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# An Empirical Study of Communication and Information Technology in Nigeria Tertiary Education Sector in enhancing the qualitative measure of Education: A case study of Federal Polytechnic, Ilaro

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## ABSTRACT

*Communication Information technologies (ICT) today affect all forms of human life. They perform an important aspect in work, business, school and play. In addition, generality of the populace see ICT as a motivation for betterment. Changes in information processing, working conditions, and exchange, teaching methods, research access to communication and information technologies. During this digital age, it is important to use ICT in the classroom so that students can apply learnt skills they need in the 21st century. ICTs enhances learning and teaching opportunities which further raises the profile of teachers as pioneers of the educational environment. ICTs help teachers present their classrooms in a way that engages and learns at all levels of education. The purpose of this article is to analyze some of the earlier studies considering the efficacy of ICTs and their influence they have on the aftermath of learning, as well as numerous conceptual and methodological concerns related to measuring effectiveness. It also takes into account the definition, measurement and empirical application of models to quantify the effectiveness of ICT use and its impact at the country level.*

***Keywords***: *Communication and Information Technology (ICT), educational Policy education, performance, efficiency, learning and Teaching, Academic technology,*

## 1. INTRODUCTION

The role of communication and information technologies (ICT) in the education system of the 21st century cannot be overemphasized. The life path of global economic integration is vital to the participation of institutions in the world economy. Swift changes in technology do has not made things a bit easier, but the faster the better. The evolution of information and communication technologies (ICT) in Nigeria's education system must continue, and the potential implications of economic development, labor force growth and social and cultural awareness are enormous. Nigeria's investment in ICT infrastructure in the education system could not be correlated to almost identical investments in telecommunications, but education is definitely influenced by the global impact of ICTs such as ICT and continues to play a role as education, training and research. However, economists disagree as to whether ICT efficiency is the result of higher growth in total factor productivity (TFP) and enhanced production efficiency (ascribed to a highly literate population). Over the past 20 years, considerable amounts of money has been used to fund ICT globally. However, the utilization of ICTs in training and education has been important in majority of EU and OECD countries over the past decades, but the level of advancement has been mixed. ICTs have an enormous influence on the educational sector, organization and methods of learning and teaching. Moreso, the inculcation of ICT into the Nigerian Higher Education tends to further improve the regularity, cost-effectiveness and availability of instruction delivery to students (Albirini, 2006) thereby building an enterprising and vigorous teaching and learning environment (Arnseth & Hatlevik, 2012). The use of computers and technological tools are not purposive to further widen the physical separation of students and teachers but perhaps the connection of these tools is vital for ICT integration in education. The use of ICT help teachers facilitate the design and adaptation of their lesson plans with due consideration of creative and practical approach that is intended to simulate the active participation of students during the delivery of the lesson.

However, there are significant variance in the amount expended for ICT within countries, between countries and between institutions within various countries. In some countries, ICT has been incorporated into their schools curricula and have demonstrated effective and suitable use of ICTs to sustain education. The National Policy on ICT in Nigeria has irreversibly considered the promotion and application of ICT strategy to facilitate its rapid development and growth [National Policy on ICT 2012, p.9]. It is important for Nigeria to key into the global trend that is been driven by ICT in all ramifications of its economy with more emphasis on education. Since it has recognized the importance of ICT as an essential tool for sustainable development. Furthermore, with the policy as a road map, the government focus is driven at making the country a salient player in the ICT sector to match the global competitiveness. This policy also intends to integrate the proper utilization of ICT in mainstream training and education, also tends to institute a new multi-faceted ICT institutions as centers of excellence delivering the much needed development and innovations that will cement Nigeria’s competitiveness in the global stage. Furthermore, the

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policy is also gears at developing the much needed human capital with prominence on creating and supporting a knowledge-based society (Yushau & Nannim, 2018).

The importance of this study demonstrated the imperatives of investing in ICT resources, supporting ICT education, funding ICT programs, and professional development are essential for the education system and future economic growth of the Nigerian workforce in meeting the growing demands of the global competitive markets. Currently, the socio-economic growth of the world can only be attributed to the use of technology. Thus, ignoring the financing and use of technology in the Nigeria education system means the possibility of economic stagnation.

