
IMPACT OF INFRASTRUCTURAL SUPPORT FOR INTEGRATION OF ICT IN CURRICULUM IMPLEMENTATION IN PUBLIC SECONDARY SCHOOLS IN TARABA STATE, NIGERIA

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Abstract

Digital Literacy is one of the teachers' and learners' competences among several competencies to be developed in the 21st century. Despite this fact, many educators have failed in training learners to acquire Digital Literacy through integration of Information Communication Technology (ICT) in curriculum implementation. The purpose of this study is to determine the influence of integration of ICT in curriculum implementation in public secondary school in Taraba State. The objective of the study was to establish the extent to which infrastructural support influences integration of ICT in curriculum implementation in public secondary schools in Taraba State. The study adopted descriptive survey research design. The target population was 52 secondary school principals, 700 teachers. Data was collected using questionnaires and interview schedules. The sample size was 16 principals randomly from 16 schools in the state, 25 teachers from urban secondary school while 45 teachers from rural secondary schools in the state. The data collected was analyzed using both quantitative and qualitative data analysis approaches whereby both descriptive and inferential statistics were used. The study established that well developed ICT infrastructure positively influences ICT integration in implementation of curriculum as majority of respondents (57.5%) indicated well established infrastructure influences ICT integration to a great extent and 20% to some extent. This brought out the glaring truth that principals who do not employ ICT expert in their schools limit the extent to which technical support is offered to the entire schools in ICT integration in curriculum implementation.

Key Words: Curriculum implementation, infrastructure, Information and communication technology, integration, teaching, learning

Introduction

Many of the productivity exploits in the entire world economies over the past three decades have been to a great extent, attributed to the impact of Information and Communication Technology (ICT). (ICT) has been used in education and training as a priority in most European countries during the last decade although progress has been varying in different countries (Elmunhya, H., 2012). Some of the countries have adopted use of ICT and perfected infrastructure at a faster rate. In most developed countries such as UK, schools have implemented the use of ICT in teaching and learning into the curriculum and demonstrate high level of effective and appropriate use to support teaching and learning (OECD, 2004). Globally it is recognized that teachers and schools are constantly engaged in enhancing how they teach, how their students learn and how learning is assessed. It is essential to embed ICT infrastructure in the education system all levels (Lowder & Regmi, 2020). It has the potential to support transformation in teaching, learning and assessment practices in schools and it can connect educational policy with economic and social development (Chapman & Mahlck, 2018). Similarly, there is growing evidence that digital technologies change the way students learn, the way teachers teach, and where and when learning takes place (Voogt, Knezek, Cox, Knezek, & ten Brummelhuis, 2013). Learners need more open-ended learning experiences that develop the learners' higher- order thinking, creativity, independence, collaborating and ownership of learning. When the ICT infrastructure is used effectively, it can provide opportunities for all teachers, students and parents/guardians to develop these Key Skills (Bariu, 2020). This is not the case in developing countries where most of them are struggling to put up ICT infrastructure. Haggins (2017), in his study on ICT integration in teaching and learning in New Castle university, UK points out that, countries that have integrated ICT into their education system have benefited by creating enabling environment for teachers and students to construct rich multi-sensory, interactive environments with far reaching implications on teaching and learning potentials resulting from ICT integration. Computers and internet are useful in increasing teachers' basic skills and subject mastery, to provide resources that can later be used in classroom, and to help teachers to familiarize with specific instructional approaches. The ICT tools increase interaction and collaboration amongst teachers of a particular subject hence forms a platform for sharing teaching and learning ideas. The fast growth of the global economy and the information based society has put pressure on education systems all over the world to use ICTs to teach the 21st Century skills to learners (World Bank, 2004). The growth of the ICT sector has challenged teachers to prepare for effective use of the new teaching and learning tools in their teaching profession (UNESCO, 2005).

According to a study conducted in Malaysia by Granger, Morbey, Lotherington, Owston, & Williams, M.D (2013), that sought to explore the facilitating conditions that were associated with teachers' laptop use in terms of ICT infrastructure, technical support, and administrative support in a school setting, it was established that upon realizing the important feature of instructive and learning landscape through Information and Communication Technology (ICT), the Malaysian government has begun to invest massively in the education system to open a wider scope of ICT and create a dynamic ICT environment for learning. However, based on the findings, it was reported by one of the teachers that the outdated hardware limits the use of computers in instruction. The teacher was not able to integrate technology into instruction due to the old and outdated hardware. Conversely, one of the informants stated that limited software act as one of the antecedents that prevents the use of computers as an instructional tool.

