Effective Management Towards Maintenance of Available And Utilization of Information and Communication Technology Tools for Quality Instructional Delivery in Public Universities in South-East Nigeria

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Abstract
The world educational system is speedily moving technologically in teaching-learning process. Management of these technological facilities for teaching remains essential in effective utilization of the facilities for quality instructional delivery in the school system. The study employed ex-post facto survey design with a population of 624 respondents from six south-east universities. A proportional stratified random sampling was used to determine 60% of the population which gave the sample size of 345. The reliability of the instrument yielded 0.88 index using PPMCC statistics. The study has four research questions and three hypotheses that were tested at 0.05 level of significance. The study research questions were answered using mean rating while the
hypotheses were tested using z-test statistics. The study findings revealed that effective management is relevant for quality maintenance culture of ICT tools for teaching and learning in public universities. It also shows that there is no significant difference between poor maintenance culture and hindered instructional delivery as shown by z-cal of -1.0657 ≤ zcrit of 1.96. The researchers conclude that effective management of ICT facilities for quality instructional delivery is relevant as such recommend that school administrators in the universities should have managerial blueprint for all facilities used for teaching and learning process.

Effective management world over is the bedrock for ensuring quality output in both educational circles and other sectors of life. Management therefore is an essential factor in ensuring that both human and material resources are qualitatively utilized and maintained for the purpose of actualizing the end goal of an organization.

Terry and Franklin (2003) opined that management is a scientific process consisting of the activities of planning, organizing and controlling performed to determine and accomplish stated objectives with the use of human and other resources. Weihrich and Koontz in Asiegbu (2004) asserted that management is the process of designing and maintaining an environment in which individuals, working together in groups efficiently accomplish selected aim. Put differently from the opinions above, management deals with articulated broad plans geared towards organizational success using both human and material resources. This means that the level of utilization and maintenance of teaching-learning facilities is determined by the extent to which these facilities are adequately managed.

More-so, the world educational community is speedily and adversely taking the technological community for teaching and learning exercises. Information and communication technology for some decades has become a major issue and concern as relates to the availability and utilization impart of ICT in transferring and acquiring knowledge in 21st century education system can never be ignored due to its easy access to relevant and resourceful information to both educational researchers, students and the entire society.

Gay and Blades (2005) asserted that information and communication technology encompasses effective use of equipment and programmes to access, retrieve, convert, store, organize, manipulate and present data and information. To Wheeler (2000), ICT intends to serve as a means of improving efficiency in educational process and effect change in teaching methodology, assessment of learning and teaching and its evaluation. The statement above thus is an implication that the introduction of information and communication technology tools, its availability, utilization and proper maintenance will
More-imperatively information and communication technology really has contributed to skill development learning, creativity and innovation, hi-tech thinking among students and development in technological environment to access information that is educative to the user. Its application has greatly affected the globe as such turned the society into a global community through the introduction of electronic mail, money transfer, world-wide web, goggle search, quick inter-change of ideas through chat groups, video conferencing, blogs, teleconferencing, use of gamification for learning, mobile Apps and video-conferencing. This emergent technologies in educational community has served as a modification strategy to improve learning methodologies, professional development of teachers and quality delivery of instruction in achieving high level of productivity among students.

Looking at the 21st century teaching and learning, there is advancement in the application and usability level in automated classroom gadgets such as computer camera, VTR system, CCTV, video cassette recorder/player, internets, and camcorder etc. By information and communication technology we mean the application and use of telecom facilities to retrieve, transmit, store and translate information in teaching and learning world. It seems that Wilderrotter (2007), Yussuf (2005) and Daniel (2002) agreed that ICT integration and usage in education system will yield bountiful result in teaching and learning process. The information importance to the society is reflective to the ability to impact on behaviour and decision of individual within the society. Notably, effective communication can be said to take place only when the receiver understands the exact idea that the sender intends to transmit. So technology leads to provision of conducive learning atmosphere for global enhancement.

Isichie (2000) rightly said that global enhancement using information to have a meaningful control over nature, to survive the challenges and change in the environment and build a civilized way of life for high standard of living is referred to as technology. Put differently, technology is the application of scientific discovery to solve ‘societal problems and challenges in a more practical and fast means. These in essence imply using those discoveries from science to produce needed tools for controlling both nature and the environment for the purpose of satisfying man’s pressing needs.

