of principals	N	$\overline{X}$	SD	df	t– cal	t–crit	Decision
Urban	54	2.81	0.92				
				166	0.74	±1.96	Do not reject Ho
Rural	114	2.98	0.85				

Table 2 shows that the calculated t – value, at 0.05 level of significance and 166 degree of freedom, is 0.74 while the critical or table value is ±1.96. Since the calculated value of t is less than critical t – value, the null hypothesis is therefore not rejected. This means that no significant difference exist between the mean ratings of urban and rural secondary school principals on how information technology infrastructure constraints affect management of public secondary schools in Enugu state.

Discussion

It was found in the study that the constraints associated with information technology infrastructure management in public secondary schools in Enugu state, as perceived by the principals include; lack of trained ICT operators; high cost of ICT facilities; lack of financial allocation for school IT infrastructure; high level of computer illiteracy; lack of electricity; and lack of ICT parts and accessories for maintenance. This finding is quite revealing and instructive. The high level of computer illiteracy and high cost of ICT facilities among others agree with the views of Nnonah (2013) who stated that factors that constrain the provision of ICT resources in schools include; insufficient funds in schools, high cost of ICT facilities and lack of trained experts. Nnonah further stated that factors that constrain the effective utilization of ICT resources in schools were lack of appropriate ICT infrastructure, lack of fund, lack of electricity and lack of requisite knowledge and skills by teachers. However, the finding did not agree with Nnonah on general resistance to change as constraint in schools.

Among the constraining factors are insufficient funds in schools which seem to be one of the most complex

constraints affecting ICT development in Nigerian secondary schools. This finding supports the findings of Efesike (2008) who observed that funds for the development and servicing of ICT centres are in most cases grossly inadequate. The findings are consistent with the report of Salau (2003) that funding is a major constraint for making Nigerian secondary schools ICT compliant.

Lack of electricity was a constraint found in the study. This finding is in line with the remarks of Kwache (2007) who posited that inconsistent electric power supply in most parts of the country is one of the problems militating against the implementation of ICT in Nigerian education sector. It doesn't really matter whether it is rural schools or urban. The epileptic supply of electricity and at times complete short down of power affects the management of information technology infrastructure in all the secondary schools in Enugu state.

Another constraining factor agreed upon by respondents is lack of trained ICT operators. This finding is also in line with the observation of Kwache (2007) who noted that most institutions lack computer literate teachers and ICT experts that would support and manage the internet connectivity or application of computing in the teaching and learning process. Davenport and Linder (1994) stressed seriously that the human component is a critical part of information technology infrastructure management. The implication is that without the human component, the technical information technology infrastructure cannot function. However, the finding revealed that the respondents rejected general resistance to change and poor belief and attitude of teachers as constraints to effective information technology infrastructure management in schools.

The t – test analysis on the mean ratings of urban and rural school principals on how information technology infrastructure constraints affect management of public secondary schools in Enugu state revealed that there is no significant difference between them. This result could be attributed to near-the- same atmosphere existing in all the public secondary schools whether urban or rural notably insufficient fund, lack of electricity supply, lack of trained ICT operator, among others.

Educational Implication and Recommendation

Since there was perceived lack of trained ICT operators, high cost of ICT facilities, insufficient fund, high level of computer illiteracy, lack of electricity supply, and lack of ICT parts and accessories for maintenance etc, chances are that effective management of information technology infrastructure will be lacking in schools. This will adversely affect the provision of essential facilities in schools. Until the facilities for teaching and learning like information technology infrastructure are provided, teaching may be uninteresting. In the light of the findings and implications of the study, the researcher hereby made the following recommendations:

(1)   There is need for the government to create financial allocation for school IT infrastructure.

(2)   There is need for the government to organize seminars, workshops and conferences on regular basis for teachers and principals on information communication technology.

(3)   Teachers should be given opportunities to attend trainings to update their knowledge on the effective use of computers.

(4)   Principals should encourage school/community relationship and through the help of functional Parents Association procure important information technology infrastructure and fortify security outfits for them.

(5)   Schools wishing to adopt ICT integration in their all round school activities should procure a power generating set as a supplement to Electricity Distribution Company power supply or procure solar system power supply.

The implementation of the above recommendations and many others will guarantee educational quality. Apart from efficiency and high performance which will be the attendant results, the overall human capital development which is a sine-qua-non for economic development will be achieved.

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