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Effects of Information and Communication Technology (Ict) on Nigerian Educational System: A Case Study of Kogi State University, Anyigba

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Abstract

This research paper examines the effects of Information and Communication Technology (ICT) on Nigerian educational system with a focus on Kogi State University (KSU), Anyigba. The study employed the survey method, choosing 40 academic staff, five library staff, 5 management staff and 250 students randomly from the seven (7) faculties at KSU. A questionnaire containing 39 questions was administered using mean (X) and standard deviation (SD) and t-test to analyze the data. The hypotheses were tested at 0.05 level of significance and a coefficient of 0.85 was established using the statistical tool of Pearson product moment correlation coefficient. The result among other things showed that (1) lack of ICT professional, resources, infrastructure and management support affects effective teaching and learning and research development in Nigerian schools, (2) common challenges include but not limited to poor funding, lack of infrastructure, lack of technical support and lack of professional development in ICT use and integration into curriculum. It is the recommendation of this study among other things, that the government and her agencies should support their own ICT policy by providing funding to schools and to also look at curriculum changes that encourages ICT integration.

Keywords: Information and communication technology, ICT, Teaching and learning, ICT Nigeria, Academic technology, Policy on education, NPE, KSU.

Contents

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1. Introduction

The role of Information and Communication Technologies (ICTs) in the 21st century education system cannot be overemphasized. It is the life line to global economic integration and so vital, if an institution must take part in the global economy. The rapid change in technology does not make it easy but the earlier, the better. The development of information and communication technology (ICT) into the Nigerian educational system is here to stay and the potential outcome in economic development, manpower improvement and socio-cultural awareness is huge. Although Nigerian's investments in ICT infrastructure in education system have not yielded much compared to similar investments made in telecommunication (Atureta, 2011), education has certainly been affected by the penetrating influence of ICT worldwide as ICT has made impact and continue to make on the quality of teaching, learning and research in the institutions recently (Kwacha, 2007). The potential of ICT integration are enormous. ICT in the Nigerian educational system will accelerate, enrich and deepen skills, motivate and engage students in learning; helps to relate school experiences to work places, helps to create economic viability for tomorrow's workers, contribute to radical changes in school, strengthens teaching, and provides opportunities for connection between the school and the world (Lemke and Coughlin, 1998; Davis and Tearle, 1999); cited byYusuf (2005)).

It is almost impossible to talk about ICT in the educational systems without understanding some salient commonly used words Educational Technology: according to the Association for Educational Communications and Technology (2004) as "the study and ethical practice of facilitating learning and improving performance by creating using, and managing, appropriate technological processes and resources" (p. 3). Instructional Technology: Instructional Technology is defined as "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning" (Seels and Richey, 1994). Information and Communication Technology (ICT): "includes a wide range of applications, communication, and technologies used in information retrieval, research communication and administration" (Scott, 2002 sited by Agbetuyi and Oluwatayo (2012)). According to Yusuf and Onasanya (2004), the use of instructional media and communication technology can help improve effective teaching and learning. Research has also shown that it makes students active learners as ICT improves students' creative thinking; critical thinking; reflective thinking; and enlarges learning community through collaboration.

Earlier introduction of technology to schools and classrooms met with opposition, resistance, fear, and lack of confidence in the teacher's ability to integrate it into their subject areas. But today even the teachers themselves are finding it difficult to grow, teach and research without technology use. The use of technology in the classroom allows teachers to make a smooth shift into individualized instruction and concentrate on developmentally appropriate use of technology for different age and material content (Aldridge and Goldman, 2007). Research data available have shown that ICT in the schools,

- Allows cooperation and collaborative work between teachers, researchers, and academic institutions
- Gives access to a variety of information sources, forms and types thus reducing the burden of teachers to create notes.
- Makes learning more student-centred, problem-centred and inquiry-based, developing critical, reflective, and creative thinking
- Changes the roles of teachers to coaches, facilitators, and mentors
- Offers opportunity to learn all the time and from anywhere.
- Reduces overcrowded classrooms
- Increases number of students admission (if utilized for distance education)
- Allows for easy and fast communication between students and teachers
- Increased multicultural awareness. Technology improves the teachers' ability to teach "authentic version of multicultural education" (Munoz, 2002)