Information and communication technology, in its contribution in educational system has been viewed as a veritable instrument for enhancing quality educational output. This quality may be viewed from the perspective of ICT robustness, maintainability, testability, adaptability, learn- ability, modularity, complexity and safety. It therefore provides an alternative method for institution which provides educational access to its consumers at the fastest peak and convenience. Gbadamosi (2006) opined that ICT encourages the participation of large number of students, it also
resolves the problem of inadequate personnel. The digitalization and globalization of modern system of learning is an application of advanced technological gadgets for accessing new ideas and creativity within the educational circle. The effectiveness of ICT use in instructional delivery in education system depends on the appropriate selection of the relevant ICT tools, improved operational skills and acceptance of ICT by both the learner and the teachers. Bottino (2003) upholds that ICT use can improve performance teaching, administration and development of relevant skills in disadvantaged communities. The view above connote that ICT use in teaching helps in encouraging new dimensions of learning by doing, problem solving activities learning and development of new concepts and method of teaching.

Recallable school plant management deals with activities and services that connect keeping the physical plant open and available ready for effective utilization in a tenantable order. Maintenance therefore becomes a major aspect of facility management in the school environment. Maintenance of facilities involves repair, update, upgrading, and replacement of the available resources in order to assume its originality or newness for use. The educational section support programme in Nigeria (ESSPIN 2009) observably noted that the conditions of schools and its facilities for operation are in poor usable condition due to poor maintenance as such as the life span of the resources are reduced.

ICT irrespective of its usability benefits for teaching and learning transaction, there are obstacles impending its usability and availability in the school system. Nwankwo (2006) identified that poor managerial involvement with the design of management information system, inappropriate emphasis on computer systems, undue concentration of low level data process application, lack of top management support and poor application by transformation experts of management support remain a hindering factor to the use of ICT in schools. Sofoluwe (2007) consented that inadequate planning, hasty development, inadequate user involvement, political considerations, incapability of the information technology to extend to functional area of school organization remain a big challenge for making available and usable ICT tools in education system.

**Statement of Problem**

For there to be effective utilization of information and communication technology in the schools system, adequate provision and quality management towards maintenance of the resources must be put in place. However the problem of unavailability, poor management skills, poor maintenance culture, inability to use the available tools, incompetence among educational personnel, wrong selection of ICT tools for teaching and learning transaction, poor ICT manipulative skills among students and teachers and poor network system constitutes the major problem for this study. The
ideal situation should involve a strategic and effective management by the educational personnel’s towards making available and ensuring proper utilization of the available resources by providing quality maintenance culture of the gadgets, training of the personnel’s to be skilled in using the gadgets and proper selection of technology for teaching and learning activities.

Purpose of the Study

The purpose of this study is to ascertain how effective management could serve as a determinant for utilization and maintenance of ICT tools for teaching learning towards quality educational output. Specifically, four objectives were raised to guide the study

i. To determine the perception of lecturers on the relevance of effective management towards quality maintenance of available facilities in public universities.
ii. To determine if the utilization of ICT facilities impacts on quality instructional delivery in public universities in south-east.
iii. To determine the perception of lectures on the availability of ICT facilities.
iv. To determine the perception of lecturers in how poor maintenance culture of available ICT gadget can hinder effective teaching-learning activities.

Research Question

The following research questions were posed to the study. They are:

i. What is the lecturers’ perception on the relevance of effective management towards quality maintenance of available ICT tools in public universities?
ii. Do ICT facilities have any impact on quality instructional delivery?
iii. What is the lecturers’ perception on the availability of ICT facilities for teaching-learning in public universities?
iv. Does poor maintenance culture of available ICT tools hinder effective utilization for teaching-learning activities in south-east universities?

Hypotheses

The following hypotheses were formulated to guide this study and will be tested at 0.05 level of significance. They are:

i. There is no significant difference between federal and state university lecturers’ perception on the relevance of effective management towards quality maintenance of available ICT tools in public universities.
ii. There is no significant difference on mean response between federal and state lecturers on poor maintenance culture and hindered teaching-learning activities.
iii. There is no significant difference on mean response between federal and state lecturers on ICT impact and quality instructional delivery.
Methodology

This aspect of the study details the procedures and methods used for the study. An ex-post-facto survey design was used for the study. Ex-post facto survey design is ideal because the researcher cannot manipulate nor have control over the variables. Cohen, Manion and Morison (2000) aptly opined that ex-post facto research is a substitute for experimental research and can be used to test hypothesis of cause and effect or correlational study where it is not practical or ethical to apply true-experimental or quasi-experiment. The study population is 624 lecturers from six colleges of education in the universities at study. A sample size of 345 respondents was selected using proportional stratified random sampling to get 60% of the population.

