

# ADOPTION OF ICT TO ENHANCE EDUCATIONAL DEVELOPMENT IN NIGERIA

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## Abstract

Education has always played a central role in human development while today the world accepts universal primary education as an achievable goal. Formal schooling for everyone is a relatively recent phenomenon, even when it was less formalized or standardized scientific and technical curiosity help moved mankind from agricultural to the industrial .Now into the knowledge economy know as the ICT. ICTs has been prime as the "ultimate saviour" for reaching the millennium development goals but they are more of an enabler. They have the potential to help reach both, but not without reliance on more traditional learning system and technologies. This research related the relationship between an education-centered approach with ICTs, adding tutorial and the efficiency of the educational system in the classroom and beyond.

**Keywords:** Education, ICT, Rationale, School, Traditional Learning, Technology

## 1. Introduction

At personal level, education helps individuals more beyond subsistence agriculture, and helps them compete against their peers. However, in today's globalized world, the competition is not just with people of the same village or region but across continents. A century ago, improving transportation was a driving force globalization. Now, information and communications technology (ICT) is a major factor in spurring positive educational development but it has been seen as symmetry, that is, it has the potential to be the great equalizer and democratizer for

those who had been left outside its scope, or who had failed to harness its resources.

Learning occurs in four different streams in the 20<sup>th</sup> century:

(i) Formal learning takes place in schools and higher education institutions providing systematic education

(ii) Non-formal learning occurs outside the formal education system but is nevertheless an organised event with specific target groups or clients and learning objectives. This includes continuing education, adult education, professional training and literacy programmes.

(iii) Informal learning is the individual acquisition of skills, knowledge and attitudes from the everyday experience and environment.

(iv) Virtual collaborative learning occurs both as an independent learning structure or within networks made up of learners with similar learning needs in the case of initiatives like the African virtual university and as an integrated strategy added on to

The first section is used to describe the current trends in education and different learning streams. The second section is factor influencing the adoption of ICT in educational domain. The third section covers why ICTs was adopted for the student and how it will be deploy to meet their needs. The fourth section covers the conclusion.

## 2. Literature Review

In this literature review we highlight the factors affecting the ICT adoption process and their numerous impacts. As our study is focusing on education and the impact of ICT to enhance education was also being explored.

Four attributes from Roger's model [7] are relative advantage, compatibility, complexity, image and cost which will be adopted in this framework to test the impacts on ICT adoption process.

Besides focusing on particular ICT factors, the organizational and environmental factors also may impact on the process of ICT adoption in an organization. According to Rashid and Al-Qirim [1], the organizational factors collectively impact on the resources of the business in relation to adoption of ICT innovation [2]. However, the process of ICT adoption could be quite difficult for a firm because of its requirements. The willingness for adoption of ICT is, usually, associated with organizational readiness where organization must adapt with a large investment and firms may not have sufficient financial resources to support the high investment in hardware and software technology that is required [3, 4]. Therefore we would expect that organizational awareness, encouragement and readiness might influence technological innovation. Damanpour [5] found that environments with high uncertainties would have positive influence on the relationship between organizational structures and organizational innovation. Apart from that, competitor also could be one of the important external factors considered in ICT adoption. ICT adoption decision would be influenced by the relative advantage gained by LSPs compared to their competitors. If there is no relative advantage gained by LSPs, ICT might not be adopted [6].

### 3. Adoption of ICT in Nigeria Schools

There is an immense opportunity for the utilization of ICTs in the education sector in Nigeria, for learners, teachers and the administrators. Enormous opportunities are present in the use of ICTs in education and we can also weigh the opportunities against the constraints in their education systems. Education choices have to be made first in terms of objectives, methodologies and roles of teachers and students before decisions on appropriate technologies can be made. No technology will fix bad educational philosophy and practice. Learning objective should be aligned with learning technologies.

There are four rationales for the use of computer in schools:

- (i) Social rationale – this is the demystification of the importance of computers at school level;
  - (ii) Vocational rationale – the need to prepare learners for employment through providing computer competencies, including educational programmes;
  - (iii) Pedagogical rationale – the use of computers to improve on the delivery of education and as an aid in the teaching and learning process;
  - (iv) Catalytic rationale – use of the computer in the overall performance of schools, integrating functions of teaching and learning management and administration.
- Whereas the developed nations are placing emphasis on the development of e-commerce, the worldwide web and the internet, the developing world is still grappling with

attaining access to ICT equipment and gathering hands-on experience in operating ICT devices. Affordability should be addressed, as it is the developing world.

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The capacity of ICTs to achieve development goals will not be effectively leveraged without content that is responsive to user needs and local conditions. If ICTs are to be used for education purposes, the content should be relevant to the curricular requirements of the education system and the needs of the students, teachers and administrators.