1.1. Nigerian National Education Policy on ICT

According to Baba (2014), a policy without follow up implementation is just an empty document without backings. The National Policy on Education (NPE) as revised in 1988 and again in 2004, required the teaching of computer science as a discipline and integration of same into school administration and instruction, however, the implementation was not effectives as the funding to purchase and the infrastructure to based the technology is not readily provide nor available. Computer Science is been taught as a theory course in most schools without practical which makes conceptualization difficult. The federal government re-emphasized the need for ICT integration into the Nigerian educational system show the need to move beyond just computer in the classrooms to the level of ICT and the need for infrastructure by coming up with three major ICT objectives. Yusuf (2005) stated that three (# xv, xvi and xxiv) of the 31 ICT objectives specifically addressed ICT in education (p. iv-v). These are to: (1) empower youths with ICT skills to prepare them for competitiveness in a global environment, (2) integrate ICT into the mainstream of education and training and (3) establishment of multifaceted ICT institutions as centers of excellence of ICT (Federal Ministry of Education (FME), 1988; 2004; Federal Republic of Nigeria, 2001). The National policy on ICT in education, Agbetuyi and Oluwatayo (2012) listed nine major strategies for achieving these objectives:

i. Making ICT compulsory at all educational institutions
ii. Developing ICT curricular for all levels of education
iii. Using ICT in distance education
iv. ICT companies' investment in education
v. Giving study grant and scholarship on ICT
vi. Training the trainers' scheme for youth corps services on ICT
vii. ICT capacity building at the zonal, state and local government levels

viii. Establishing private and public dedicated ICT institutions
ix. Working with international and domestic initiative to transfer ICT knowledge.

Important to note among the strategies for achieving the above was a specific strategy statement that there will be "restructuring the education system at all levels to respond effectively to the challenges and imagined impact of the information age and in particular, the allocation of a special IT development fund to education at all levels" (p. vi). These strategies look great and will go a long way to improve and achieve the objectives only if implementation, follow-up and evaluation are effective.

1.2. Issues Surrounding the Use of ICT in Nigeria

Baba (2014) in a recent presentation at ISTEAM conference listed the following issues surrounding the use of technology in Nigerian schools:

- The policy as of today is yet to achieve the "vertical" category or even scratch the surface of education, health and tourism needs of the country
- The sporadic and inconsistent attempt at introducing technology into the education system is not enough to evaluate ICT policy implementation.
- Technology policy without proper implementation is mere talk. It actually frustrates the teachers interested in using it in their classrooms
- Lack of constant and full current power.
- Lack of infrastructural development to support the available technology
- Lack of professional development
- Lack of technical support

2. Significance of Study

The purpose of this study is to identify the various effects of ICT on education in Nigeria-positively or negatively with a focus on Kogi State University (KSU). Among other things the study seeks to find the effects of ICT on:

- Quality of teaching and learning
- Quality of research and development
- Student learning and overall academic performance at KSU
- Access to study materials and availability, and
- To determine if management support and interest in ICT use has any bearing on ICT initiative, development, and implementation in Nigerian educational systems

This study, it is believed will add to body of literature advocating the use of ICT in Nigerian educational system especially in the universities. The research findings will intimate the administrators, stakeholders and management of Kogi State University on the benefits of investing in ICT infrastructure, training and integration into teaching and learning. It is hoped that the results of this study will guide policy makers in intensifying their support and push for not just ICT policies but the real implementation on university campuses.