More-so, the study comprises of six universities in south-east Nigeria which includes Michael Okpara University of Agriculture, Umudike; University of Nigeria, Nsukka; Nnamdi Azikiwe University, Akwa; Abia State University, Uturu; Enugu State University of Science and Technology and Anambra State University of Science and Technology. The study covers only colleges of education in the six selected schools.

Instrumentation

The research instrument for this study is the researcher self-constructed instrument titled effective management towards maintenance of available and utilization of information and communication technology for quality instructional delivery questionnaire (EMMAUICOTQ). The instrument was validated by two experts in education management and planning to ensure general test format and scrutiny of the instrument. Their constructive criticisms and corrections were effected as the final draft of the questionnaire that was administered to the respondents. PPMCC was used to run the analysis for the instrument reliability test which yielded a reliability index of 0.88. This was done through a test re-test method of which the instrument was re-administered to the respondents at two weeks interval.

Method of Data Analysis

Mean rating was used to answer the research questions while z-test was used for testing the hypotheses.
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Results

Research question 1

Table 1: Mean Rating Analysis of Federal and State Lecturer Perception on Relevance of Effective Management towards Quality Maintenance of Available ICT Tools in Public Universities.

<table>
<thead>
<tr>
<th>Item no</th>
<th>Σxs</th>
<th>M</th>
<th>X</th>
<th>Pm</th>
<th>Σxf</th>
<th>n₂</th>
<th>X</th>
<th>Pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>208</td>
<td>81</td>
<td>2.06</td>
<td>2.74</td>
<td>541</td>
<td>209</td>
<td>2.58</td>
<td>2.79</td>
</tr>
<tr>
<td>2</td>
<td>246</td>
<td>81</td>
<td>3.03</td>
<td>2.74</td>
<td>664</td>
<td>209</td>
<td>3.17</td>
<td>2.79</td>
</tr>
<tr>
<td>3</td>
<td>209</td>
<td>81</td>
<td>2.58</td>
<td>2.74</td>
<td>545</td>
<td>209</td>
<td>2.60</td>
<td>2.79</td>
</tr>
<tr>
<td>4</td>
<td>226</td>
<td>81</td>
<td>2.79</td>
<td>2.74</td>
<td>529</td>
<td>209</td>
<td>2.53</td>
<td>2.79</td>
</tr>
</tbody>
</table>

Key Decision: The mean of 2.50 and above will be accepted as positive mean while below 2.50 is negative. Table 1. Shows that the pooled mean of the four questionnaire item for state universities is 2.74 which is positive and the federal university with pooled mean of 2.72 which is positive as such their pooled mean is above 2.50. We therefore conclude that both state and federal university lecturers in south-east Nigeria uphold that effective management is relevant for quality maintenance of ICT tools in the school system.

Research Question 2

Table 2: Mean Rating Analysis of State and Federal Lecturers on ICT Facilities Impact Quality Instructional Delivery.

<table>
<thead>
<tr>
<th>Item no</th>
<th>Σxs</th>
<th>M</th>
<th>X</th>
<th>Pm</th>
<th>Σxf</th>
<th>n₂</th>
<th>X</th>
<th>Pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>209</td>
<td>81</td>
<td>2.58</td>
<td>2.85</td>
<td>629</td>
<td>209</td>
<td>3.0</td>
<td>2.85</td>
</tr>
<tr>
<td>2</td>
<td>255</td>
<td>81</td>
<td>3.14</td>
<td>2.85</td>
<td>642</td>
<td>209</td>
<td>3.0</td>
<td>2.85</td>
</tr>
<tr>
<td>3</td>
<td>263</td>
<td>81</td>
<td>3.24</td>
<td>2.85</td>
<td>556</td>
<td>209</td>
<td>2.66</td>
<td>2.85</td>
</tr>
<tr>
<td>4</td>
<td>200</td>
<td>81</td>
<td>2.46</td>
<td>2.85</td>
<td>685</td>
<td>209</td>
<td>3.27</td>
<td>2.85</td>
</tr>
</tbody>
</table>

Since the mean of lecturers from both state and federal universities are positive with recorded pooled mean of 2.85 and 2.71 respectively, we therefore conclude that ICT facilities used has impact on quality education outcome.
Research Question 3

Table 2: Mean Rating Analysis of State and Federal Lecturers’ Responses on Lecturers Perceptive of Availability of ICT Facilities and Teaching Learning in Public University.