## 2. LITERATURE REVIEW

There have been many theoretical and empirical attempts to evaluate the influence of ICTs on academic performance in contrasting circumstances. Recently, the perspectives to assessing ICT in education always focused on only a couple of features such as inputs, outputs and outcomes / impacts. Using indicators can help you assess how investments (eg, cash, infrastructure, resources) are related to these impacts. However, the assessment should take into account the various stages of the realization procedure and scrutinize changes in the culture of the school system at the micro (student) level, meso (institution/school) and macro (national) level. At the national and institutional level, educational policies and regulations has been developed to contribute to the use of ICTs in education. In schools and classrooms, school administrators and teachers strive to find the most befitting ways to use ICT technology to support their students 'and their students' academic success. Considering the study conducted by Baba (2014), the no-follow-up policy is just a blank document with no comments. Revised in 1988 and 2004, the National Education Policy (NPE) requires computer science to be taught academically and incorporated into school administration and instruction. However, implementation is ineffective because the purchase of infrastructure and technology financing are not yet available or available. Computer science is difficult to conceptualize because it is taught as a theoretical course without hands-on courses in most schools. The federal government reaffirmed the need to integrate ICT into Nigeria's education system and demonstrated the need to move from classroom computers to ICT and infrastructure levels, with three main goals for ICT.

There are several initiatives inaugurated currently in place to rate and keep track of the effectiveness of ICT use and its favourable impression on education. SITES (Second Information Technology in Educational Research), sponsored by the International Association for Educational Achievement Assessment (IEA), which samples, investigates, identifies and describes the use of ICT education in 26 countries. This study examines the use of computers in classrooms in schools based on a sample of teachers, principals and ICT officials. This is not about student achievement, but about the significance of ICTs on students from a teacher's perspective (Pelgrum and Anderson, 1999; Kozma, 2003). Also, Balanskat et al. (2006) analyzed numerous studies in respect to the

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effectiveness of ICT in European schools. They concluded that there was little indications and insubstantial similarity. Individually, each study uses a different strategy and approach which requires cross-country comparisons.

In contrast, Trucano (2005) analyzed several studies on the effectiveness of ICT in schools and concluded that the significance of ICT use on academic performance is vague. In addition, Cox and Marshall (2007) stated that ICT research criteria do not have significant impact. Empirica (2006) also examined ICT accessibility and usage in European schools in 2006. It provides information and facts on the 25 EU member states including Norway and Iceland, limited by the by the non-consideration that takes into account the performance of the students in using ICT to learn, it became impossible to study important aspects of the impact of ICTs in some EU member states. Machin et al. (2006) has clear examples of the use of ICTs to improve student computer literacy, and the purpose of reinforced learning skill (TEL) has become more controversial (Machin et al., 2006). Since different studies provide mixed results, they developed theoretical examples with a large amount of factual data disposition supporting the predictable benefits of using ICT in schools (Kirkpatrick and Cuban, 1998). Nigerian's ICT adoption is rated low with the huge investments in ICT infrastructure over the years, the major factors incapacitate the in-depth adoption of ICT in the Nigerian Educational sector includes the lack of skilled ICT-manpower and inadequate ICT facilities has hampered the successful integration of ICT in our tertiary institutions. The behavioural impact has narrowed the initiative of research and tools used to be basically descriptive in nature. Isiyaku, Ayuba & Abdulkadir (2015), dwelt on investigated the suitability of a structural model the explains the impact of two variables namely: attitude towards ICTs and perceived enjoyment (exogenous) on behavioural intention Communication and Information Technology(ICT) behavioural usage (Endogenous) with idea and plan action based on Technology Acceptance Model. The application of Structural Equation Model on the study showed a decline in Teacher's Behavioural intentions to use ICT especially in the tertiary Educational sector. Coupled with the lack of ICT facilities, it can be congruently inferred that the usage of ICT by teachers is mostly influenced by the enjoyment they derived from the use of ICT while their use of ICT was more affected their ICT attitudes, this invariably implies that a lot of teacher are unable to effectively deploy the usage of ICT in their various classes. A more robust approach was adopted by Moyosore (2012), the research investigated the use of ICT relative to overcrowded classroom with a specific case study of Nigerian Universities, as a result of the growing population of students the study demonstrated how the adoption of ICT are effective tools in mitigating the challenges of teaching and learning in overcrowded classrooms. Furthermore, in an effort to upscale the essential educational challenges of enrolling larger number of students, the ICT tools that are salient to teaching and learning are mostly deployed out the classroom with the exception of most Nigerian private Universities. Activity theory was employed to develop the understanding intrinsic factors relative to its importance in the teaching and learning in crowded classrooms. The outcome of the study suggested that the for techno-centric and

