

The Need for Computerization in Basic Education in Nigeria

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Abstract

Information and communication technologies (ICT) have become commonplace in all aspects of life. Across the past twenty years, the use of computers has fundamentally changed the practices and procedures of nearly all forms of endeavor within business and governance. Education is socially-oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners (pupils and students). The use of ICT in education lends itself to more student-centered learning settings. But with the world moving rapidly into digital media and information, the need for computers and its peripherals in universal basic education is becoming more and more important and this importance will continue to grow and develop in the 21st century. In this paper, a literature review regarding the importance of ICTs in basic education was provided, effective use of ICT for Education, along with ICT use in the teaching-learning process; quality and accessibility of education; learning motivation and learning environment. Besides, an overview of the ICT and scholastic performance.

Introduction

Computers and its related components are making dynamic changes in our society today. They are influencing all aspects of life. The influences are felt more and more at schools, however, ICT provide both pupils/students and teachers with more opportunities in adapting learning and teaching to individual needs, society is forcing schools aptly respond to this technical innovation. Tinio (2002) states the potentials of ICTs in increasing access and improving relevance and quality of education in developing countries. Tinio further observed that:

‘The potentials of ICT are as follows: ICTs greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems improve policy formulation and execution, and widen the range of opportunities for business and the poor. One of the greatest hardships endured by the poor, and by many others, who live in the poorest countries, in their sense of isolation, and ICTs can open access to knowledge in ways unimaginable not long ago’.

In Watson’s (2001) description, ICTs have revolutionized the way people work today and are now transforming education systems. As a result, if schools train children in yesterday’s skills and technologies they may not be effective and fit in tomorrow’s world. This is a sufficient reason for ICTs to win global recognition and attention. For instance, ICTs are dependable tools in facilitating the attainment of one of the Millennium Development Goals (MDGs), which is achievement of universal primary education by the year 2015. Kofi Anan, the former United Nations Secretary General, points out that in order to attain the goal of Universal Primary Education by the year 2015; we must ensure that information and communication technologies (ICTs) unlock the door of education systems. This indicates the growing demand and increasingly important place that (ICTs) could receive in education. Since ICTs provide greater opportunity for students and teachers to adjust learning and teaching to individual needs, society is, forcing schools to give appropriate response to this technical innovation. Even though ICTs play significant roles in representing equalization strategy for developing countries, the reality of the digital divide- the gap between those who have access to, and control technology and those who do not, make a huge difference in the use of ICTs. This means, that the introduction and integration of ICTs at different levels and various types of education is the most challenging undertaking. Failure to meet the challenges would mean a further widening of the knowledge gap and deepening of existing economic and social inequalities among the developed and the developing countries.

In Nigeria the primary target of UBA is to ensure that every Nigerian child acquires a minimum of 9 years basic education that is achieving 100% success in ensuring that all school-age children are in school. Given the unstable and consequently unreliable educational realities in Nigeria, one cannot but wonder how far the UBA can go in meeting its target and achieving its set objectives. For UBA to achieve all it is meant to achieve, it must be dynamic. Since needs of the society are changing and Education is meant to address these needs so as to make the society conducive for human survival, the processes and activities must be adjusted to address these changes. This is where Computerization in basic education comes in.

Thus, the purpose of this term paper is to discuss the benefits of ICT use in education, in the enhancement of pupils and students learning and experiences of some countries in order to encourage policy makers, school administrators, and teachers pay the required attention to integrate this technology in their education systems. In so doing, it highlights the benefits of ICT in education, existing promises, and the

limitations and challenges of integration to education systems.

The Benefits of Computers in Basic Education

The uses of ICT is making major differences in the learning of students and teaching approaches. Schools in the Western World invested a lot for ICT infrastructures over the last 20 years, and students use computers more often and for a much larger range of applications (Volman, 2005). Several studies reveal that students using ICT facilities mostly show higher learning gains than those who do not use.