<table>
<thead>
<tr>
<th>Item no</th>
<th>Σxs</th>
<th>M</th>
<th>X</th>
<th>Pm</th>
<th>Σxf</th>
<th>n2</th>
<th>X</th>
<th>Pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>240</td>
<td>81</td>
<td>2.96</td>
<td></td>
<td>629</td>
<td>209</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>253</td>
<td>81</td>
<td>3.72</td>
<td>2.95</td>
<td>642</td>
<td>209</td>
<td>3.09</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>208</td>
<td>81</td>
<td>2.56</td>
<td></td>
<td>556</td>
<td>2.9</td>
<td>3.66</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>256</td>
<td>81</td>
<td>3.16</td>
<td></td>
<td>685</td>
<td>209</td>
<td>3.27</td>
<td></td>
</tr>
</tbody>
</table>

Going by the pooled mean of lecturers responses from both state and federal universities which are positive with recorded pooled mean of 2.95 and 3 respectively, we conclude that availability of ICT tools enhance quality teaching-learning in public universities.

Research Question 4

Table 2: Mean Rating Lecturers in Federal and State University on Poor Maintenance Culture and Hindered Teaching Learning Activities

<table>
<thead>
<tr>
<th>Item no</th>
<th>Σxs</th>
<th>M</th>
<th>X</th>
<th>Pm</th>
<th>Σxf</th>
<th>n2</th>
<th>X</th>
<th>Pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>240</td>
<td>81</td>
<td>3.33</td>
<td></td>
<td>641</td>
<td>209</td>
<td>3.06</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>117</td>
<td>81</td>
<td>1.4</td>
<td>2.72</td>
<td>356</td>
<td>209</td>
<td>1.70</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>258</td>
<td>81</td>
<td>3.18</td>
<td></td>
<td>658</td>
<td>209</td>
<td>3.14</td>
<td>2.72</td>
</tr>
<tr>
<td>4</td>
<td>240</td>
<td>81</td>
<td>2.72</td>
<td></td>
<td>625</td>
<td>209</td>
<td>2.99</td>
<td></td>
</tr>
</tbody>
</table>

From the table 4 above, apart from questionnaire item 18 in both state and federal responses which recorded the mean of 1.4 and 1.70 respectively, other responses in item 17, 19, 20 recorded a positive mean. The pooled mean of the two groups shows 2.72 which exceed the bench mark; we therefore conclude that poor maintenance culture of available ICT tools hinders effective utilization for teaching-learning activities.

Table 5: Hypothesis 1: z-test Analysis of No Significant Difference on State and Federal Lecturers Perception on the Relevance of Effective Management towards Quality Maintenance of Available ICT Tools in Public Universities

<table>
<thead>
<tr>
<th>Respondent</th>
<th>N</th>
<th>X</th>
<th>SD</th>
<th>Std.err.</th>
<th>Z-cal</th>
<th>Z-crit.</th>
<th>decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>81</td>
<td>10.9</td>
<td>2.179</td>
<td></td>
<td></td>
<td></td>
<td>Accepts</td>
</tr>
<tr>
<td>Federal</td>
<td>209</td>
<td>10.890</td>
<td>2.180</td>
<td></td>
<td></td>
<td></td>
<td>Ho01</td>
</tr>
</tbody>
</table>

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Table 5 shows that the z-cal of 0.298 ≤ z-crit. of 1.96, we therefore accept the null hypothesis and reject the alternative hypothesis thus concludes that there is no significant difference between the perception of state and federal lecturers on relevance of effective management towards quality maintenance of available ICT tools in public universities in Nigeria. Thus they perceive the importance of effective management of ICT tools in the university community.

