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Assessment of the Integration and Challenges of Information and Communication Technologies (ICTS) in Tertiary Institutions in Nigeria

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Abstract

The study examined the modes of integration of information and communication technologies (ICTs) in tertiary institutions in Nigeria. It determined the level of success in various areas where ICTs have been integrated in tertiary institutions and examined higher education staff attitude towards the integration of ICTs. Finally, it examined the challenges militating against effective integration of ICTs in higher institutions. The study adopted the descriptive survey research design. The population for the study comprised the staffs of tertiary institutions in Osun state, both the teaching and non-teaching. A sample size of 240 teaching and non-teaching staffs were purposively selected from three institutions in Osun State based on type, nearness and ownership. An instrument titled: Assessment of the Integration and Challenges of ICTs Questionnaire (AIICQ) was developed and validated before use. Four research questions were raised and answered. Data collected were analysed, using frequency counts, simple percentage mean and Relative Significance Index (RSI). The results showed that 74.2% of the staffs used ICTs blended with conventional/manual approach in their institutions. The study concluded that if information and communication technologies are to be effectively integrated into teaching and learning in tertiary institutions, there must be a positive level of acceptance by the staffs, higher institutions management as well as all agencies involved in the running of higher institutions in Nigeria.

Keywords: Integration, Information and Communication Technologies (ICTs), Tertiary Institutions, Challenges.

Introduction

Given the importance of tertiary education, many nations around the world have come to embrace it for optimal development. According to Idumange and Nwaeke (2011), through university education, the citizens of a nation acquire high level skills in various sectors like health, education, and engineering In pursuance of this, there is need for both students and

staffs of higher institutions to have a good grasp of Information and Communication Technologies (ICT). ICTs must be integrated into every aspect of higher education in order to produce students who are ICT literate and can easily adapt in the 21st century where technology permeates every sphere of life. Bingimlas (2009), in Owino (2009) affirms that the utilization of ICTs in teaching is a more effective way of preparing for the globalising job market. The world is in a computerised age where technology has created a web of interconnectivity between places and people far and wide.

Over the years, technology has undergone significant changes which have made it one of the most common elements in our society. This advancement has resulted in, Information and Communication Technologies (ICTs), otherwise known as 'new media'. According to the UNESCO reports (2002), ICTs are a combination of 'informatics technology' with other related communication technologies, chief of which is the internet, computer and smart phones. These cover internet services, telecommunication equipment, media and broadcasting, wire-based information services, and other related information and reception of knowledge activities. In clearer terms, ICTs can be described as computerised or electronic machines that can be used for a wide range of activities (Ofodu, 2007) as cited in Ajayi and Haastrup (2009).

For this study, ICTs will be taken to mean digital communication resources or materials which are applied in the teaching and learning process to improve education. Such resources include the internet, computers, projectors, smart phones, and other digital and audio visual resources. Information and Communication Technologies are increasingly having more influence on all aspects of the society as they have become an integral part of the society. They have a transformative impact on the way information is processed, stored, accessed and disseminated, and have made the world a global village (Agi, 2013; Garba, Singh, Yusuf and Ziden, 2013).

Industries all over the world, have witnessed significant improvement in their modus operandi with the integration of ICTs in their daily operations. According to Oliver (2002), despite the full scale adoption of ICTs in other fields, the education industry still lags behind in fully integrating ICTs, especially in primary and secondary schools. But as times continue to change, many factors have helped to awaken the need to adopt ICTs into the learning environment. Oliver (2002) observes that the factors include the need to make the teaching and learning process more efficient, effective and dynamic.

Zubairu (2015) asserts that ICTs have contributed immensely in evoking a positive change in the quality of research, teaching and learning. Researches Researchers have been carried out globally to prove that a boost in student exposure to educational ICTs through curriculum integration has a significant impact on student performance especially in terms of knowledge comprehension, practical and presentation skills (Kozma, 2005 and Fister and McCarthy, 2008). According to Ajayi (2008), with the adoption of ICTs, learning institutions have become more efficient and productive and are necessary prerequisites for upgrading the standard of education.