For instance, Kulik's (1994) finding across 75 studies in the United States showed the following. Students who used computer tutorials in mathematics, natural science, and social science score significantly higher on tests in these subjects. Students who used simulation software in science also scored higher. The findings also indicated that primary school students who used tutorial software in reading scored significantly higher on reading scores. Very young students who used computers to write their own stories scored significantly higher on measures of reading skill. Moreover, students who used word processors or otherwise used the computer for writing scored higher on measures of writing skill. Furthermore, the use of ICTs in education also shifts the learning approaches. As put by (Bransford, Brown, and Cocking, 1999) cited in Volman (2005), there is a common belief that the use of ICTs in education contributes to a more constructivist learning and an increase in activity and greater responsibility of students. This limits the role of the teacher to supporting, advising, and coaching students rather than merely transmitting knowledge. The gradual progress in using computers changes from learning about computers, to learning computers, and finally to learning with computers (Volman, 2005). With respect to introducing ICT technologies in schools, Olson (2000) advises to explore the following questions as bases for in-service teacher education. These are (1) how can the theoretical ideas tested in practice? (2) What does practice say back to these theoretical ideas? (3) How is useful negative feedbacks obtained? (4) What might be substantive talking points about the new processes? What is practical from a classroom perspective? (5) What does talking about the new say about the nature of existing technology? Is it adequate? (6) What scaffold needs for the next stage?

On the other hand, teachers' reluctance to adopt innovations need to be seen in the context of existing technology and commitments. Fullen (1989) cited in Watson (2001) states that change or improvement can happen at schools if teachers understand themselves and understood by others. For instance, many teachers are currently not in a position to make informed judgments on ICTs to support their teaching goals. Clearly a variety of factors still do make using ICT in the curriculum problematic (Watson, 2001). Because of this, the influence of ICT did not bring revolutionary changes at schools. For instance, the National ICT survey in the Netherlands shows that most primary-school students use computers less than once a week and there are still many secondary school teachers who do not use ICT at all (Volman, 2005). Most often, they use computers for drill-and-practice and word processing. In recent years however, there has been a growing interest to know how computers and internet can best utilized to improve effectiveness and efficiency of education at all levels and in both formal and non-formal settings. As there is a shift of theories explaining learning processes, ICTs become handmaiden for learning activities. Voogt's (2003) description on the major roles, distinguished ICTs as an object for study, an aspect of a discipline or a profession, and a medium of instruction. As a medium of instruction, ICTs fit to realize and implement the emerging pedagogy of constructivism (Davis, 1997; Office of Technology Assessment, 1995; Panel on Educational Technology, 1997; Watson, 1996) in Voogt (2003).

Moreover, Voogt (2003) differentiated between traditional learning setting and constructivist approaches. The former considers learning as transmission of knowledge to students, which is the sole responsibility of the teacher. On the other hand, the constructivist approach considers learning as authentic and learner centered. ICT, the computer for example is a great help in the constructivist approach, where one can design simulated and individualized learning environments to students. ICTs are exerting impacts on pedagogical approaches in the classrooms. Their contribution to changes in teaching practices, school innovation, and community services is considerable.

A research review by Kozma (2005) suggests three significant concerns of consideration regarding ICTs impact on education. Firstly, student outcomes such as higher scores in school subjects or the learning of entirely new skills needed for a developing economy. Secondly, we should consider teacher and classroom outcomes such as development of teachers' technology skills and knowledge of new pedagogic approaches as well as improved attitudes toward teaching. Finally, one has to consider other outcomes such as increased innovativeness in schools and access of community members to adult education and literacy. Emerging pedagogy is the name given to the new view of constructivist learning when compared to the relatively long existing behaviorist view of learning.

