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Information and Communication Technology (ICT) in the Classroom: Nigeria at the Emerging Stage

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Abstract
Integration of ICTs into the school system offers great opportunities to the education system with its capacity to integrate, interact, close geographic distance and also achieve the instructional objectives. This paper looks at the broad stages along which an educational system can map its ICT development, termed as Emerging, Applying, Infusing and Transforming stages for pedagogical usages of ICT. While at the same time the paper investigates what stage of ICT development Nigeria is at on the model. The study had N=347 teachers from schools across Akwa Ibom North-East Senatorial District, descriptive statistics was employed for data analysis. Findings indicate that Nigeria is still at the emerging stage, teachers use of ICT in Nigeria's classroom is still low and in some cases facilities are absent. There is need for all concern to redirect and readjust to meet the challenges and lack in the knowledge age. The education sector has to do better and be at par with other sectors in the county.

Keywords: ICT, Computers, Teaching, Learning, Emerging Stage, Classroom.

Introduction

Information and Communication Technology (ICT) in the classroom, is Nigeria still in the Emerging Stage? Is the question begging for answer(s), in Ogechukwu & Osuagwu (2009) study they pointed to that direction suggesting that, the Nigerian education system was yet to progress beyond the emerging phase of ICT in education, for according to the study "emerging" is only one of four approaches, the goals of ICT in education embraces. Other approaches are: emerging, applying, infusing, and transforming. Nigeria as a nation recognizes the potentials of ICT in her educational system. Its National Policy on Education (FRN) as revised in 1988 and 2004, emphasizes the need to integrate ICT in the Nigerian education system. A major leap of acceptance of the need to go beyond computer to the level of ICT integration. Three major objectives stand out in the Nigerian National policy for Information Technology (FRN, 2019), being; to empower youths with ICT skills to prepare them for competitiveness in a global environment; integrate ICT into the mainstream of education and training and establishment of multifaceted ICT institutions as centers of excellence of ICT.

The National Policy on Computer Education (FME, 1988) had emphasized at each level of the Nigerian education system goals to be achieved, for the primary school pupils, they have to be introduced to the basic computer skills, the use of the computer to facilitate learning and rudimentary use for text writing, computation and data entry. At the secondary school, they have extended related goals as the primary level which were to be achieved at a higher level. The tertiary institutions were also required to teach computer science as a discipline and to integrate it in school administration and instruction.

To achieve these goals, nine major strategies were marked out. These were

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.

To cause and encourage change at a pace that stimulates the development of 21st-century skills and the use of ICTs in educational practice is widely regarded to empower both teachers and students. ICT has caused the shift from teacher-centered to a student-centered approach, ICT have opened up possibilities for improved teaching and learning, particularly in the areas of resource access made possible by technology integration. Related studies on technology in Nigerian school system by Utulu and Alonge (2012), notes that technological advancements have led to numerous forms of technology integration in education, such as mobile learning, online learning, and blended learning, where teaching and learning activities can be conducted through electronic mail, chats, web-based conferencing, messaging platforms, and web pages for information sharing resources.

These educational activities have resulted in interactive and collaborative learning, facilitated and assessment is seen to improve during the teaching-learning process. Ogundile *et al.* (2019) posits that support, accessibility, infrastructure, learning tools, and cognitive skills are five categories of characteristics that influence the usage of ICT in Nigerian secondary schools, however a report, according to a recent assessment on ICT readiness in Sub-Saharan Africa is still quite poor, with most governments' experiencing significant delays in the acquisition of facilities due to lack of finances. Studies have listed ICT challenges in findings from studies in Nigerian schools as inadequate provision of ICT facilities for effective teaching, teachers in schools are not computer literate, lack of interest among teachers to adopt the use of modern ICT facilities for teaching, lack of ICT technicians to repair broke down existing ICT facilities where there were available, lack of constant supply of electricity to use ICT

facilities for teaching and learning, fear in using ICT facilities for their teaching, inadequate funding for procurement and management of ICT facilities (Ibrahim & Usman, 2023).