Table 6: Hypothesis 2: Z-test Analyses on no Significant Difference on Responses between State and Federal Lecturers on ICT Impact to Quality Instructional Delivery

<table>
<thead>
<tr>
<th>Respondent</th>
<th>N</th>
<th>X</th>
<th>SD</th>
<th>Std.err.</th>
<th>Z-cal</th>
<th>Z-crit.</th>
<th>decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>81</td>
<td>11.444</td>
<td>2.019</td>
<td></td>
<td>0.2317</td>
<td></td>
<td>Accepts</td>
</tr>
<tr>
<td>Federal</td>
<td>209</td>
<td>10.866</td>
<td>3.162</td>
<td></td>
<td>2.1486</td>
<td>1.96</td>
<td>Ho₁</td>
</tr>
</tbody>
</table>

Table 4.8 reveals that the z-cal of 2.1486 ≥ the z-critical of 1.96, we therefore accept the alternative hypothesis and reject the null hypothesis thus conclude that there is a significant difference on response of state and federal lecturers on impact of ICT to quality instructional delivery.

Table 7: Hypothesis 3: Z-test Analyses on No Significant Difference on Responses between State and Federal Lecturers on Poor Maintenance Culture of ICT Tools and Hindered Teaching-Learning Activities.

<table>
<thead>
<tr>
<th>Respondent</th>
<th>N</th>
<th>X</th>
<th>SD</th>
<th>Std.err.</th>
<th>Z-cal</th>
<th>Z-crit.</th>
<th>decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>81</td>
<td>11.840</td>
<td>2.489</td>
<td></td>
<td>-1.0657</td>
<td>1.96</td>
<td>Ho₁</td>
</tr>
<tr>
<td>Federal</td>
<td>209</td>
<td>12.148</td>
<td>2.032</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The result of the analysis shows that z-cal of 1.0657 ≥ the z-crit. of 1.96; we therefore accept the null hypothesis and reject the alternative hypothesis thus conclude that there is no significant difference of state and federal lecturers’ responses on poor maintenance culture of ICT tools and hundred teaching-learning activities.
Summary of the Findings
The findings of the study are as follows:
i. Effective management is relevant for quality maintenance culture of ICT tools for teaching-learning transaction as uphold by state and federal lecturers’, in public universities.
ii. The findings also revealed that availability of ICT tools enhance quality instructional delivery. This evidenced the pooled mean of 2.95.
iii. It also finds out that poor maintenance culture of ICT tools available hinder effective utilization for teaching-learning activities. This was revealed by the pooled mean of 2.72.
iv. The study also shows that no significant difference in perception by lecturers’ exist in relevance of effective management towards quality maintenance of ICT tools. It was as a result that the Ho₁ of 0.19655 > H₁ of 1.96 as tested at 0.05 level of significance.
v. Further, the null hypothesis of no significant difference of lecturers’ responses on ICT impact to quality instructional deliver was rejected while the alternative hypothesis was accepted thus state that there is a significant difference on lecturers’ perception on ICT impact to quality instructional delivery in public universities. This was evidenced since the z-cal of 2.1486 ≥ z-crit. value of 1.96.
vi. The study also revealed that the z-cal value of -1.0657 ≤ z-crit. of 1.96 as such the null hypothesis on no significant difference on poor maintenance culture of ICT tools and hundred instructional delivery was accepted.

Conclusion
The researchers concluded that effective management of ICT facilities for quality instructional delivery is relevant. They also conclude that poor maintenance culture of ICT tools in public universities hinder effective and quality instructional delivery of lecturers. It is also concludable that availability of ICT gadget serves as an enhancement to quality teaching-learning activities.

Recommendations
i. The researchers recommended that the school administrators in the universities should have managerial blue print for all facilities used in teaching-learning process.
ii. The school management should adopt qualitative measures toward good culture maintenance of facilities in the school system.
iii. Adequate fund and its prudent utilization towards purchase of more technological aids, its installation and maintenance in public universities should be ensured by government. This should be done in collaboration with the school management and government.
iv. There is need for professional development of lecturers of both federal and state level on use of ICT tools for delivery instruction

v. Proper selection of ICT tools in universities for teaching should be ensured.

vi. There should be a giant step towards using advanced emergent technologies such as gamification, camcorder, mobile apps and blogs etc. in teaching-learning.

References