2.1. Research Questions

1. What are the effects of ICT on the quality of teaching and learning?
2. What are the effects of ICT on the quality of research and development?
3. What effects does lack of ICT access have on student's learning and overall academic performance at KSU?
4. What are the effects of management and staff attitude on ICT use on campus

2.2. Research Hypotheses

1. There is no significant effect of ICT on the quality of teaching and learning
2. There is no significant effect of ICT on the quality of research and development
3. There is no significant effect of lack of ICT access on student's learning and overall academic performance at KSU
4. There is no significant effect of management and staff attitude on ICT use on campus

3. Method

This study employed quantitative research method and the survey research design to find out the views of Kogi State University (KSU) students and academic staff on the use and affect of ICT on university education and on teaching, learning and research. The population of study included randomly selected KSU academic staff and students from the seven (7) faculties at KSU. A questionnaire containing 39 questions covering all four (4) research questions was constructed and used to gather data for the study. The instrument has two sections; section A took care of demographic variables of the respondents while section B had twenty (39) items.

The test-retest-reliability coefficient of 0.85 was established through the use of a statistical tool of Pearson products moment correlation coefficient. The responses were scored on a 1-4 weighing (strongly agree=4, Agree=3, disagree=2, strongly disagree=1). A simple percentage and T-test statistical tools were used to elicit answers for the research questions and test the hypotheses at 0.05 level of significance.

4. Data Analysis

The questionnaire was used to gather data from both staff and students of Kogi State University to elicit answers for research questions. Detail analysis is as provided in table 1

Research Question 1: What are the effects of ICT on the quality of teaching and learning?
Items 1 to 7 on the questionnaire guided the analysis for this question. The result is as presented in Table 1

Table-1. Mean of response of staff and students on the Effects of ICT on the quality of teaching and learning.

Items	Statements	Staff N=40	Ẍ	Students N=250	Ẍ	Average Ẍ	Decision
1	affects teaching and learning	150	3.75	900	3.60	3.70	Accept
2	leads to poor quality of research	85	2.13	440	1.76	1.95	Reject
3	limits diversity in materials for teaching and learning	56	1.40	330	1.30	1.35	Reject
4	affects education generally	151	3.78	830	3.32	3.55	Accept
5	affects academic performances	128	3.20	820	3.28	3.24	Accept
6	Reduces access to study materials	100	2.50	600	2.40	2.45	Reject
7	Leads to plagiarism	79	1.98	580	2.30	2.14	Reject

Grand mean Ẍ = 2.63

The researchers adopted the decision rule made up of rejecting items whose score is less than 2.5 and accepting those whose mean is 2.5 and above. Table 1 data shows the grand mean score of 2.63 which is greater than 2.5. This shows that both the staff and students agree that ICT have effects on the quality of teaching and learning, educational generally and academic performance to a large extent.
Research Question 2: What are the effects of ICT on the quality of research and development?
Items 8 to 19 on the questionnaire guided the analysis for this question. The result is as presented in Table 2

Table-2. Mean staff and student responses on the effects of ICT on the quality of research and development.

Items	Statements	Staff N=40	Ẍ	Students N=250	Ẍ	Average Ẍ	Decision
8	Will make learning more effective	141	3.65	860	3.40	3.53	Accept
9	Will expand opportunity for collaboration	130	3.25	750	3.00	3.13	Accept
10	Widen the scope of research	152	3.80	940	3.76	3.75	Accept
11	Enables academic staff use of internet	144	3.83	960	3.84	3.84	Accept
12	Access make technology integration easy	136	3.60	950	3.80	3.70	Accept
13	Reduce exam malpractice	140	3.40	945	3.78	3.59	Accept
14	Improve students' grade	131	3.50	930	3.72	3.61	Accept
15	Improve education system in Nigeria	140	3.28	980	3.92	3.60	Accept
16	Literacy should be a criterion for promotion	140	3.50	1140	4.56	4.03	Accept
17	Literacy should be a criterion for employment	141	3.52	765	3.06	3.29	Accept
18	Integration should be encouraged	139	3.48	845	3.38	3.43	Accept
19	Will improve staff enthusiasm for research and writing	132	3.30	1000	4.00	3.45	Accept

Grand mean Ẍ = 3.598 = 3.60

Table 2 shows that the grand mean of 3.60 is greater than 2.5. This means ICT has a wide range of effects on research and development.
Research Question 3: What effects does lack of ICT access have on students learning and overall academic performance in KSU?
Items 20 to 27 on the questionnaire guided the analysis for this question. The result is as presented in Table 3.