As Akubailo and Ndubuizu (2013) rightly notes a high percentage of teachers and lecturers in science subjects in Nigeria are computer illiterates. From this standpoint, it is obvious such teaching staff will find it extremely difficult to deliver ICT compliant education and training. Power supply in Taraba State is epileptic. ICT facilities are power driven. In urban cities where there is power supply it is irregular and therefore interrupts the effective use of ICT facilities. Further, low level funding has resulted in low level provision of ICT facilities in schools. Gbadamosi (2020) observes that education is grossly underfunded in Nigeria and has affected many areas such as the funding of ICT project, training and retraining of teachers, and development of software packages. The problems are further aggravated by the fact ICT has not been fully integrated into the curriculum of primary and secondary education in Nigeria. Not until the national policy on education is revised to fully integrate ICT in the curriculum the problem will still linger.

Curriculum implementation entails translating the curriculum into courses of study, syllabuses and subjects. The process involves facilitating the learner to acquire knowledge, skills and attitudes so as to function effectively in a society by acquiring the desired learning outcomes. Viewed from this perspective, curriculum implementation also refers to the stage when the curriculum itself as an educational programme, is put into effect. The requirements for curriculum implementation include pedagogy, teaching and learning materials, facilities, school climate, capacity development for curriculum implementers and financial support. According to a study by Ogbonnaya (2010), ICT integration in curriculum implementation transforms the method of delivering the content between the teacher and the learner by among other aspects, creating an easy access to information. The use of ICT in teaching and learning assists students to be able to draw a comparison from more than one variable thus widening the scope of learners. This goes a long way in developing innovation and creativity. Ogbonnaya (2010) further maintained that the use of ICT in teaching and learning motivate students and could instill the learning curiosity if employed correctly, enabling students to want to learn further. The integrated ICT curriculum pedagogy allows students to use computers to access information and form collaborative groups to solve complex tasks in various learning areas.

ICT infrastructure includes the availability, suitability and use of ICT tools such as hardware, software, internet access and peripheral equipment provided in the school (Vanderlinde and van Braak, 2010). These ICT resources facilities in schools should be designed and enabled in the direction of supporting continuous transformation and development of various learning approaches to integrate ICT in curriculum implementation. Availability and access to ICT infrastructure of schools or like; buildings, electricity, fixed telephone and digital instruction facilities, educational satellite and solar energy sources as spare in case of the electrical supply interruptions are key prerequisites to the integration of ICT in curriculum implementation (Elmunyah, 2012; Lu et al., 2015; Schreurs, 2007).

The Government of Nigeria appreciates and recognizes that, an ICT literate workforce is the foundation on which Nigerians can acquire the status of a knowledge driven economy (Federal Republic of Nigeria, 200). Information and Communication Technology (ICT) integration in curriculum implementation is described as the means of using any ICT tool such as computers, internet, e-learning technologies and CDs to assist teaching and learning (Williams 2013). According to a survey report in the National Policy on Education, (2004), ICT and education in Nigeria in particular and Africa in general has made remarkable progress putting in place an ICT policy framework and implementation strategy scheduled to complete with measurable outcomes and time frames. However, universal implementation is challenging given the lack of resources, national ICT infrastructure, and even electrical

supply; particularly in the rural areas (Farrell 2017). The Ministry of Education's policy framework indicates that there are a number of challenges concerning access to and use of ICT in Taraba State, including high levels of poverty, limited rural electrification, and frequent power disruptions. Most secondary schools have some computer equipment; however, this could consist of one computer in the office of the school head. Very few secondary schools in the State have sufficient ICT tools for teachers and students. Even in schools that do have computers, the student-computer ratio is 150:1 (Federal Republic of Nigeria, 2006).

From the above discourse it is evident that ICT integration in education in Taraba State is not without challenges. That assertion necessitated the current study which sets out to determine the impact of infrastructural support for integration of ICT in curriculum implementation in public secondary schools in Taraba State, Nigeria.

Literature Review

Becta, G. & Gbadamosi, L. (2020) researched on the adequacy of ICT resources and the right ICT Skills for teachers in integrating ICT tools in teaching and learning of English Language University of Ile-ife. A survey was conducted over a period of five months. Data was collected by use of questionnaires. The survey findings revealed that 81.7% schools have computer laboratories, 64.2% said personal computers are connected to the central server and 48.6% have computers for use. However, majority of computer laboratories are inadequate in specifications and quality hence inadequate use. Swarts, P. & Wachara, E.M (2010) report that high cost of internet connectivity and poor electricity connections in rural areas pose a challenge to ICT integration in rural areas. The report further notes that 58.9% of computers in all schools are not connected to the internet except one school where all 50 computers are connected; that schools in rural set up are unable to use ICT due to internet inaccessibility and affordability, limited rural electrification and frequent power disruptions. At the national level, Ezenwa (2017) observes that affordability of ICT infrastructure could be limited by the high cost of putting infrastructure in place and is linked with the issue of poverty. At the institution level, expensive hardware and software as well as the high cost of communication and services restrict access to ICT. Most schools in Nigeria do not have the means to purchase expensive computers and hardware to provide training for their staff. Affordability could be achieved through the use of open sources of ware or cheaper versions of software which can operate on older procurement or refurbished computers, redesigning of hardware so as to lower the cost of internet access, merging internet technology to use television connection with modification and using community wireless LAN (Local Area Networks).