ICT enhancing Teaching and Learning process

The field of education has been affected by computers, which have undoubtedly affected teaching, learning and research (Yusuf, 2005). ICT have the potential to accelerate, enrich, and deepen skills, to motivate and engage

students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Davis and Tearle, 1999; Lemke and Coughlin, 1998; cited by Yusuf, 2005). In a rapidly changing world, basic education is essential for an individual be able to access and apply information. Such ability must find include ICT in the global village.

Conventional teaching has emphasized content. For many years course have been written around textbooks. Teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. Contemporary settings are now favoring curricula that promote competency and performance. Curricula are starting to emphasize capabilities and to be concerned more with how the information will be used than with what the information is. Contemporary ICT are able to provide strong support for all these requirements and there are now many outstanding examples of world class settings for competency and performance-based curricula that make sound use of the affordances of these technologies (Oliver, 2000). The integration of information and communication technologies can help revitalize teachers and students. This can help to improve and develop the quality of education by providing curricular support in difficult subject areas. To achieve these objectives, teachers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnerships with ICT as a tool.

According to Zhao and Cziko (2001) three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. However, research studies show that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential quite significantly (Smeets, 2005). Harris (2002) conducted case studies in three primary and three secondary schools, which focused on innovative pedagogical practices involving ICT. Harris (2002) concludes that the benefits of ICT will be gained "...when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT. As a consequence, the use of ICT will not only enhance learning environments but also prepare next generation for future lives and careers (Wheeler, 2001). Changed pool of teachers will changed responsibilities and skill sets for future teaching involving high levels of ICT and the need for more facilitative than didactic teaching roles (Littlejohn et al., 2002).

According to Cabero (2001), "the flexibilization time-space accounted for by the integration of ICT into teaching and learning processes contributes to increase the interaction and reception of information. Such possibilities suggest changes in the communication models and the teaching and learning methods used by teachers, giving way to new scenarios which favor both individual and collaborative learning". The use of ICT in educational settings, by itself acts as a catalyst for change in this domain. ICT by their very nature are tools that encourage and support independent learning. Students using ICT for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools (Reeves & Jonassen, 1996), the influence of the technology on supporting how students learn will continue to increase. In the past, the conventional process of teaching has revolved around teachers planning and leading students through a series of 4 instructional sequences to achieve a desired learning outcome. Typically these forms of teaching have revolved around the planned transmission of a body of knowledge followed by some forms of interaction with the content as a means to consolidate the knowledge acquisition. Contemporary learning theory is based on the notion that learning is an active process of constructing knowledge rather than acquiring knowledge and that instruction is the process by which this knowledge construction is supported rather than a process of knowledge transmission (Duffy & Cunningham, 1996). In this domain learning is viewed as the construction of meaning rather than as the memorization of facts (Lebow, 1993; Jonassen & Reeves, 1996). Learning approaches using contemporary ICT provide many opportunities for constructivist learning through their provision and support for resource-based, student centered settings and by enabling learning to be related to context and to practice (Berge, 1998; Barron, 1998). As mentioned previously, any use of ICT in learning settings can act to support various aspects of knowledge construction and as more and more students employ ICT in their learning processes, the more pronounced the impact of this will become. Teachers generate meaningful and engaging learning experiences for their students, strategically using ICT to enhance learning. Students enjoy learning, and the independent enquiry which innovative and appropriate use of ICT can foster. They begin to acquire the important 21st Century skills which they will need in their future lives.

ICT enhancing the Quality and Accessibility to Education

ICT increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere. It can influence the way students are taught and how they learn as now the processes are learner driven and not by teachers. This in turn would better prepare the learners for lifelong learning as well as to improve the quality of learning. In concert with geographical flexibility, technology-facilitated educational programs also remove many of the temporal constraints that face learners with special needs (Moore & Kearsley,

1996). Students are starting to appreciate the capability to undertake education anywhere, anytime and anyplace.