Table-3. Mean responses of the staff and students on the effects of lack of ICT access on students learning and overall academic performance in KSU

Items	Statements	Staff N=40	Ẍ	Students N=250	Ẍ	Average Ẍ	Decision
20	Prepare students for global market	144	3.60	990	3.96	3.78	Accept
21	Improve overall performance of students	144	3.60	1000	4.00	3.80	Accept
22	Helps prepare students for self reliance	139	3.48	935	3.74	3.61	Accept
23	training in ICT use is important	139	3.48	943	3.79	3.64	Accept
24	training is highly needed by both student and academic staff	142	3.55	938	3.75	3.65	Accept
25	ICT use will improve students' performance	142	3.55	970	3.88	3.72	Accept
26	ICT access will reduce extra cost to students	145	3.63	1000	4.00	3.82	Accept
27	ICT will improve my research and writing ability	137	3.43	980	3.92	3.68	Accept

Grand mean Ẍ = 3.72

Table 3 shows that the grand mean of 3.72 is greater than 2.5. The data analysis shows that lack of ICT access pose a negative and devastating effects on KSU students learning and overall academic performance.
Research Question 4: What are the effects of management and staff attitude on ICT use on the campus of KSU?

Items 29 to 39 on the questionnaire guided the analysis for this question. The result is as presented in Table 4

Table-4. Mean of the responses of staff and students on the effects of management and staff attitude on ICT use on the campus of KSU?

Items	Statements	Staff N=40	Ẍ	Students N=250	Ẍ	Average Ẍ	Decision
29	Even when there is ICT, no infrastructure (power, network, etc)	76	1.90	510	2.04	1.97	Accept
30	Students have no interest in ICT	74	1.85	555	2.20	2.02	Accept
31	Unavailability is the reason I do not use ICT	141	3.52	951	3.80	3.66	Accept
32	Unreliability is the reason I do not use ICT	140	3.52	950	3.80	3.66	Accept
33	Academic staff have no interest in ICT	136	3.40	918	3.67	3.54	Accept
34	Lack of funding is the biggest problem for ICT implementation	114	3.85	990	3.96	3.41	Accept
35	Lack of training and manpower development is a the biggest reason for lack ICT implementation	139	3.48	928	3.71	3.60	Accept
36	Lack of technical support is the reason I do not use ICT	139	3.48	919	3.58	3.58	Accept
37	Using ICT means more work	130	3.25	550	2.20	3.73	Accept
38	Too old to be bothered by technology	125	3.18	525	2.10	2.62	Accept
39	ICT us e is time consuming	76	1.90	1000	4.00	2.95	Accept
40	Other comments:	-	-	-	-	-	

Grand mean Ẍ = 3.06

Table 4 shows that the grand mean of 3.06 is greater than 2.5, thus it was accepted that the attitude of management and staff affects ICT use positively or negatively.

5. Research Hypotheses

Hypothesis 1: There is no significant effect of ICT on the quality of teaching and learning

To address this question data was gathered from 40 staff and 250 students of Kogi State University, Anyigba. The result is a presented below in table 5.

Table-5. T-test on the responses of staff and students to the effect of ICT on the quality of teaching and learning

Group	N	Ẍ	ẍ	SS	t-cal	t-critical	Decision
Staff	40	679	17	77687	0.003	1.960	Accept HO
Students	250	4150	16.6	2045510			

df=288

Legends

df = degrees of freedom
N = Total number of respondents
Ẍ =No. of responses
ẍ = mean of responses
SS = Sum of Squares

Table 5 shows that the value of t-calculated is less than the critical value of t. Therefore, the null hypothesis was accepted.