Implementation of Nigeria's ICT policy started in April 2001 right after the approval by the Federal Executive Council with set up and inauguration of the National Information Technology Development Agency (NITDA), as the ICT implementing body (http://nitda.gov.ng/document/nigeria). The policy empowered NITDA to enter into commercial ventures and strategic alliances with the private sector to collaborate and realize the country's specific vision of "making Nigeria an ICT capable country in Africa and a key player in the information society through ICT use as the machinery for sustainable development and global competitiveness" (NITDA, 2001, p.13). The creation in February 2007 of an IT department in the Federal Ministry of Education followed thereafter. Several implementations plan by government agencies and the private sector were initiated to complement the activities of the department. The promotion of ICTs in education has been going on at all levels in the country (Uyouko, 2015).

The reality of ICT aims and polices is not yet evident in Nigeria where the bodies and agencies that are mandated to develop and regulate the ICT sector still operate without coordination and each act differently as a single unit in the industry. Though in the last decade there have been significant gains mostly with regards to mobile telephony, the absence of industry process in the Nigeria ICT sector has resulted in the breaking down and disorganization in the management of materials in the sector. The National ICT policy shall be used as action plans to improve the sub-sectoral policies, and arrange definite execution instructions as suitable (NICTP, 2012).

These new teaching technologies offer wide new opportunities for schools to attend the superiority and productivity they have over a long period. National education programs have been found to fail in implementing ICT into educational systems because such programs were not supported with educational research and were formulated in non-educational domain (Albirini, 2006). Sadly however, the implementation of ICT has not been effective. The benefits derived from ICT use in education are summarized as active learning, collaborative learning, creative learning, integrative learning and evaluative learning. By active learning, ICT-enhanced learning mobilizes tools for examination, calculation and analysis of information, thus provides platform for students' enquiry, analysis and construction of new information.

ICT-supported learning encourages interaction and cooperation among students, teachers and experts regardless of where they are. Also, ICT – supported learning promotes manipulation of existing information and creation of real – world products rather than regurgitation of received information. It has also enhanced integrative approach to teaching and learning. This approach eliminates the artificial separation between the different disciplines and between theory and practice that characterizes the traditional classroom approach. By evaluative learning, ICT-enhanced learning is student – directed and diagnostic. Unlike static,

text or print-based educational technologies, ICTs allow learners to explore and discover rather than mere listening and remembering.

Stages of ICT Development

Ajumdar, (2009) in a study presented a model that can be useful in determining the stages of ICT development reached by a country, a region or district, or even an individual institution. The model presented is derived from international and other countries studies of ICT development that have identified a series of broad stages through which educational system and institutions generally could follow through in the adoption and use of ICT. This study has adopted Ajumdar, (2009) model and is presented here to provide a framework for stages of pedagogy technology integration and to allow for better understanding of Nigeria's progress thus far. Typically studies of ICT development in both developed and developing countries identify at least four broad approaches although the number of stages identified varies, allowing for the introduction and use of ICT in education to proceed in broad stages that maybe formed as a continuum or sequence.

Emerging Stage. The beginning stages of ICT development demonstrated by schools is the emerging approach/phase/stage. At this point schools have just started on their journey in the ICT use with a scanty computing facility, acquired by the school authority or donated from outside the school. At this starting stage, administrators and teachers are on to explore what is possible, consequences and challenges of using ICT for school management and progressing to adding ICT to the curriculum.

Applying Stage. Schools at this stage have moved from emerging to applying with a new understanding of the potentials and contributions of ICT to learning, they have developed and exemplify the applying approach. In this phase, administrators and teachers utilize ICT in the school management system and in the curriculum. Teachers typically dominate the learning environment, at the applying approach phase the adaption of the various subject curriculum are in order to increase the use of ICT in those subject area which also allow for specific selection of tools and software.

Infusing Stage. At this stage called the infusing approach, integrating or embedding ICT across the curriculum is involved, those schools are observed at this point now employ a variety of computer-based technologies in their laboratories, classrooms, and administrative offices. The curriculum reflects real-world applications as subject areas merge. Infusing approach to ICT development, infuses all aspects of teachers' professional lives in a way that students learning improves as well as the management of all learning processes.

Transforming Stage. At the stage ICT becomes an integral and invisible part of daily personal productivity and professional practice for schools that use ICT to rethink and renew school organization in creative ways. The attention of the curriculum is now learner-centred that

integrates subject areas in real-world applications where learning is no longer in the abstract form.