ICTs provide the opportunity to overcome the persistent problem of lack of staff, obsolete learning materials in Nigerian higher institutions and is a useful support for various educational activities (Idowu and Esere, 2013).

The means that ICTs have made it possible for learning to be more participatory, causing a shift from the teacher centred to the learner friendly environment which has also transformed instructors to facilitators. Scholars such as Grimus (2000) and Yelland (2001) have reasoned that the use of ICTs in the instructional process gives learners the chance to learn how to function in this era of digitalization, and that learners with ICT skills are in a better position to face new developments with better understanding in addition to being better equipped for the labour market.

While this may be the ideal situation in more advanced countries of the world where such facilities are readily available, the Nigerian situation may be slightly different as the integration of ICTs in education is still in its infancy due to a myriad of challenges and setbacks. Osakwe (2012) revealed that many Nigerian universities have problems accessing ICTs in other to attain improved standards of teaching and learning. According to Ajegbelen (2016) and Starr (2001) other impeding factors include lack of financial support, inadequate training for teachers, lack of motivation for the need to fully adopt ICTs as teaching aids, unstable power supply, lack of ease of access and high cost of internet services. Notwithstanding these challenges, ICTs in education have come to stay.

Against this backdrop, concerted efforts are being made to further enhance the implementation of ICTs in the education sector. The federal government of Nigeria, in a bid to access international best practices, reviewed the l998 national policy on education as stated in year 2004 to accommodate the introduction of ICTs into the school system. Furthermore, in an official publication released in 2017, the UNESCO noted that extra budgetary contributions through member states like the UNESCO–China Funds-in-Trust (CFIT) and the UNESCO-Korea Funds-in-trust (KFIT) projects are being harnessed to accelerate the process of implementing ICTs in education projects in Africa.

This study, therefore, investigated the extent to which information and communication technologies have been adopted in higher institutions in Nigeria with the aim of assessing the integration and challenges of Information and Communication Technologies in tertiary institutions in the country. Specifically, this study sets out to:

1. examine the modes employed in the integration of Information and Communication Technologies in higher institutions in Nigeria,
2. determine the level of success in various areas where Information and Communication Technologies have been integrated in higher institutions in Nigeria,
3. examine higher education staff attitude towards the integration of Information and Communication Technologies in higher education in Nigeria
4. examine the challenges militating against effective integration of Information and Communication Technologies in higher education.

Research Questions

From the objectives of the study, the following research questions were raised.

1. What are the modes of integration of Information and Communication Technologies in higher education in Nigeria?
2. What is the level of success in various areas where Information and Communication Technologies have been integrated in higher education in Osun State?
3. What is the higher education staff attitude towards the integration of Information and Communication Technology in higher education in Osun State?
4. What are the challenges militating against effective integration of Information and Communication Technology in higher education in Osun State?

Methodology

The design adopted was the descriptive survey research. The descriptive survey research design was appropriate for this study since it was a fact finding study investigating to what extent ICTs had been integrated in tertiary institutions in Nigeria, the areas of integration and the challenges. This is in line with Lokesh's (l988) assertion that descriptive survey studies usually collect detailed descriptions of existing phenomena with the purpose of employing data to justify current conditions and practices or making more informed plans for improvement. Survey studies are used in investigations of phenomena in their natural settings.

The population for the study comprised teaching and non- teaching staffs of all higher institutions in Osun State. The sample consisted of 240 teaching and non-teaching staff from higher institutions in Osun State. Three (3) higher institutions were purposively selected based on type, nearness and ownership. These include Obafemi Awolowo University, Ile-Ife, Federal Polytechnic, Ede and Osun State College of Education, Ilesha. Thirty one (3l) teaching staff and forty nine (49) non-teaching staff were selected using convenience sampling technique. These gave eighty (80) respondents in each of the institutions. In all, two hundred and forty (240) respondents were selected from the three institutions. The investigators personally visited all the three institutions and administered the instruments. Convenience sampling technique was employed in the three institutions to elicit information from the respondents.