A study in Obafemi Awolowo University, Ilie-Ife in 2010 by Farrel, G. & Omorala (2017) used qualitative study among forty school teachers to determine and examine regularly occurring factors that affect the implementation of the technology among the school teachers. According to the study it emerged that teachers will perceive greater control to employ technology in to instructional use when they have the necessary hardware and software resources. The study concurred with Cowie and Jones (2005) in Malaysian schools who reported that with the ICT infrastructure provided, teachers were able to access school network, the Internet and laptop accessories (printer, digital camera, data projector, large TV screen, scanner and video camera). Hence, the educators have more prospects to utilize instructional technology when the ICT infrastructures are provided in a well manner. Past research studies have shown clearly that ICT infrastructure can be one of the factors that influence the technology use among the teachers (Cowie & Jones, 2021).

Kukali (2013) did a study in Kenya which sought to establish opportunities available and challenges faced in use and integration of ICT in public secondary schools management in Bungoma South District, Kenya. The study employed descriptive survey design. The study population comprised of 36 Principals, 36 Deputy Principals, 36 Directors of studies and 4 District Quality Assurance and Standards Officers. Saturated sampling technique was used to select three Quality Assurance and Standards Officers, 32 principals, 32 Deputy Principals and 32 Directors of Studies. Data collection instruments were self-administered questionnaires and interviews. Quantitative data was analyzed using descriptive statistics in form of frequencies counts and percentages while qualitative data was analyzed on an ongoing process as themes and sub themes emerged. The results of the study reveals that 100% of principals, 93.8% of deputy principals and 90.6% of director of studies cite lack of adequate ICT infrastructure as a major challenge in use and integration of ICT in management. In 50% of the schools, respondents observe that there is inadequate room for ICT equipment hence congestion limiting teachers to make maximum use of computers and the internet. Most respondents report either lack of or poor internet connectivity which is a hindrance to communication and linkages through email and fax.

The school management does not make adequate use of the internet for purposes of professional and educational resource; yet such processes brings into focus best management practices such as decision making and problem solving (Kukali, 2013). However, this study identified a research gap in the influence of ICT infrastructure and its integration in management of public secondary schools in Makueni County considering the local of the study. Ogachi (2019) observe that the availability of infrastructure, especially computers, influenced the integration of ICT by the principals in their administrative tasks. For those principals' offices with operating computers, a fair number had reliable internet connection.

Methodology

The current study adopted a descriptive survey design in order to determine the impact of infrastructural support on ICT integration on curriculum implementation in public secondary schools in Taraba State. The target population for the study was 52 public secondary school principals, 700 teachers. The study sampled 30% of principals and teachers. Twenty- seven urban schools and twenty five rural schools were sampled via stratified sampling technique. The strata included teachers in the urban schools and teachers from the rural schools. Once this was done, proportionate random sampling was exercised to determine the number of teachers in each stratum required for the study. Each teacher in that sub populations was assigned a number. Therefore, each teacher had an equal chance of being picked to participate in the study. Teachers corresponding to the numbers were included in the sample. The sample size included 16 principles, 60 teachers.

Data Collection Instruments

The purpose of a tool or instrument in research is to measure the variables of the study (Mugenda, 2021). This study used questionnaires and interview schedule as tools for data collection both of which were administered to principals and teachers in separate occasions.

Results and Discussion

The study sought to determine the impact of infrastructural support on ICT integration in curriculum implementation in public secondary schools in Taraba State, Nigeria. The results showed that majority of the principals (37.5%) had between 1–5 functional computers which were mainly found in the accounts office, secretary's office and the departments for the county schools. 25% of the schools had between 6 -10 functional computers which the principals indicated that the computers were in offices for official use for the School

Management Information Systems (SMIS). Only 12.5% of the schools and 6.25% indicated that they had 16 -20 functional computers and over 21 functional computers respectively which were distributed in the offices and the computers laboratory. Majority of the rural school teachers (32%) indicated that the schools they represent have 1-5 functional computers, 24% have 6 - 10 computers while 16% and 8% of the urban schools have 16-20 computers and over 21 computers respectively which are found in the offices and in the computer laboratory.