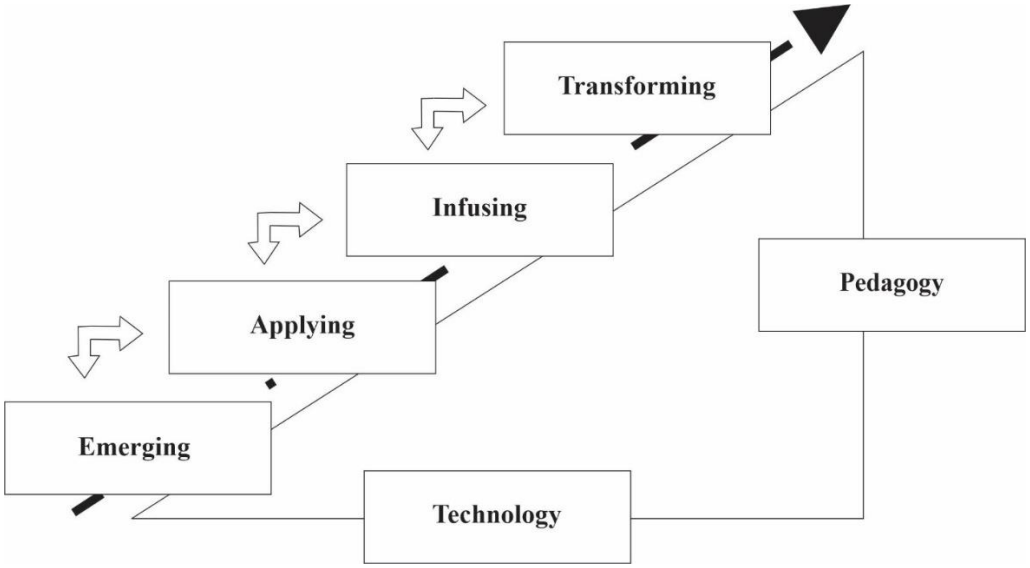

Figure 1: Stages of ICT development
Source: Ajumdar, (2009).

ICT Status in the Classroom.

Research on current literature emphasizes the enormous role played by information and communication technology (ICT) in any development process. It is also widely argued that ICT has the potential for reaching rural populations to provide them with quality education and training, access to job opportunities and information important for their participation in market and economic activities.

However according to Iloanusi and Osuagwu (2009), study, Nigeria's classrooms from primary to higher institutions, the mode of delivery of knowledge and curriculum seems yet to enhance ICT. It is expected that the goals of ICT in education should embrace the four approaches; emerging, applying, infusing and transforming approaches. The last three phases are functional approaches. Several years have gone by after, but the use of ICT in teaching and learning among teachers and students in Nigeria's classroom is still low and in some cases absent. Nigeria in the African continent is regarded as the largest ICT market with about (82%) of the continent's telecoms subscribers and (29%) of internet usage. This figure should account for ICT penetration in the classroom. It is believed that the adoption and use of ICTs in schools have a positive impact on teaching, learning, and research, emphasizing the roles ICTs can play in education, schools in Nigeria have yet to extensively adopt them for teaching and learning. Several efforts geared towards integration of ICTs into the school system, have not had much

impact. The use of ICT in education would depend on understanding ICT; when, how and where to use ICT and what technology to use Ogechukwu & Osuagwu (2009).

As earlier stated, the study seeks to answer the question directed at the status of ICT in Nigerian classrooms. Is Nigeria still at the emerging phase? This is a follow up study to the 2009 research on ICT status in Nigeria.

This study has four Research Questions:

1. To what extent can teachers be said to have attained the emerging phase?
2. What are the available ICT tools use in enhancing teaching in the classroom?
3. What are the challenges on the use of ICT in teaching?
4. What are the strategies on improving the use of ICT in teaching?