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deterministic approach toward teaching and learning toward ICT cannot completely guarantee effective and improved quality of learning until some more commensurate measures and investments are put into perspective. Such as review of fundamental educational issues, as learning is revolves around the student and the distributed problems between the learner and the contextual has to be resolved since learning is a shared activity. Finally, another keen problem mitigating the use and deployment of ICT in Nigerian tertiary is self-motivation, inadequate and regular training of qualified staff in the use ICT.

In contract to several literatures that has demonstrated the efficiency of ICT teaching and learning based on the perspective of the teachers, Fabunmi (2012) investigated the effectiveness of using ICT to enhance teaching and learning based on the viewpoint of undergraduate students. The survey dissected the underling challenges that student still patronize the traditional means (books) of sourcing and retrieval of information in some tertiary institutions rather than the use of ICT with is the trending and efficient, which is perhaps attributed to the cost implication. For the furtherance of teaching and learning using ICT, Avbarefe, (2021) analyzed the effectiveness alongside the practical elements of ICT integration in public schools. The research outcomes identified two major findings: the integration of ICT for students tends to motivate active participation and in-depth engagement of the student in lessons where ICT are deployed and also in respect to the integration of ICT based on the teacher experience, results from the study showed that teacher are not provided with adequate time to use ICT during teaching and learning process, this affect the more needed experience in the deployment and use of ICT.

## 3. METHODOLOGY AND DATA

Measuring effectiveness typically requires: (a) cost estimates; b) production evaluation; and (c) comparing between the two factors. The application of this idea to ICT activities, it can be said to be cost-effective, for instance, when ICTs bring maximum benefits to the citizens of the country for the money spent. Effectiveness is often defined as a relatively positive sense. The relationship between costs and benefits of country X in comparison to other countries, assuming the benefits of a country are several times higher than the costs of other countries, then the cost of ICT in country X is considered more efficient. However, measuring the effectiveness of ICTs is relatively difficult because it is difficult to compare and measure costs and benefits.

The method employed in this study was a quantitative research method, which was used to calculate the views of students and academics at Federal poly Ilaro (FPI) on the impact of ICT on university education, teaching and research. The study population consisted of teachers, randomly selected by FPI, and students from 7 undergraduate schools in FPI. A questionnaire consisting of 39 questions comprising all 4 research questions was developed and employed in the collating the

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research data. This tool has two parts. Part A covers the demographic variables of the respondent, and part B has 20 items. The reliability test retest coefficient of 0.85 was determined using the Pearson's product moment correlation coefficient statistical tool. Answers are graded on a scale of 1 to 4 (strongly agree = 4, agree = 3, disagree = 2, strongly disagree = 1). The t-test and statistical percentage methods were used for analytical basis.

## DATA ANALYSIS

Questionnaire was used to collate data responses based on the research questions from staff and students at Federal Poly Ilaro (FPI). A detailed analysis is shown in Table 1.

Table 1. Overview of statistics in the study

| S/N | COMMENT | STAFF | X | STUDENT | X | AVERAGE | DECISION |
|---|---|---|---|---|---|---|---|
| 1. | Adversely, affect teaching and learning. | 150 | 3.75 | 900 | 3.60 | 3.70 | Accept |
| 2 | Poor quality of research | 85 | 2.13 | 440 | 1.75 | 1.95 | Reject |
| 3 | Limits diversity | 56 | 1.40 | 330 | 1.30 | 1.35 | Reject |
| 4 | Affect, education generally | 151 | 3.78 | 830 | 3.32 | 3.55 | Accept |
| 5 | Affects, academic performance | 178 | 3.20 | 820 | 3.28 | 3.24 | Accept |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6 | Plagiarism | 100 | 2.50 | 600 | 2.40 | 2.45 | Reject |
| 7 | Lack of access, to study materials | 79 | 1.96 | 500 | 2.30 | 2.14 | Reject |