One of the most vital contributions of ICT in the field of education is- Easy Access to Learning. With the help of ICT, students can now browse through e-books, sample examination papers, previous year papers etc. and can also have an easy access to resource persons, mentors, experts, researchers, professionals, and peers-all over the world. This flexibility has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who previously were constrained by other commitments (Young, 2002). Wider availability of best practices and best course material in education, which can be shared by means of ICT, can foster better teaching. ICT also allows the academic institutions to reach disadvantaged groups and new international educational markets. As well as learning at anytime, teachers are also finding the capabilities of teaching at any time to be opportunistic and able to be used to advantage. Mobile technologies and seamless communications technologies support 24x7 teaching and learning. Choosing how much time will be used within the 24x7 envelope and what periods of time are challenges that will face the educators of the future (Young, 2002). Thus, ICT enabled education will ultimately lead to the democratization of education. Especially in developing countries like Nigeria and other African countries in general, effective use of ICT for the purpose of education has the potential to bridge the digital divide.

ICT enhancing Learning Environment

ICT presents an entirely new learning environment for students, thus requiring a different skill set to be successful. Critical thinking, research, and evaluation skills are growing in importance as students have increasing volumes of information from a variety of sources to sort through (New Media Consortium, 2007). ICT is changing processes of teaching and learning by adding elements of vitality to learning environments including virtual environments for the purpose. ICT is a potentially powerful tool for offering educational opportunities. It is difficult and maybe even impossible to imagine future learning environments that are not supported, in one way or another, by Information and Communication Technologies (ICT).

When looking at the current widespread diffusion and use of ICT in modern societies, especially by the young the so-called digital generation then it should be clear that ICT will affect the complete learning process today and in the future. Authenticity is an important issue which should be addressed in the design and development of learning environments (Collins, 1996). Learning environments need to reflect the potential uses of knowledge that pupils are expected to master, in order to prevent the acquired knowledge from becoming inert (Bransford, Sherwood, Hasselbring, Kinzer, & Williams, 1990; Duffy & Knuth, 1990). In addition, teachers should stimulate pupils to engage in active knowledge construction. This calls for open-ended learning environments instead of learning environments which focus on a mere transmission of facts (Collins, 1996; Hannafin, Hall, Land, & Hill, 1994; Jonassen, Peck, & Wilson, 1999). ICT may contribute to creating powerful learning environments in numerous ways.

ICT provides opportunities to access an abundance of information using multiple information resources and viewing information from multiple perspectives, thus fostering the authenticity of learning environments. ICT may also make complex processes easier to understand through simulations that, again, contribute to authentic learning environments. Thus, ICT may function as a facilitator of active learning and higher-order thinking (Alexander, 1999; Jonassen, 1999). The use of ICT may foster co-operative learning and reflection about the content (Susman, 1998). Furthermore, ICT may serve as a tool to curriculum differentiation, providing opportunities for adapting the learning content and tasks to the needs and capabilities of each individual pupil and by providing tailored feedback (Mooij, 1999; Smeets & Mooij, 2001). As Stoddart and Niederhauser (1993) point out, ICT may fit into a spectrum of instructional approaches, varying from traditional to innovative. Another aspect which may of course influence the use of ICT is access to technology (Kennewell, Parkinson, & Tanner, 2000; OTA, 1995). This refers not only to the number of computers, but also to the placement of the equipment, e.g. in the classroom or in a computer room. Kennewell et al. (2000) feel it is essential that computers be placed in the classroom, in order to maximize the opportunities for curriculum activity. ICT environment improves the experience of the students and teachers and to use intensively the learning time for better results. The ICT environment has been developed by using different software and also the extended experience in developing web based and multimedia materials. ICTs have an important role to play in changing and modernizing educational systems and ways of learning.

The Key Challenges of ICT Integration in Basic Education

The integration of ICT in basic education may face various challenges with respect to policy, planning, infrastructure, learning content and language, capacity building and financing. ICT-enhanced education requires clearly stated objectives, mobilization of resources and political commitment of the concerned bodies. Tinio (2002) discusses issues such as analysis of current practices and arrangements, identification of potential drives and barriers, curriculum and pedagogy, infrastructure and capacity building to be considered in the formulation of policy and planning. In addition, it is wise to specify educational goals at different education and training

levels as well as the different modalities of ICT use that can facilitate in the pursuit of the goals.