Methodology

The area of study was Akwa Ibom North-East Senatorial District. A Descriptive Survey Design was used. The population for the study consists of all the secondary school teachers located in the study area. The choice of Akwa Ibom North-East Senatorial District is because it is the district harbours the state capital, Uyo. A cosmopolitan area with vast business set-ups, a federal university, state owned college of education, teachers whose origin spread across other areas of the state. A sample of 347 teachers of secondary schools in the study area was randomly selected from a population of 6,405. Twenty (20) item questionnaires labelled "Availability and Utilization of ICT Tools in Teaching" (AUICTTT) was used to collect data from the respondents. Two measurement and evaluation experts validated the instrument and the reliability of the instrument was established using the Cronbach alpha generating a coefficient of 0.79, indicating that the instrument was reliable. The questionnaire was designed to obtain the opinions of respondents in a 4-point Likert scale manner of strongly Agree, Agree, Disagree and Strongly Disagree. The study adopted a descriptive survey. A 96% returned on the questionnaire distributed was achieved in good and useable condition. The frequency distribution and descriptive statistics obtain were analyzed with the SPSS software version 22, in the analysis a mean score below 2.50 was interpreted as negative (opposing to the research question) and a mean score above 2.50 was interpreted as positive (accepting to the research question).

Results and Discussions

Analysis of Research Questions

Research Question 1. To what extent can teachers be said to have attained the emerging phase?

In the emerging phase it is believed that the users of the technology must become aware of ICT. Teachers at this stage become aware of ICT tools and their general functions and uses, this stage places emphasis on ICT literacy and basic skills. This stage is also called the discovery stage.

Table 1: emerging phase of ICT tools, general functions and uses

S/No	Item	Mean	Decision
1	Appropriate software to support instruction is available in my school for ICT use.	2.87	Disagree
2	I do not know how to integrate ICT into my lesson.	2.98	Disagree
3	There is no necessity to change current approaches to teaching.	2.42	Disagree
4	I have access to instruction (such as courses, seminars, or workshops) on using ICT in teaching.	2.90	Disagree
5	I develop teaching materials (e.g. presentation slides, videos, etc.) for my class using ICT.	2.94	Disagree

Table 1 indicates a high mean score of between 2.87, and 2.94 all in disagreement by respondents a reverse of a positive expected response on the items on the questionnaire.

Research Question 2. To what extent does available ICT tools used in enhancing teaching in the classroom?

Table 2: Mean score of the available ICT tools use in enhancing teaching in the classroom?

S/No	Item	Mean	Decision
1	There are available computers desktop in schools in Akwa Ibom North-East Senatorial District	2.10	Disagree
2	Schools in Akwa Ibom North-East Senatorial District have enough laptop for students use.	2.20	Disagree
3	There are enough computers to be used by teachers in the teaching process in Akwa Ibom North-East Senatorial District.	2.42	Disagree
4	Government provides adequate computer to facilitates teaching.	2.30	Disagree
5	Schools are provided internet access for teachers.	1.94	Disagree

Table 2 indicates a low mean score of between 2.10, and 1.94 suggesting a disagreement by respondents that there is availability of ICT tools to facilities teaching and learning process.

Research Question 3. What are the challenges on the use of ICT in teaching in Akwa Ibom North-East Senatorial District.?

Table 3 Mean Score of the challenges of teachers on the use of ICT in teaching.

S/No	Item	Mean	Decision
1	There are not enough ICT facilities to improve teaching in schools in Akwa Ibom North-East Senatorial District	2.60	Agree
2	The high cost of linking a personal computer to the internet poses as a barrier to making effective use of the ICT.	2.74	Agree
3	Lack of interest in ICT is a factor hindering teachers' effective utilization of ICT facilities.	2.04	Agree
4	Teachers do not have knowledge of the effective use of ICT in schools.	2.93	Agree
5	There are insufficient training personnel to handle ICT facilities in Akwa Ibom North-East Senatorial District.	3.02	Agree

Table 3 has a mean score of 2.60, 2.74, 2.93 and 3.02 respectively on items as indicated, all have positive responses as regards challenges faced by teachers on the use of ICT in teaching in schools in the study area. Item 8 on the other hand with a low mean score of 2.04 indicates that the lack of interest in ICT is not a factor hindering teachers' utilization of ICT facilities, suggestive of other factors that may be responsible This may have resulted from the fact that teachers do not have knowledge of the effective use of ICT tools in schools in Akwa Ibom North-East Senatorial District, Nigeria.

Research Question 4. What are the strategies on improving the use of ICT in teaching?