The instrument titled 'Assessment of the Integration and Challenges of ICT Questionnaire (AIICQ) was designed by the researchers to assess the integration and challenges of Information and Communication Technologies in tertiary institutions. It was designed with both open ended and close ended questions that were related to the topic and research questions raised. The instrument consisted of two sections. Section A had six (6) close-ended and one (l) open-ended questions to get the demographic data of respondents. Section B, had four (4) sub- sections. Sub-section l, consisted of two (2) questions designed to elicit information on the mode of integration of ICTs in the tertiary

institutions. Sub-section 2, had l9 questions on the level of success of ICTs integration in tertiary institutions. There were l0 questions in sub-section 3 on the attitude and perception of tertiary institution's staffs towards ICTs while sub-section 4, had nine (9) questions that elicited information on the challenges militating against the effective integration of ICTs in tertiary institutions. The questionnaire had a total of 45 structured questions. To obtain the necessary information, the investigators personally administered the questionnaires and allowed the respondents to express their opinions freely. Data collected were analyzed using the frequency counts, simple percentage, mean and relative significance index (RSI).

Tab1e 1: Socio-Demographic Information of Higher Education Staff

Variab le	1evels	Frequency (f)	Percentage (%)
	University	80	33.3
	Polytechnics	80	33.3
Type of Institution	College of Education	80	33.3
	Total	**240**	**100.0**
	Male	112	46.7
	Female	104	43.3
Sex	No Response	24	10.0
	Total	**240**	**100.0**
Status in the	Teaching Staff	93	38.8
Institution	Non-Teaching Staff	147	61.2
	Total	**240**	**100.0**
	Below 18yrs	3	1.3
	18-30yrs	82	34.2
	31-43yrs	60	25.0
Age	44-57yrs	83	34.6
	58yrs and Above	8	3.3
	No Response	4	1.7
	Total	**240**	**100.0**
	OND/NCE	24	10.0
	HND/First Degree	118	49.2
Academic	Master Degree	71	29.6
Qualification	Ph. D.	27	11.3
	Total	**240**	**100.0**
	less than 5yrs	48	20.0
Years of Working	5-10yrs	88	36.7
Experience in the	5-20yrs	84	35.0
Institution	11-20yrs	20	8.3
	Total	**240**	**100.0**

Results

Research Question 1: What are the modes of integration of Information and Communication Technologies in higher institutions in Osun State?

Tab1e 2: M odes of Integrati on of Inf ormation and C ommunication Techn ology in Higher Institutions in Osun State

Areas of Activities	Mode of Integration	Frequency (f)	Percentage (%)
Te aching/learning/ Research Activities	Full integration of ICT	63	26.3
	ICT b lended with Conventional/manual	177	73.8
	Total	240	100.0
Administrative Re lated Functions	Full integration of ICT	62	25.8
	ICT b lended with Conventional/manual	178	74.2
	Total	240	100.0

Table 2 shows the modes of integration of information and communication technologies in higher institutions. As shown in the table, in teaching/learning/research activities, 26.3% of the higher institution staffs sampled indicated that full integration mode was adopted while for 73.8% of the respondents; the mode of integration was ICTs blended with conventional/manual. Similarly, in terms of administrative functions in the higher institutions, 25.8% of the staff indicated full integration of ICTs while 74.2% indicated that ICTs blended with conventional/manual approach was the mode adopted in their institutions. This result shows that the mode of integration of information and communication technologies in higher education was the blended approach in which ICTs were blended with the conventional/manual method.

Research Question 2: What is the level of success in various areas where information and communication technology has been integrated in higher institutions in Osun State?

The result of the level of success in various areas where Information and Communication Technologies have been integrated in higher institutions in Nigeria is presented in Table 3.

