

**INFORMATION COMMUNICATION TECHNOLOGY (ICT) APPLICATIONS
IN THE MANAGEMENT OF UNIVERSITIES OF AGRICULTURE
AND TECHNOLOGY IN NIGERIA**

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Abstract

The information needs of universities in Nigeria especially Universities of Agriculture and Technology are rapidly expanding and changing. As at present, the success of these institutions may depend more on their ability to manage the large volume of information/data which they must process speedily to provide information for the management decision making, rather than on their ability to control administrative departments and academic programmes. The emergence of information communication technology and its adoption in universities' management in Nigeria is yet to take firm root in solving the numerous problems facing the universities' management team. As the number of universities especially Universities of Agriculture and Technology and students enrolment grow, the challenges it poses to the universities' management make the application of ICT essential for the success of the institutions. This study, in order to address the above challenges, examined how far the two types of the universities are making use of the Information Communication systems available for the universities' management in meeting their challenges in the area of students registration, processing of students academic records, personnel records, teaching and research. The results of the analysis of responses of 92 senior administrative staff and academic staff in administrative positions from the two types of universities in Nigeria were obtained through the research questionnaire. Mean and t-test statistics were used to answer the three research questions and to test the hypotheses at 0.05 level of significance. The result showed that the institutions demonstrate moderate applications for the Universities of Technology

and low for the Universities of Agriculture. The overall result show that the Universities of Technology performed significantly better than the Universities of Agriculture in the application of ICT in the management of the specialized universities in Nigeria. Based on the findings, some recommendations were made.

Introduction

The ever increasing huge investment in education is being matched with equally keen interest in communication and technological developments, which have crucial effects in the labour force of a country. The rapid growth in the use of computer and computer-based technologies over the years have similarly had impact on the educational system around the world (Yusuf, 2005) to such an extent that the use of Information Communication Technologies (ICTs) have become important tools for teaching in different institutions and a way for the management of tertiary institutions especially the universities. According to Hynes and Richardson (2008), ICT refers to forms of technology that are used to transmit, store, create, share, or exchange information and may include such technologies as radio, television, video, DVD, telephone (both fixed line and mobile phones), satellite systems, computer and network hardware and software, as well as the equipment and services associated with these technologies like video conferencing and electronic mail. In Nigeria, many Universities administrators including the Universities of Agriculture and that of Technology use ICT in their day to day management of their universities. One, therefore, cannot over estimate the application of Information and Communication Technology (ICT) on the everyday life of an academic institutions like the universities due to the information needs of such institutions.

The information needs of universities in Nigeria especially the specialized Universities of Agriculture and Technology are rapidly expanding and changing. As at present, Bennet and Bennet (2005) had noted that the success of any of the tertiary institutions may depend more on its ability to manage the large volumes of information/data, which they must process speedily to provide information for the management decision making rather than on its ability to control administrative departments and academic programmes. Information has always been necessary for the task of universities management. In

the view of Oboegbulem (2011), management is a routine process of administration which involves planning, organizing, directing, leading and controlling of resources to achieve an organizational goal which in this study is the universities. Management in this study is the coordination of all the resources of the Universities of Agriculture and Technology through the process of planning, organizing, directing and controlling in order to attain the universities goals. No one can dispute the fact that university education has become more complex and with the establishment of specialized universities of agriculture and that of technology, their management is becoming more demanding of the managers.

Association of African Universities (2001) noted that with the student explosion in the universities and the multiplicity of programmes, universities are required to handle large volume of data which they must process to provide information for their management decision making as well as meeting the information requirement of her various clientele; namely; the students, the parents, the government, the community and the general public. More importantly, globalization, quest for quality and market competitiveness have posed more challenges to the management of the specialized universities in recent times. Yusuf (2005) had remarked that as the universities try to face squarely these challenges and be adjusted to the changing world, overwhelmed with knowledge explosion, ICT becomes an indispensable part of universities management.

The emergence of Information Communication Technology and its adoption in university management especially in the specialized Universities of Agriculture and Technology in Nigeria is yet to take firm root in solving the numerous problems facing the universities management team. As the number of Universities of Agriculture and Technologies and students enrolment grow, the challenges it poses to the universities management makes the application of ICT essential for the success of the institutions. In addition, the volume of information required today for the management task has increased due to the increased size and complexity of the specialized universities as they are larger in terms of the number of specialized employees, number of specialized operating units, specialized academic programmes, departments and divisions. The information enables many specialized departments and activities to be properly co-ordinated. According to

Nwafor (2005), the different departments, units and divisions of the (specialized) universities are faced with the challenges of keeping good records on issues bordering on students' enrolment and admission, personnel recruitment and promotions, payment of fees and salaries, accounts and finances, examinations and results compilation, certificates and documentation, public relations and publicity, research and publishing, monitoring and evaluation of programmes. Some of the above areas are what the senior non-academic managers have to contend with. The management team of the specialized universities must take up the challenge of globalization to meaningfully address the numerous challenges facing the institutions. What capacity do these specialized institutions have for ICT adoption? What are their constraints to application of ICT in university management? These are the issues addressed by this study as the following research questions are posed:

1. What capabilities have the Universities of Agriculture and Technology in the adoption of ICT facilities for the management of the specialized institutions?
2. What are the areas of application of ICT in the management of the two specialized universities in Nigeria?
3. What are the challenges faced by the specialized universities in the application of ICT in the university management?