Generally, the following should be considered if ICTs should serve as an added value in education:

- (a) Educational policy  
Establishing the best policy framework is essential if the development potential of ICTs is to be fully realised. Effective introduction of ICTs requires policies and planning at various levels. At the national level, when leaders recognise the benefits of ICT it is easier to allocate funds for their support. Incentive can be provided to increase the involvement of the private sector. The government should show support and commitment and be involved in the democratisation process of access to ICTs. The regulatory framework should be adaptable to allow faster expansion of ICT use and enterprise growth.  
Hence, the following education policy initiatives are important conditions and facilitators of ICT based learning:
  - (1) Government awareness of the importance of ICTs for national education. This calls for understanding that:

- (i) ICTs are virtually important to the development of the economy and to participation in the global information society, with a corresponding need to develop appropriate skills and
- (ii) ICT based learning and distance education can play a crucial role in broadening access to education for the whole society and reaching the education for all goals.

- (2) A strategy plan or policy. this must be based on an analysis of needs and priorities for the use of ICT to improve education – the school net Africa value chain being a possible basis to begin with. Some key elements and concrete steps of such a strategic plan include:

- (i) ICT skills integration in national curricula – in teacher training institutions and in the classroom.

- (ii) Equipping schools with appropriate technologies such as computers
- (iii) Teacher and administrator training on ICT
- (iv) Initiatives and programmes which invite and attract private sector involvement

(3) The presence of the local participation and initiative and serious considerations regarding the self sustainability of projects. Financially, skills wise (e.g through train the trainers); equipping teachers to use these technologies in teaching; long term maintenance of such technologies; support system to ensure longevity to get optimal use from resources committed to such technologies. In order to develop sustainable ICT based education in developing countries like Nigeria, models of financing need to be devised which provide for transition from initial dependency on the international donor agencies to self-sustaining and continuing institutions.

A policy on ICT in education is just one fact of preparing the population and workforce in Nigeria to be productive, competitive and at ease in the information economy. Education is fundamental to achieving development – education not just in terms of skills acquisition, but in the application and implementation of skills to meet needs of the communities to bring about development.

#### (b) CAPACITY BUILDING

There is need for low cost solutions, government support and increased involvement of the telecommunication providers in narrowing the gap between the capacities of urban and rural schools. Technology infrastructure needs upgrading, more so with poor telecommunications infrastructure in Nigeria. Maintaining permanent qualified technical support is costly and trade off should be made. Teachers in the schools should be trained to cut across teaching as well as providing technical support.

The success of ICTs will to a large extent be based on the cooperation between the technical and educational infrastructure. The quality of manpower and teachers on the ICT programmes has a great impact on the success of ICT learning. There is a need for dedicated human resources with several roles. A full time IT teacher for technical backstopping would be appropriate for each school.

Basic literacy is of crucial importance for the development of ICT in Nigeria. To deploy ICT for educational development in Nigeria, we should develop a critical mass of trained personnel at various levels. Developing human capacity in ICT will be supported by the promotion of relevant educational curricula and the creation of new educational facilities with emphasis on ICT skills development. Teachers often do not know what

they can do with technology, and the tendency is to use ICT simply to automate traditional teaching methods. Teachers need to get critical guidelines and upgrading of their skills for effective use of ICT.

#### (c) PARTNERSHIPS

Partnerships between the various stakeholders in ICT programmes will be central to the full adoption of ICTs. Issues raised with partners resolve around the need for strong coordination and support from the government, active partnerships between the government ,NGOs, the private sector, donors and telecommunication providers; private – public sector partnerships for long-term sustainability; and complementary donor funding for such programmes. Partnerships need to be flexible, strength related, privileged and here clearly defined goals of importance are the rural communities in Nigeria. This group of people is often overlooked but forms the strongest basis for the sustainability and successful implementation of ICT projects.

#### (d) ACCESS TO ICTs

Access to ICT is a fundamental requirement and the solution to the problems of the digital divide and other development divides. If the desired end-goals of empowerment and opportunities are considered, access leads to information, which can lead to knowledge, leading to empowerment and opportunities. Of course, it is not linear and one requires complementary capabilities, especially to interpret information into usable knowledge. In fact, knowledge is an interpreted extension of information that captures relevance and context, and it is tightly coupled with opportunities. The digital divide, however defined, is a stark divide and a challenge for development and technology professionals. It is actually a manifestation of other underlying divides, spanning economic, social, geographic, gender and other divides. Attempting to address the digital divide as a cause instead of a symptom of other divides has led to many failure of ICT drives development projects.

The digital divide can be considered at four levels: awareness, availability, accessility and affordability.

- (i) Awareness: relates to knowing what can be done with ICT; people must also be open to using ICT (attitudes)
- (ii) Availability: ICT must be offered within reasonable proximity, with appropriate hardware/software.
- (iii) Accessibility: relates to the ability to use the ICT (spanning literacy, e-literacy, language, interfaces, etc)
- (iv) Affordability: all ICT usage together should, ideally, be only a few percent of one's income (under 10% maximum); this covers life-cycle costs (termed total costs

of ownership – TCO), spanning hardware, software, connectivity, education, etc.

Reducing the divide requires improvements across all the dimensions of ICT (dubbed the 4c framework): computing, connectivity, content and human capacity.