Adopting a typical conceptual framework for efficiency, it describes the relationship between inputs, outputs and outputs, which are key components of performance and effectiveness indicators. The substituted (i.e., incoming) monetary and non-monetary resources have borne fruit. For example, the cost of ICT, investment in broadband, or the base computer-to-student ratio (possible baseline) affect the number of students graduating from classes (possible outcomes) and national test scores (possible outcomes). I / O ratio is the most essential indicator of efficiency. Furthermore, comparing the performance metric, the idea of efficiency includes the concept of capacity limitation, which is a possible level considering the magnitude of the operation. The higher the output for a specific input or the lower the input for a specific output, the more efficient the activity. By comparison, productivity is simplified as the relationship between the proportions of the output to the input raw material used.

**Research Question**

What are the effects of ICT on the quality of teaching and learning?

**Hypothesis**

The impact of ICT on the quality of education and training is insignificant; To answer this question, we collected data responses from 40 employees and 250 students of the Federal Polytechnic Ilaro. The results are shown in Table 2.

| GROUP | N | X | X | SS | T-cal | T-critical | Decision |
|---|---|---|---|---|---|---|---|
| STAFF | 40 | 679 | 17 | 77687 | 0.003 | 1960 | ACCEPT |
| STUDENTS | 250 | 4150 | 16.6 | 2045510 | 0.003 | 1960 | ACCEPT |

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**Teachers Professional Development and ICT**

Teachers need continuing professional development prospects in order to accelerate their skills in using ICT for formative (educative/ developmental) learning assessments, self-paced learning, accessing online resources, and for stimulate student interactivities and collaboration. The general conduct or attitudes of teachers' in their classrooms will be positively impacted with such ICT trainings, such career developments should further provide peculiar guidance on ICT learning and teaching within specific discipline. Limitations of critical thinking in the aspect of academics by students is the resultant in the absence of such support, teachers tend to use ICT for skill-based applications. As a display of support toward teachers in respect to their transformation based on their teaching techniques to include the use of ICT, it is important for education supervisors, teacher educators, managers, and decision makers to also be trained on the use of ICT.

**Ensuring benefits of ICT investments**:

Supplemental conditions must be attained adequately to make certain that the investments made in ICT are beneficial to students, such educational policies makers must ensure that schools provide some fundamental acceptable ICT infrastructures with must encompass consistent and affordable internet connectivity with adequate security measures such as site blockers and filters. Moreso, ICT usage in in pedagogical scenarios such as education, discipline-specific usage of ICT and the requirement to specifically enhance the basic literacy level of teachers are the are the long term goal of policy makers when successful integration of ICT into the academic curriculum is attained. Subsequently, for deeper impact in the adoption of ICT, contextual material should cogitate the local culture of the area of use hence developing digital contents in native languages. The synergy that compasses the human, organizational and technical supports have a collaborative interplay on the challenges crucial in ensuring efficient use of ICT. The Resource constrains involving ICT in respect to the total cost is substantial as it embroils training of administrators and teachers, technical support, internet connectivity, provision of Hardware's and software's facilities. The adoption of ICT into the learning environment based on the established policies should be implemented in piecemeal, such as providing ICT infrastructure will yield sustainable and uncomplicated upgradable ICT infrastructure in schools without too much financial burden. Supplementing the efforts of the Government, some schools have adopted a scheme known as "Bring Your Own Device" where student are allowed to bring their own personal mobile technology such as smartphones, tablets or laptops, hence reducing the burden that government needs to provide ICT gadgets. Furthermore, it is more important that schools need to provide equal access to ICT learning devices with due considerations for indigent student that cannot afford ICT devices. In addition to ensuring the benefits of ICT investment is the bridging of the digital divide with reference to the disparity of internet accessibility and digital media both within and outside various countries. There is wider variation in digital disparity among the world poorest people due to the absence of digital literacy and technical skills for adequate internet penetration and media