Hypotheses

- Ho₁: There is no significant difference between the opinion of heads of academic and non-academic departments at the Universities of Agriculture and their counterparts at the Universities of Technology on the capabilities of the two specialized universities to adopt ICT in their management process.
- Ho₂: There is no significant difference between the opinion of heads of academic and non-academic departments at the Universities of Agriculture and their counterparts at the Universities of Technology in Nigeria on the level of inhibitions on application of ICT facilities in management of universities.
- Ho₃: There is no significant difference between the opinion of heads of academic and non-academic departments at the Universities of Agriculture and their counterparts at the Universities of

Technology on the level of application of ICT facilities in the management of the two types of universities.

Methodology

The study is explorative in nature using descriptive survey research design. The

population comprised all the academic and non-academic heads of departments and units in the Universities of Technology and that of Agriculture in Nigeria. A total of 92 administrative heads made up of 64 heads of academic and non academic departments in the 16 universities of technology and 28 heads of academic departments in the 3 Universities of Agriculture in Nigeria formed the sample size used for the study.

A structured response questionnaire designed by Okorie, Agabi and Uche (2005) was modified by the researcher and used for data collection. The questionnaire response mode were structured and weighted using the following nominal values: three points for high capabilities; two points for moderate capabilities, one for low capabilities and zero for not at all, for answering research question one. Also, for answering research question two, the weighting is as follows: three for high application, two for moderate application, one for low application and zero for no application at all. The same weighting pattern was applied respectively for the level of inhibitions (challenges) faced by the universities on the application of ICT in the management of the universities as; three for high inhibition, two for moderate inhibition, one for minimal inhibition and zero for no inhibition used for research question three. From the above, the scale mid-point is 1.55 and for the purpose of interpretation of results, the true limits of the scale points were adopted thus; Mean scores ranging from 0.00-0.55, 0.56-1.55, 1.56-2.55 and 2.56-3.00 respectively represent nil, minimally (low), moderate and high capabilities, inhibition, or applications. Three experts validated the instrument and a reliability co-efficient of $r = 0.71$ for the instrument was obtained using Cronbach Alpha method. The instrument was administered to the 92 administrative academic and non-academic departments with the help of three research assistants who are also senior lecturers in the two specialized universities. All the copies of the questionnaire were retrieved and used for data analysis. The researcher also carried out on the spot assessment of the ICT

facilities on ground and cross checked such information with responses for the questionnaire responses before carrying out the data analysis. The data were analysed using the Mean to answer the research questions in line with the real limit of the scale points and t-test to test the null hypotheses formulated for the study at 0.05 level of significance and 90 degrees of freedom.

Results

Research Question 1: What capabilities have the Universities of Agriculture and Technology in adoption of ICT facilities in the management of the universities?

Table I
Mean, Standard Deviation and t-test analysis of the difference between the opinions of Heads of Academic and Non Academic Departments at the Universities of Agriculture and their counterparts at the Universities of Technology on the capabilities of the universities to adopt ICT in their management process

S/N	Capabilities of Universities	Universities of Technology			Universities of Agriculture			GX	Gsd	t-cal
		\bar{X}_1	Sd ₁	Dec	\bar{X}_2	Sd ₂	Dec			
1	Organizing training for staff on the use of ICT	1.91	0.71	Moderate	1.25	0.70	Low	1.71	0.76	2.72*
2	Organizing training for students on the use of ICT	2.33	0.64	Moderate	1.75	0.75	Moderate	2.15	0.73	3.56*
3	Availability of functional computers in every department or unit for office use	2.03	0.59	Moderate	1.36	0.73	Low	1.83	0.70	4.78*
4	Availability of functional internet facilities owned by the institutions for students' registration, browsing and	1.94	0.56	Moderate	1.93	0.60	Moderate	1.93	0.57	0.08

	general information and communication									
5	Alternative power source for supporting internet and ICT centre	1.63	1.02	Moderate	1.61	0.83	Moderate	1.62	0.96	0.10
6	Adequate number of academic staff who are computer compliant	1.91	0.87	Moderate	1.85	0.63	Moderate	1.90	0.80	0.12
7	Adequate number of administrative staff who are computer and ICT compliant	1.84	0.76	Moderate	1.86	0.80	Moderate	1.85	0.77	0.11
8	Students are computer and ICT compliant to facilitate their registration and information retrieval.		0.7	Moderate	1.35	0.7	low	1.70	0.78	3.78*
	Total Capability	1.95	0.75	Moderate	1.63	0.76	Moderate	1.85	0.79	1.94

NB: Grand Mean (\bar{GX}) = 1.85; Sd = 0.79; t-cal = 1.98

Sd= standard deviation:

Gsd= Grand standard deviation.