Tab1e 3: Level of Success in Various Areas Where Information and Communication Technologies have been integrated in Higher Institutions in Osun State

S/N	Areas of Application of ICT	NS		FS		S		VS			
		F	%	F	%	f	%	F	%	Mean	Rmks
1	Teaching and learning	28	11.7	87	36.3	95	39.6	30	12.5	**2.5**	FS
2	Curriculum development	27	11.3	98	40.8	84	35.0	31	12.9	**2.5**	FS
3	Staff development,	23	9.6	80	33.3	105	43.8	32	13.3	**2.6**	S
4	Research and information sourcing	20	8.3	83	34.6	103	42.9	34	14.2	**2.6**	S
5	Communication of research outcomes	21	8.8	88	36.7	94	39.2	37	15.4	**2.6**	S
6	Admission enquiry by students	12	5.0	71	29.6	110	45.8	47	19.6	**2.8**	S
7	Students admission and records	21	8.8	50	20.8	122	50.8	47	19.6	**2.8**	S
8	Examination results and transcripts	14	5.8	68	28.3	110	45.8	48	20.0	**2.8**	S
9	Finance database	24	10.0	82	34.2	93	38.8	41	17.1	**2.6**	S
10	Human resource database	25	10.4	88	36.7	86	35.8	41	17.1	**2.6**	S
11	Information management	23	9.6	72	30.0	104	43.3	41	17.1	**2.7**	S
12	Applying for admission through e-media	33	13.8	77	32.1	96	40.0	34	14.2	**2.5**	FS
13	Registration/enrolment of students	19	7.9	58	24.2	106	44.2	57	23.8	**2.8**	S
14	Course allotment and availability of information	42	17.5	98	40.8	73	30.4	27	11.3	**2.4**	FS
l5	Information about hostel accommodation	40	16.7	95	39.6	67	27.9	38	15.8	**2.4**	FS
16	Recruitment and w ork allotment of staff in the institution	48	20.0	87	36.3	81	33.8	24	10.0	**2.3**	FS
17	Attendance and leave management of staff members, and perf ormance appraisal	52	21.7	103	42.9	64	26.7	21	8.8	**2.2**	FS
18	Use of e -media f or scheduling/allocation of examination halls	61	25.4	84	35.0	76	31.7	19	7.9	**2.2**	FS
19	Payments of all forms of fees	39	16.3	68	28.3	80	33.3	53	22.1	**2.6**	S
20	Use of e -media f or the processing and disp lay of results of students	54	22.5	74	30.8	62	25.8	50	20.8	**2.5**	FS
	overall Average Mean									**2.6**	S

Mean Cut off Score: 1.0 -1.75= N0t at a11 successfu1 (NS); 1.76 -2.5= Fair1y Successfu1 (FS); 2.6-3.5= Successfu1 (S); 3.6-4.0= Very Successfu1 (VS)

Table 3 shows the level of success in various areas where information and communication technology has been integrated in higher education. It is shown that considering the mean cut off score, the level of success in areas such as integration of information and communication technologies in areas such as admission enquiry by students (Mean=2.8); students admission and records (Mean=2.8); examination results and transcripts (Mean=2.8); registration/enrolment of students (Mean=2.8); information management (Mean=2.7); staff development (Mean=2.6); research and

information sourcing (Mean=2.6); finance database (Mean=2.6); human resource database (Mean=2.6), and payments of all forms of fees (Mean=2.6) have been adjudged as successful. However, teaching and learning (Mean=2.5); curriculum development (Mean=2.5); applying for admission through e-media (Mean=2.5); use of e-media for the processing and display of results of students (Mean=2.5); course allotment and availability of information (Mean=2.4); information about hostel accommodation (Mean=2.4); recruitment and work allotment of staff in the institution (Mean=2.3); attendance and leave management of staff members, and performance appraisal (Mean=2.2), and use of e-media for scheduling/allocation of examination halls (Mean=2.2) have been adjudged fairly successful.

Research Question 3: What are the higher institutions staffs' attitudes towards the integration of information and communication technologies in higher institutions in Nigeria?

In order to answer this research question, responses to 10 items measuring attitude towards the integration of information and communication technologies in higher institutions were scored such that a Strongly Agree response was allotted 4, Agree response, 3, Disagree response 2 and Strongly Disagree response 1. On this attitude scale, higher scores connote positive attitude and vice versa. However, items such as 2, 3, 4, 6, 7, and 9 that were negatively worded were reversed in scoring. Individual's responses to these items were scored and cumulated. The minimum and maximum scores obtainable were 10 and 40 respectively with a range score of 30. The score obtained by individual respondents was categorized such that scores of l0-25 were adjudged as negative attitude while scores of 26-40 were considered positive attitude. This outcome was then subjected to a descriptive analysis. The result is presented in Table 4.