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usage. Employing the advocacy and policies enactments that will reach the farthest student irrespective of his/her dominion, will deliberately bridge the divide by putting forward digital literacy, accessible internet and media to all the students. Also, the problems associated with minority language groups, especially students whose mothers tongue is at variance with the official language of instruction can be put at a great disadvantage, reasons been that they are less like to have adequate access to internet connection and probably computers when compared with their peers who are better equipped with the much needed ICT tools to prepared for talks and papers. Based on this facts, student from minority groups are most likely not to have materials availability for them online to access much needed information, the use of automated speech recognition, accessibility to audio-visual materials chat functions and many more ICT tool can further nourish their skills in learning the official language of instruction. Furthermore, flexibility in accommodating students with variegated learning styles is a specific benefit that ICT provides with it diverse options with regards to information processing in view of the fact that over 87% of students population learn effectively via tactual and visual methods in order to make logical sense of an idea or expressing the ability to learn. Reading and hearing are insufficient enough to help student attain better learning experience regarding an information, ICT helps provide extra supportive function on mobile devices through programmes for students with special needs, audio feedback, control features, simples screens and instructions, setting of level and difficulty are some the features available for students with special needs.

## RESULT AND DISCUSSION

The aim of this research is to highlight the different impacts of ICT on higher education. This case study uses FPI as an example. This study, inter alia, aims to determine the impact of access to and use of ICTs on: Access to teaching materials and identifying administrative support and interest in the use of ICTs in relation to ICT initiatives, development and implementation of the Nigeria education system. This study proved that the influence of ICT on research in Nigeria's education system cannot be underestimated. Baba (2014), Agbetui and Oluwatayo (2012), Yusuf (2005) and Aldridge and Goldman of the USA (2007) assent that the use of ICTs performs an indispensable role in effectiveness and efficiency of education. In primary school, children's perception is the link between ICTs and the methods of learning in school, which has been very successful in integrating ICT into the curriculum. The involvement of teachers in planning research has given pupils the edge that they can memorize specific learning episodes that provide a fertile foundation for children of this age grade to better understand the dynamics of teaching and learning (Goodison, 2002). Teacher's quintessence are mainly on developing technical ICT skills, while the ICT curriculum emphasize on the integration of ICTs in teaching and learning. The optimism that school ICT curriculum that "transforms" the national ICT curriculum into a curriculum that will be an integral part of general school policy (Tondeur, Braak, Valcke., 2006), notwithstanding the

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tremendous efforts to make information and communication technology (ICT) a core principle of higher education, most cannot afford it.

It is a crossroads that introduces new technologies in a partially changing context of teaching, learning and peer collaboration. The role shift brought about by ICT competencies raises questions about the significance of structured ICT characteristics in teachers training. Numerous newly qualified teachers want to gain better understanding of ICT and related technologies (Andersson, 2006). The correlation between fluctuations in ICT investment and variations in educational outcomes of local education authorities (LEAs). In divergence to earliest research in the business literature, there are proofs that investment in ICT has an unequivocal effect on learning outcomes in primary schools. This provides interesting similarities between existing and related jobs that do not benefit students in companies, where there is evidence that ICT investments increase the productivity of companies (Machin, McNally, Silva. 2007).

## IMPLICATION OF THE STUDY

During the course of this study, it was discovered that students, staff and researchers are united throughout Nigeria's education system, and striving for unlimited access to the Internet and shared technology resources is essential to improving research and development in teaching and learning. Answers to certain Questionnaire also provide access to technologies that open up a wider range of research materials for students and educators, to embrace synergetic research works, reduce plagiarism in research projects, and encourage strengthen journal publications. Also, to ensure indicated potential research topics are expanded. Students are more creative, more intuitive, creative and positive thinking, which increases their confidence in their research skills. The study also shows that students and staff, no matter how strongly they desire to incorporate and incorporate skills into their curriculum, are not easy to implement or incorporate.

## CONCLUSION

The major findings of this research are that the accessibility and use of ICTs are very important for improving student learning efficiency. This shows that the presence of ICT in education supports students. Overall, the analysis showed that many of the countries studied have great capabilities to improve ICT efficacy and improved educational outcomes. Nonetheless, some shortcomings of the shown empirical studies should be noted. Firstly, the inadequacy of data hinders the application of the presented technology. Quality data is needed because the methods that can be used to measure performance respond to abnormal values and can be determined by external conditions. Secondly, the specific characterization of inputs, outputs, and outcomes can

have a significant impact on outcomes. Finally, it is imperative to take into account that a distribution free statistics method be used and the DEA is a well-established and valid methodology, but differences between countries are not statistically assessed and this can be considered a methodological limitation. Thus, administrative support and funding are essential for the deployment, integration and use of technology in Nigeria's education system.

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