Hypothesis 2: There is no significant effect of ICT on the quality of research and development as perceived by staff and students of Kogi State University

Table-6. T-test on the responses of staff and students to the effect of ICT on the quality of research and development

Group	N	Ẍ	ẍ	SS	t-cal	t-critical	Decision
Staff	40	1684	42.1	236948	0.007	1.960	Accept Ho
Students	250	11030	44.12	9480700			

df=288

Table 6 shows that the value of t-calculated 0.007 is less than the t-critical value 1.960. Thus the null hypothesis that states that there is no significant effect of ICT on research and development.

Hypothesis 3: There is no significant effect of lack of ICT access on students learning and overall academic performance in Kogi State University

Table-7. T-test on the responses of staff and students to the effect of lack of ICT access on students learning and overall academic performance of students at Kogi State University

Group	N	Ẍ	ẍ	SS	t-cal	t-critical	Decision
Staff	40	1132	28.3	159684	0.005	1.960	Accept Ho
Students	250	7761	31.04	7534173			

df=288

Table 7 shows that the values of teachers 0.005 is less than the critical table value of 1.960. Therefore, the null hypothesis was accepted.

Hypothesis 4: There is no significant effect of management and staff attitude on ICT use on the campus as perceived by staff and students of Kogi State University

Table-8. T-test on the responses of staff and students to the effect of management and staff attitude on ICT use on the campus of Kogi State University

Group	N	Ẍ	ẍ	SS	t-cal	t-critical	Decision
Staff	40	1214	30.35	153392	0.013	1.960	Accept Ho
Students	250	6846	27.38	6579220			

df=288

Table 8 shows that the value of t-calculated 0.013 is less than the value of t-critical 1.960. Therefore, the null hypothesis was accepted

6. Discussion of Findings

The purpose of this study was to identify the various effects of ICT on education in Nigeria with a focus on Kogi State University (KSU). Among other things the study seeks to find the effects of ICT access and use on:

- Quality of teaching and learning
- Quality of research and development
- Student learning and overall academic performance at KSU if there is access to study materials and,
- To determine if management support and interest in ICT use has any bearing on ICT initiative, development, and implementation in Nigerian educational systems

With this study, it became clear that it is impossible to underestimate the effect of ICT on the research, teaching and learning process in Nigerian educational system. Baba (2014), Agbetuyi and Oluwatayo (2012), and Yusuf (2005), like their American counterparts Aldridge and Goldman (2007) all agreed that ICT use plays a vital role in effective and efficient delivery of education. It also shows the desire of Nigerian students to have access to ICT.

Through this study, it was discovered the opinion the students, staff and researchers in Nigerian educational system is consistent and their desire to have unrestricted access to internet facilities and general technology resources is important to the improvement of research, development, and teaching and learning. Responses to items 8 to 27 on the questionnaire indicated that access to technology exposes students and educators to more and diverse research materials, encourages collaborative research efforts, reduces plagiarism on research projects, encourages and increases journal publication efforts, widens potential research topics, makes students more inventive, intuitive, creative, and proactive in their thinking thereby increasing their confidence in t heir research ability.

This study also shows no matter how strong the desires of students and academic staff to use and integrate technology into the curriculum is, there can be no implementation or integration without the full, physical and consistent support and funding from the management, educational administrators and leaders.

7. Implications of Study

The implication of this study is that investing in ICT resources, funding ICT programs, supporting training and professional development in ICT is important to the educational systems and future economic growth of manpower in Nigerian if she s to meet the growing demand s of the global market. The socio-economic development of the world today cannot be clearly detached from technology use. To ignore funding and use of technology in Nigerian educational system therefore is to stagnate potential economic development.

8. Conclusion

While information technology cannot explain everything about the U.S. productivity revival, “the robust link between IT intensity and productivity gains suggests that there is an important economic relationship." (Stiroh, 2001; 2002). Technology is a change phenomenon that defies belief unless it is put into a context of other things in our lives. Oblinger and Verville (1999) opined that though technology is not an industrial issue, "One reason that IT acts as a change agent is that the speed and magnitude of the alterations it catalyzes are so dramatic." (p. 1), he also believes that much of Americas’ productivity and success are due to the quality of technology development and implementation.