Table 4 Mean score showing the strategies used in improving the use of ICT in teaching in schools

S/No	Item	Mean	Decision
16	Capacity building and training opportunities for teachers in ICT skills	2.91	Agree
17	Using ICT presentation software such as power point/ multimedia presentation in teaching.	2.51	Agree
18	The use of overhead projector for teaching.	2.79	Agree
19	Provision of internet facilities such as router, modem for networking purpose.	3.10	Agree
20	Provision of internet facilities such as router, modem for networking purpose.	2.84	Agree

In Table 4, items mean scores of 2.91, 2.51, 2.79, 3.10 and 2.84 respectively indicates positive response of the strategies in improving the use of ICT in teaching in Schools in Akwa Ibom North-East Senatorial District.

Discussion of Findings

Teachers Attainment at the Emerging Phase

Table 1 presents and interesting score, the teachers' responses though above the cut off mark that should indicate a positive response on the items, reported high scores on the reverse as the items were positively worded. Governments at the federal and state level are quick to supply secondary schools with basic ICT facilities and computers for proper teaching in the hope of the great abilities of internet and computers in encouraging effective instructional delivery as well as the immediate need to instill computer literacy in learners (Stephen, 2013). However, this huge expenditure and budgetary allocations to education and ICT use to modify the way teachers teach and the way student learn in Akwa Ibom State, schools have not become fully aware of the worthwhile possibilities of ICT since many teachers in schools do not make use of ICT in their teaching process.

Available ICT tools use in enhancing teaching in the classroom

In Table 2, data obtain from the study indicates the majority of schools lack available ICT facilities. Compliance with ICT standards should be emphasized if Nigeria is to produce graduates who are both functional and effective. Oliver, (2019) explained that the majority of the students in his study do not have access to the use of personal computer. This problem could be traced to the socio-economic background of the learners. While Chinasa and Onyinyechukwu (2022), posit that in many secondary schools in their study students do not have enough computers, in most cases the ratio of computer is 10:1, a result of inefficient and ineffective teaching and learning for the teachers and the students.

Challenges on the use of ICT in teaching in Akwa Ibom North-East Senatorial District.

Table 3 reveals the challenges teachers faced on the use of ICT in teaching in schools in the study area. The challenges include, inadequate ICT facilities, lack of adequate ICT knowledge, etc. This study is consistent with the work of Adomi and Kpangban (2018) reported that electricity failure has been a persistent problem militating against computer application and use in Nigeria. Teaching and learning cannot be effective in the absence of (computer) school physical facilities (Edumark, 2014). Emengini, Igwe, Anyanwu, Okeke and Iwundu (2021), the lack of utilization of facilities can be explained where school facilities are in place but teachers and students do not regularly utilize them to facilitate their learning due to lack of adequate access to technical support. Ubogu & Money (2020) revealed that poor ICT skills and lack of ICT tools among teachers and students are challenges faced in teaching and learning process.

Strategies on improving the use of ICT in teaching.

Result in Table 4, clearly teachers acknowledge that ICT enhances academic activities. The use of ICT in educational settings is both relevant and functional in the delivery of education to learners in order to assist them in learning the skills necessary for the working world. The pedagogical applicability of the ICTs is concerned essentially with the more effective learning and with the support of the various components of ICTs. All subjects ranging from mathematics (the most structured) to music (the least structured) can be learnt with the help of computers. Akpan (2016) emphasized that pedagogic application of ICTs involves effective learning with the aid of computers and other information technologies serving the purpose of learning aids which plays complementary roles in teaching/learning situations rather than supplements to the teacher/instructor/facilitator. The findings of the study revealed capacity building and training opportunities for teachers, using ICT presentation software such as power point, the use of overhead projector, provision of digital library with computers and laptops and provision of internet facilities as strategies for enhancing the use of ICT in teaching in Schools.

Conclusion

From the discussion, it is obvious that Nigeria is still in the emerging stage. In the initial phase, teachers use productivity tools such as word processor, visual presentation software, spreadsheet, database, email etc. to support their daily work performance. In this stage, usually emphasis at the emerging stage is on basic operations of electronic office software and the use of productive tools for teaching in ICT development. The integration and implementation of ICT into Nigeria classroom educational will drastically revolutionized teaching. Students who study in a variety of ways can optimize their learning potential when lecturers use ICT to enrich their teaching. However, in order to achieve maximum impact and influence of ICT, facilities have to be in place, sincerity of government to see through policies and the implementation is a major key challenge in ICT use, teachers on the other hand have to be adjusted to meet the challenges of the knowledge age.

Compliance with ethical standards

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Disclosure of conflict of interest:

The Authors proclaim no conflict of interest.

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