Table 4: Higher Institutions Staff Attitude towards the Integration of Information and Communication Technologies in Osun State

Attitude	Score Range	Frequency (f)	Percentage (%)
Negative	1-25	71	29.6
Positive	26-40	169	70.4
Tota1		240	100.0

Table 4 shows the higher institutions staffs attitude towards the integration of information and communication technology. While 29.6% of the sampled respondents expressed a negative attitude towards the integration of information and communication technologies in higher institutions, the attitude of 70.4% of the staff was positive. In other words, the majority of higher education staff demonstrated a positive attitude towards the integration of information and communication technology in their respective institutions.

Research Question 4: What are the challenges militating against effective integration of Information and Communication Technologies in higher education in Osun State?

In order to answer this research question, responses to items measuring the challenges militating against effective integration of information and communication technologies in higher education were subjected to descriptive analysis. The respective Relative Significance Index (RSI) value for each challenge was ranked and presented in Table 5.

S/N		SA		A		D		SD		RSI	Rank
	Challenges	**F**	**%**	**F**	**%**	**f**	**%**	**F**	**%**		
1	Lack of investment in ICTs for higher education development	76	31.7	114	47.5	33	13.8	17	7.1	0.44	7th
2	Lack of clear cut government policies on ICT	65	27.1	135	56.3	30	12.5	10	4.2	0.49	3rd
3	Lack of skilled manpower to manage available systems	55	22.9	108	45.0	56	23.3	21	8.8	0.48	4th
4	Inadequate training facilities for ICT education at the tertiary level	67	27.9	115	47.9	39	16.3	19	7.9	0.46	6th
5	Shortage of time for learning the required skills and competence for the integration of ICT on the part of the staff.	54	22.5	127	52.9	47	19.6	12	5.0	0.51	2nd
6	Attitudes of various managements in and outside institutions towards the development of ICT related facilities	51	21.3	143	59.6	33	13.8	13	5.4	0.53	1st
7	High cost of communication facilities	85	35.4	108	45.0	32	13.3	15	6.3	0.42	8th
8	Unstable power supply on the campus	108	45.0	83	34.6	31	12.9	18	7.5	0.34	9th
9	Staff resistance to change	43	17.9	105	43.8	55	22.9	37	15.4	0.48	4th

Table 5 shows the challenges militating against effective integration of information and communication technologies in higher institutions from the perspective of staffs in higher institutions. The 'attitudes of the various managements in and outside institutions towards the development of ICT related facilities' were considered the foremost challenges militating against effective integration of information and communication technology in higher institutions. The challenges had RSI value of 0.53 and ranked first. In addition, 21.3% and 59.6% of the respondents strongly agree and agree respectively to the challenges. Closely following this is shortage of time for learning the required skills and competence for the integration of ICT on the part of the staffs. It has an RSI value of 0.51

and ranked second. It is shown that 22.5% and 52.9% of the respondents strongly agree and agree respectively to this challenge. Ranked third is 'lack of clear cut government policies on ICT' with RSI value of 0.49. While 27.1% of the respondents strongly agreed, 56.3% agreed. 'Lack of skilled manpower to manage available systems', and 'Staff resistance to change' were ranked 4th with RSI value of 0.48. While 17.9% and 43.8% of the respondents agreed, 22.9% and 15.4% disagreed. Inadequate training facilities for ICT education at the tertiary level was ranked 6th with RSI value of 0.46 while lack of investment in ICTs for higher education development was ranked 7th with RSI value of 0.44. High cost of communication facilities was ranked 8th with RSI value of 0.42 while unstable power supply on the campus was ranked 9th with RSI value of 0.34.