It is the conclusion of these researchers here that establishing clear expectations can help school leaders and management or educational stakeholders in Nigeria increase successful use of technology in schools. Making sure that possible challenges in technology implementation are made transparent to the educational community and management will help avoid speculations and frustrations that lead to incomplete projects affecting technology implementations in Nigerian school system.

Baba (2014) stated that questioning if technology works is almost the equivalent of saying 'Do textbooks work?' Yes, some textbooks 'work,' in some conditions, with some teachers, with some students, but these same textbooks may not 'work' in another educational context and the same goes for technology use. Answering the question of technology’s effectiveness in teaching and learning requires a clear definition of our expectations, “how we measure success, and how we define effectiveness." (Fulton, 1998)

Most educational researchers, especially those who have examined large numbers of studies (meta-analyses), agree that if used appropriately, technology can improve education in the effect-size range of between 0.30 and 0.40 (Kulik, 2002); (Waxman *et al.*, 2002). Therefore, management support and funding is important to technology implementation, integration and use in Nigerians educational systems.

9. Recommendations

Lack of communication among educational leaders and appropriate professional development and support can hamper technology implementation. Lack of appropriate technology infrastructure and support can cause

implementation problems that can be most fatal. Therefore the following recommendations are made in respect to educational leaders (management) and teachers to aid the full, effective and hitch free implementation of technology into the curriculum of Nigerian educational systems. These recommendations is made based on acceptable standards by the International Society for Technology in Education as stated in National Educational Technology Standards (NETS) and listed by Valdez (2004).

9.1. Educational Leaders and Stakeholders Should

1. Develop action plans to define immediate and long-term tasks, resources needed, timelines, and benchmarks for accomplishing the technology goals.
2. Develop communication plans and political action strategies necessary to establish commitment and obtain resources.
3. Design and implement the necessary professional development plans to ensure that teachers have the knowledge and skills to successfully implement technology.
4. Have sufficient knowledge of the change process research in order to anticipate and address change problems and issues.
5. Formative and summative evaluation plans that will guide the successful implementation of tasks and inform them when they have accomplished the desired technology goals.
6. Inspire a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of that vision.
7. Ensure that curricular design, instructional strategies, and learning environments integrate appropriate technologies to maximize learning and teaching.

9.2. School Management Should

8. Indicate support for technology use by word and deed; value and model technology use.
9. Ensure the integration of technology to support productive systems for learning and administration.
10. Understand and acknowledge that teachers need time and support to learn effective uses of technology.
11. Provide sufficient technology to make the use of technology viable; provide the technical support necessary to keep the technology operational.
12. Pay attention to inequalities in technology access and use that exist in the school communities, and compensate to the extent possible.
13. Ensure that vision building is focused on student and teacher excellence and not on isolating technology improvement from other systemic considerations such as teacher professional development, facilities, support, and essential resources.

9.3. Teachers Should

14. Understand and support the importance of students learning to use information technology tools as an important component of their preparation for further education, work, and life in general.
15. Demonstrate support of technology use by developing skills, knowledge, and strategies necessary to model effective uses of technology.
16. Learn and use effective ways to integrate technology into the curriculum, and use technology in ways that enhance instructional opportunities and successes for all students.
17. Learn uses of technology that provide assessment feedback to parents, students, and teachers about how well students are learning and then use that data to improve learning productivity.
18. Understand and instill into their students the social, ethical, legal, and human issues surrounding the uses of technology.
19. . Teachers and students should not be expected to be experts in technology infrastructure and support. The equipment should be dependable and easily accessible. Teachers need to experience technology as something that they can build lesson plans around. They should not have to worry that their planning efforts and schedules may be frequently impossible because of equipment failure or unavailability. A few negative experiences will lead teachers to believe that technology use is more of a drag than tool and will likely reduce their technology use.
20. Technology should be used to plan and implement comprehensive systems of effective assessment and evaluation.

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