N = 92 (64 Academic and non academic heads in Universities of Technology and 28 Academic and non academic heads in Universities of Agriculture)

* = Significant at P < 0.05 and df 90.

Table 1 above shows that Universities of Technology exhibited moderate capability for ICT management in all the variables examined while the Universities of Agriculture have low weighting in ICT management in three out of eight variables. Such variables of low capabilities include availability of functional computers, organizing training for staff in ICT use and students' capability in ICT compliant. The universities also showed moderate capability for using ICT in university management. In terms of aggregate analysis, the mean

capability weighting in Table 1 revealed that both universities possess moderate capability for adoption of ICT in their management process.

Research Question 2: What are the areas of application of ICT in the management of the Universities of Technology and that of Agriculture?

Table 2
Areas of Application of ICT in the Specialized Universities

S/N	Level of Application	Universities of Technology			Universities of Agriculture			GSD	t-cal	
		\bar{X}_1	Sd ₁	Dec	\bar{X}_2	Sd ₂	Dec			
1	Students personal record	1.78	0.77	Moderate	2.11	0.57	Moderate	1.88	0.72	2.28*
2	Management of students academic records	1.86	0.87	Moderate	1.32	0.72	Low	1.70	0.86	3.35*
3	Management of students admissions and registration	1.91	0.87	Moderate	0.95	0.58	Low	1.43	0.63	6.67*
4	Staff personnel records management	0.72	0.63	Low	0.36	0.56	Low	0.61	0.63	2.73*
5	Management of teaching and learning	1.02	0.77	Low	1.04	0.64	Low	1.02	0.73	0.13
6	Financial record management	1.91	0.71	Moderate	1.25	0.70	Low	1.71	0.76	2.72*
7	Universities management services	1.63	1.02	Moderate	0.11	0.31	Low	0.87	0.69	1.43
8	Research and publication	1.94	0.56	Moderate	1.93	0.60	Moderate	1.93	0.57	6.84*
	Total	1.60	0.80	Moderate	1.13	0.56	Low	1.40	0.72	2.58*

Table 2 above reveals that the universities of technology have moderate level of applications of ICT on all the areas examined. On the other hand, the Universities of Agriculture have low level of application of ICT in all areas examined except in management of students' personnel record and in research and publications. The difference in the level of application of ICT in university management for the two types of institutions is shown in the t-test statistic presented in the Table also.

Research Question 3: What are the inhibitions (challenges) faced by the specialized universities in the application of ICT in university management?

Table 3
Mean and t-test analysis between Universities of Technology and that of Agriculture on the level of inhibitions (constraints) on the application of ICT in University Management

S/N	Challenges	Universities of Technology			Universities of Agriculture			GX	Gsd	t-cal
		\bar{X}_1	Sd ₁	Dec	\bar{X}_2	Sd ₂	Dec			
1	High cost of installing ICT facilities and internet in the institutions	1.78	0.77	Moderate	2.17	0.57	Moderate	1.88	0.72	2.28*
2	Unavailability of computer and internet outlet in the offices and classrooms	1.91	0.71	Moderate	1.25	0.70	Minimally	1.71	0.76	2.72*
3	Inadequate arrangement for alternative power supply in the institutions to support ICT	0.72	0.63	Minimal	0.36	0.56	Minimally	0.61	0.63	2.73*
4	Unavailability of functional computer or information technology centre	1.02	0.77	Minimal	1.04	0.64	Minimal	1.02	0.73	0.13
5	Frequent power outage for the ICT	2.57	0.63	High constant	2.62	0.71	High	2.60	0.70	-0.03
6	Poor knowledge of the use of computer and ICT in universities management	0.39	0.55	Minimal	0.11	0.31	Minimal	0.30	0.51	3.10*
7	Reluctance of staff and students to adapt to use of computer and other ICT facilities in management	0.72	0.63	Minimally	0.36	0.56	Minimally	0.61	0.63	2.73*
8	Difficulty of learning the new technology	0.17	0.38	Minimal	0.21	0.50	Minimal	0.19	0.42	0.38
9	Fear of maintenance cost of the new	0.89	0.69	Minimal	0.57	0.63	Minimal	0.73	0.67	2.20*