Policy makers then, need to know the potentials of ICT in applying different contexts for different purposes. Other challenging points at the level of policy and planning are identification of stakeholders and harmonization of efforts across different interest groups, the piloting of the chosen ICT-based model, and specification of existing sources of financing and the development of strategies for generating financial resources to support ICT use over the long term. The infrastructure challenges that may exist are absence of appropriate buildings and rooms to house the technology, shortage of electric supply and telephone lines, and lack of the different components of ICT. Because of this, one need to deal with infrastructure related challenges before the planning of ICT integration to education systems. With respect to challenges of capacity building, we have to develop competencies of teachers and school administrators for the successful integration of ICT in the education system. In fact, one impeding factor of ICT integration in education system is the skill gap of people implementing it (Tinio, 2002). For instance, teachers need professional development to gain skills with particular applications of ICT, integration into existing curricula, curricular changes related to its use, changes in teacher role, and on underpinning educational theories such as constructivism/or student-centered learning. Because of this, any attempt of ICT integration in basic education should parallel with teachers professional development.

The school leadership also plays a key role in the integration of ICT in education. Lack of support from the school administration is also a big challenge. Thus, for the effectiveness of ICT integration, administrators must be competent and have a broad understanding of the technical, curricular, administrative, financial, and social dimensions of ICT use in education.

Furthermore, learning content and language also challenge the integration of ICT in education. Content development is a critical area that educators overlook. In integrating ICT in education, we have to care for the relevance of the learning content to the target groups. With respect to language, English is the dominant language in many of educational software, while English language proficiency is not high in many of the developing countries, and this is one barrier in the integration of ICT to education. Another great challenge is the financing. ICT in education programs require large capital investment and developing countries need to predict the benefit of ICT use to balance the cost relative to the existing alternatives. Potential sources of money and resources for ICT use programs suggested are grants, public subsidies, fund-raising events, in kind support from volunteers, community support, revenues earned from core business, and revenues earned from ancillary activities (Tinio, 2002). Overcoming the mentioned challenges may help basic education systems benefit the most from this technology.

Recommendations

In order to ensure that ICT are widely adopted and used in Nigeria's basic education (primary school system), the following efforts should be undertaken:

- 1) Government should ensure that ICT policy statements are achievable within the prescribed time frame taking into consideration the existing infrastructure.
- 2) Use of cell phones seems to be the most logical device to serve as a turnkey tool for initiating ICT in primary schools and possibly at secondary schools too at an affordable cost.
- 3) Helping school administrators and organizations involved in ICT implementation to adapt to new circumstances and providing tools and models to respond rationally to challenges posed by ICT projects in schools.
- 4) Providing information and communication facilities, services and management at a reasonable or reduced cost by eliminating taxes on cell phones, internet access as they have done on computer and its accessories to expand ICT uptake.
- 5) Encouraging improvement of the quality of cell phone services and products to increase its penetration by reducing the tax rates charged on mobile phone services.
- 6) Management of basic education institutes should train teachers to gain skills with particular applications of ICT and its integration into existing curricula.

Conclusion

The potential of ICT to motivate and engage pupils, students and teachers to help relate school experience to work practices create economic viability for tomorrow's workers, as well as strengthening teaching and school relation to technology has been reported in several studies. Applications of ICT in basic education have been reported to impact positively on teaching, learning, and research if carefully implemented. Despite the roles ICT can play in education, primary schools in developing nations like Nigeria are yet to adopt any form of ICT for teaching and learning. Efforts geared towards integration of ICT into the primary school system have not had much impact and it is still at a very rudimentary stage and hanging at the policy level. Problems such as poor policy and project implementation strategies and limited or poor infrastructure militate against these efforts.

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