This result shows that attitudes of various managements in and outside the institutions towards the development of ICT related facilities, shortage of time for learning the required skills and competence for the integration of ICT on the part of the staff were the factors militating against effective integration of information and communication technologies in higher institutions in Nigeria. Others were lack of clear cut government policies on ICT, lack of skilled manpower to manage available systems, staff resistance to change and inadequate training facilities for ICT education at the tertiary level.

Discussion

The findings of this study show that there is a blended approach in the modes of integration of information and communication technologies in higher institutions in Osun State. The findings are in agreement with Oladipo and Akinwumi (2015), who reported that higher institutions in Nigeria are yet to fully integrate with ICTs. Ndidi and Olibie (2010) and Ololube et al (2007) also indicated that Nigerian tertiary institutions are set to integrate ICT in all spheres of academic endeavours. However, ICT is considered an indispensable development in the education sector especially because of the demand for efficiency and effectiveness in higher institutions in Nigeria. The current trend of integrating ICT with the old practice of manual operations does not suffice.

The results of this study show that members of staff of the tertiary institutions have a positive attitude towards the use of ICTs in the various spheres of higher education. This outcome is supported by Bamigboye, Bankole, Ajibgoye, and George. (2013), who reported that lecturers in Nigerian universities have favourable attitude towards the use of ICTs in education. Researches have also shown that gender does not have any impact on the use of ICTs. However, Papaioannou and Charalam bous (2011) observed that males have more positive attitude towards ICTs than females.

Higher institutions are vested with the responsibility of equipping individuals with necessary skills to contribute to the overall growth and development of the nation. To achieve these, the institutions require ICT tools for teaching, learning and administrative activities. The study has shown that the availability of the needed resources is at a low level due to a number of militating factors like lack of investment in

ICTs, inadequate training facilities and a high cost of the facilities. Lack of skilled manpower, staff resistance to change, shortage of time for learning the required skills and competences for the integration of ICT and erratic power supply constitute another group of factors.

This result is similar to Oladipo & Akinwunmi (2015), Imhonobim & Urm (2012), Olise (2010) and Osei (2007) who found out that ICT availability in Nigerian tertiary institutions is rather low and in some cases a near total absence. It contradicts Korir and Omollo (2007) who reported high levels of availability of ICT resources in African universities.

The challenges to effective integration of ICTs in higher institutions are many. The findings of this study revealed that the attitudes of various managements in and outside tertiary institutions towards the development of ICT related issues ranked as the highest challenge facing ICT integration. This does not differ from the findings of (Albrini, 2006) who noted that the attitudes of various managements of universities towards the development of ICT related facilities such as the internet and purchase of computers is poor. In some instances there are no aids or support from the government.

Conclusion

In view of the findings, this study concluded that the integration of ICT in Nigerian tertiary institutions is yet to be full blown, that is, there is still a blend of the manual or traditional modes of carrying of work functions. This situation is due a number of challenges ranging from inadequate facilities and social infrastructure, lack of adequate technical know-how required for operating the technological tools, cost of purchase and maintenance of the facilities etc. needless to say that, the study concluded the major challenge is the attitude of various management in and outside the institution towards the development of ICT related facilities.

In spite of inherent challenges affecting the full integration of information and communication technologies, it was confirmed that tertiary institution staffs, *both of the academic and non-academic,* had a positive attitude towards ICT facilities and did not see them as a threat. The areas where ICTs have been adopted in the tertiary institutions have been successful and have high hopes of getting better. The findings of this study can be said to have answered the research questions.

Recommendations

Based on the findings of this study, it is recommended that higher institutions in Osun State fully adopt ICTs in all areas of higher education. It is also important that, management both in and outside the institutions, begin to realise the role ICT plays in educational development and treat it as such.

The management of higher institutions should take more proactive measures in involving the private sector in contributing towards attaining full ICT integration in higher institutions.

Government should also provide adequate power supply and other technical facilities to enable ICTs function optimally. In addition, the government should introduce and implement policies that will encourage the utilization of ICTs in higher institutions.

Finally, the government should increase funding for the educational sector to enhance the integration of ICTs in the higher institutions.

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