10	technology Lack of commitment and will power of the universities management to support the application of ICT in the institutions management	of	1.11	0.86	Minimal	0.68	0.72	Minimal	0.98	0.84	2.48*
11	Unavailability of technical personnel to handle ICT operations.	of	1.16	0.93	Minimal	1.21	0.83	Minimal	1.17	0.90	- 2.89*
Total			1.23	0.68	Minimal	0.96	0.64	Minimal	1.07	0.69	0.55

Table 3 above reveals that power outage is a major constraint exerting high influence on both universities in adopting ICT in the management of the institutions. High cost of ICT facilities and unavailability of computer and internet outlets have moderate influence on the management of the institutions in the use of ICT while they have minimal influence on the Universities of Agriculture. The differential influence of these inhibitors is tested using t-test which reveals significant difference in most of the items presented.

Discussion of Results

Table 1 shows analysis of the assessment of the capabilities of the Universities of Technology and those of the Universities of Agriculture in adoption of ICT in the management process of the two specialized institutions. The table reveals that the universities of technology exhibited moderate capability for the use of ICT in the management of all the eight capability variables presented. These are in, organizing training for staff and students on the use of ICT, availability of functional computers and making provision for alternative source of power supply for use in ICT centres among others. Universities of Agriculture on the other hand demonstrated low capabilities in three out of eight capability variables while performing moderately in the remaining five variables examined. In terms of aggregate analysis, the mean capability weighting in Table 1 reveals that both specialized universities possess moderate capability for adoption of ICT in their management process.

A t-test comparison of the means of the respondents as shown also in Table 1 yielded a t-value of 1.94 which is less than the t-table value of 1.96. This therefore implies that the hypothesis is retained. The two specialized universities have the capability to adopt ICT facilities for their management process.

The implication of the above result is food for thought. Universities, especially the specialized institutions are embracing the use of ICT in the management of teaching and learning. The institutions' use of ICT facilities in teaching and learning and in the institutions' management, depends on the ability and willingness of the institutions' workforce to use them. This also depends on the readiness and capacity of the institutions to engage the institutions workforce in professional development. As was pointed out by Nwafor (2005), availability of computer facilities, regular training of the personnel in the use of computer and other ICT facilities are the hub on which the institutional capacities of the institutions to use ICT in their day to day management of teaching and learning are hinged on.

On the level of application of ICT in the management of the universities, (in the eight major areas of university management), the result in Table 2 reveals that Universities of Technology have moderate applications of ICT in six areas examined and low in staff personnel records management and management of teaching and learning. On the other hand, Universities of Agriculture have low application in six of the variables examined and moderate in only two items including management of students personnel record, research and publication. The differences in the performance between the two specialized universities was further confirmed by the test of t-test statistics shown in Table 2.

The findings have shown that not all the higher institutions especially the specialized universities are adopting ICT for their different academic programmes and for the university management despite the fact that universities are encouraged to embrace ICT which is the hallmark of globalization. According to Bennett and Bennett (2003), non-utilization of ICT in the institutions of higher learning will place the non-adopters behind in their quest to meet up with the globalization process. This according to him is because ICT can be used to enrich and accelerate skills and helps to relate school experiences to work practices as well as in providing opportunities for schools to

communicate with one another through e-mail and easier access to current information and more. The pressure faced by the universities particularly, the specialized universities is to establish relevance but are hindered by some factors which according to Okorie, Agabi and Uche (2005) are high cost of maintaining ICT facilities, lack of substantial online learning resources and unreliable power source supplies. The biggest obstacle to the application of ICT in the classrooms and in the university management is not just lack of funds and ICT facilities but inadequate technical personnel to handle the ICT maintenance and repairs, which are common difficulties in developing countries like Nigeria.

Conclusions and Recommendations

The findings of the study have shown that the specialized institutions in Nigeria lack the capability to adopt and utilize ICT facilities in the institutions management. The situation is worrisome as the challenge of globalization will make the specialized universities not to keep pace with the other universities in the world. The author of this paper regards

ICT as one of the basic resources for university education and management in Nigeria. It is just as important as the other resources of manpower, machine, money and management.

The management of the specialized universities should initiate actions to encourage application of ICT in their management process by organizing training and workshops for staff and students on the various areas of application of ICT in the university management.

Recommendations

From the foregoing, the managers of the specialized universities should begin to adopt ICT in their areas of operation and learn from their day to day mistakes to improve. There is need for inter-university collaboration, to sustain efforts at application of ICT, both within the country and between the country and other African states by creating a network of African ICT experts for assistance.

The institutions should procure information technology systems (mainframe computers) for economy, and increased speed of information processing to adapt university management to changes in the information technology revolution.

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