(i) Computing: personal computers (pcs) are prohibitively expensive for most people, and shared access (e.g schools, community centres or cybercafés) becomes inevitable. PCs today are very difficult to use, and even ‘experts’ spend a lot of time maintaining their machines, worrying about upgrades, security, compatibility of hardware etc as a complementary (but not substantive) technology, non-pc devices are an important option e.g mobile phones.

(ii) Connectivity: while mobile telephony is improving worldwide (witness in Africa it is now twice the number of landlines), it remains expensive, limited in rural areas, and poor at providing data connectivity. Many areas are now grappling with limited connected options, such as dial up. Instead, broadband connectivity can be affordable, even in rural areas, with the right network and business models.

(iii) Content: meaningful content is lacking in many languages, and most content is not locally relevant. Today’s system tends to make people passive consumers of information, instead of enabling the generation of local information. In addition, rich content demands multimedia (useful to overcome literacy issues), which in turn, requires broadband connectivity.

(iv) Human capacity: users need to be aware, literate and innovative to harness the power of ICT. They also should be empowered to use ICT, societal and governmentally.

Of course, ICT usage does not occur in a vacuum, rather within social and cultural norms that also shape the divide. In addition, ICT usage is based on policy and business models, especially regulation. In the long run, ICT must provide value and be sustainable from both a user and a provider perspective. As the Markle foundation’s report on national strategies of ‘ICT for development’ (2003) states, ‘digital divides are not just the result of economic differences in access to technologies (Have-Not’s), but also in cultural capacity and political will to apply these technologies for development impact (Do’s Do-Not’s)’. However affordability is certainly a limiting factor, since we have seen that many people could have access of some form of ICT but do not (e.g. mobile telephony footprint extends to over 80% of developing country populations, but the actual usage rates are much lower).

(e) Investment

There are many components of ICT for education that require investment. These include hardware (components),

software, training/education, supporting infrastructure such as electricity and connectivity.

Upgrade and install some new applications which needed more computing horsepower. Specifying the right PC is a key decision in better enabling access to ICTs in education. One method of calculating what specification to buy and what the appropriate refresh cycle should be is to calculate the ‘equivalent annual cost’ (EAC) of different specifications and different refresh cycles. (EAC is a fairly common financial method to compare capital investments with different lifetimes as an annuity that has the same present value and life as the underlying cost flow). In determining total cost of ownership for PCs, governments should also take into account all the cost components of a PC’s lifecycle including PC deployment, PC usage, PC support and PC retirement costs. Calculating the helps in choosing the right system and refresh cycle for PCs in education.

Consolidating blackened systems to reduce the numbers of servers required unit cost of ICT. Again, this is a practise that many corporations have used to reduce ICT unit costs with typically e-mail servers being a frequent target for quick cost reduction. The ever-improving price/performance ratio of communications, particularly the role of wireless as a disruptive technology, is also an enabler to consolidate multiple data centres into fewer larger data centres. Also as blade technology becomes more mainstream, computer density in computer rooms can be significantly increased, again lowering cost.

## 4. Conclusion

Education using ICT is especially difficult as it involves specialised knowledge for both ICT and education. Many electronic/distance educational models failed because existing providers thought it was enough to digitise and put their current material on the web. In fact, a number of reputed schools and universities failed or saw enormous setbacks in such efforts. To succeed, new content and ideally, new methods of instruction are key. Students learn and retain far more by doing than by ‘taking in’. This also relates to the failure of many syllabi or curricula in being relevant for either rural areas or the modern (global) economy.

ICT is not yet a stage where it can substitute for human. It is best used to enhance and extend humans’ capabilities. One major challenge is meeting minimum skill sets for all students while allowing those who were able to progress rapidly. The catch is that some can progress rapidly not only due to skills but also due to advantages of family support, infrastructure, etc. Many people acknowledge that



curriculum based rich content is the biggest gap or issue in increased adoption of ICT in education.

Armed with the appropriate ICT tools and the appropriate standards, teachers can and should be encouraged to develop curriculum focuses content which can be re-used by other teachers. Teach to the future programme has trained more than two million teachers worldwide and these kinds of programmes rapidly improve teacher competency in using and handling ICT infrastructures in the classroom. A disruptive innovative that could transform the development and proliferation of content is the establishment of a Nasper-like solution based on peer-to-peer networks which could enable easy sharing of teacher prepared content between schools and across borders.

Another tactic to improve access to ICTs in Nigeria education is the increasingly popular concept of public-private sector organisations come relationship to fund, develop and operate ICT solutions and services. As we move into an era of third generation corporate social responsibility, corporation to drive large-scale changes which produce win-win outcomes. While developing strategies which address thus, we also need to continue to drive pilots and leverage learning from rapid solution prototyping.

Finally, Nigeria government should try to create various circles of innovation through coordinated strategies on subsidize broadband deployment, PC purchase programmes, digital literacy programmes and on-line e-services provisioning while each of these components have value in isolation, network effect in education can only be achieved through the co-management and co-evolution of strategies which co-evolve the 4Cs of ICT- computing, connectivity, Content and (human) capacity.

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