The rural schools on the other hand indicated that 66.67% had 1-5 functional computers, 17.78% 6 - 10 functional computers, 4.44% and 2.22% of the schools have 16 - 20 and over 21 functional computers respectively. The small percentage of schools with 16 - 20 computers and over 21 computers had distributed the computers to the offices for SMIS and the school laboratories for the purpose of teaching students who had taken computer studies as an elective subject. Majority of the schools had very few functional computers either between 1-5 or 6 -10 which are mostly found in the offices. The overall findings from the principals, urban secondary school teachers and rural school teachers can be summed up in the statement that the functional computers in the secondary schools in Taraba State were very few hence inadequate for teachers to efficiently integrate ICT in the implementation of curriculum since all respondents gave the response that majority of the schools have 1-5 functional computers. These findings were supported by findings in a study carried out by Vanderlinde and van Braak (2010) in Malaysia on factors that affect the implementation of the technology among the school teachers. The study had found out that, teachers will perceive greater control to employ technology into instructional use when they have the necessary hardware and software resources. Samuel and Zaitun (2007) researched on the adequacy of ICT resources and the right ICT Skills for teachers in integrating ICT tools in teaching and learning of English Language in Malaysian schools. The survey findings revealed that 81.7% schools have computer laboratories, 64.2% said personal computers are connected to the central server and 48.6% have computers for use. However majority of computer laboratories were inadequate in specifications and quality hence inadequate use.

The results of the study further indicated that, majority of the principals (50%), urban school teachers (76%) and rural school teachers (44.4%) access ICT resources in the cyber cafés since most schools lacked ICT resources. ICT resources in cyber cafés cannot be used efficiently for ICT integration in curriculum implementation due to challenge of time for travelling to the cyber café and the fact that the teachers cannot borrow the resources to take to school but can only print photographs and diagrams which is limited due to the cost implication which may not be catered for by the school. The findings are in line with another study carried out by Richardson (2008) and Katulo (2013) in their studies in Namibia on ICT integration who found out that inadequate ICT resources limit ICT integration.

In addition, the findings indicated that availability of ICT resources like projectors, internet, printers, computers and source of power influence ICT integration to great extent and to some extent respectively as indicated by Principals (87.5%) and (12.5), urban schools teachers (64%) and (12%) and rural school teachers (84.4%) and (4.4). Since ICT infrastructure is not well established in most schools in the State, ICT integration in curriculum implementation has lagged behind. These findings concur with those of the study done by Cowie and Jones (2021). Agaral, R. & Prasad, J. (2018) who researched on influence of ICT infrastructure and influence of ICT resources on ICT integration in Malaysia and found out that ICT integration in curriculum implementation cannot take place efficiently without established ICT infrastructure and adequate ICT resources. The results of the study showed that majority of the rural school teachers (32%) indicated that the schools they represent have 1–5 functional

computers, 24% have 6–10 computers while 16% and 8% of the schools have 16-20 computers and over 21 computers respectively which are found in the offices and in the computer laboratory. The urban schools on the other hand indicated that 66.67% had 1–5 functional computers, 17.78% 6 – 10 functional computers, 4.44% and 2.22% of the schools have 16 – 20 and over 21 functional computers respectively. The small percentage of schools with 16 – 20 computers and over 21 computers had distributed the computers to the offices for SMIS and the school laboratories for the purpose of teaching students who have taken computer studies as an elective subject. Majority of the schools had very few functional computers either between 1 – 5 or 6 – 10 which were mostly found in the offices.

Conclusions

The study established that well developed ICT infrastructure positively influenced ICT integration in implementation of curriculum in secondary schools in Taraba State. The situation impedes ICT integration in curriculum implementation as it was established that, most schools had few functional computers in the school and even lacked computer laboratories. Consequently, majority of the principals and teachers accessed ICT resources in the cyber cafes which limited ICT integration in curriculum implementation. ICT infrastructure is a key factor in ICT integration in curriculum implementation but through responses, it was found that ICT infrastructure in most schools was in poor condition since most schools lacked internet connectivity despite the fact that majority of the respondents indicated that internet influenced ICT integration to great extent. This situation made teachers to depend on cyber cafes for internet access. The challenge as earlier noted is that functional computers are inadequate causing the process of ICT integration in curriculum implementation to be low.

Recommendations

From the findings of the study the researcher recommends that, the Federal Ministry of Education (FMOE), through the state Universal Basic Education (UBE) which is mandated to provide basic education to all deserving citizens and the Taraba State Post Primary School Management Board (TSPPSMB) should come up with modalities of implementing the ICT policy in all secondary schools to ensure all teachers in Taraba State are trained in ICT skills to be able to integrate ICT in curriculum implementation. Private employer through Teacher Professional Development (TPD) to conduct gap analysis and launch a state-wide capacity building to all teachers who are deficient of ICT skills to enable them institutionalize ICT integration in curriculum implementation in favor of Competence Based Curriculum which aims at developing digital literacy as one of the seven competencies in the 21st century.

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