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Abstract

The World is now a global village. This globalization experienced in the World today has been linked to the growth and development in technology and information dissemination. This technological revolution that has fast tracked globalization is the brain child of the industrialized world. The effect is being felt everywhere in the world, no matter how remote. A major aspect of the new technologies that has impacted on all is information and Communication technologies (ICT). ICT in its application consist of hardware, Software, networks, media for collection, storage, processing, transmission and presentation of information as voice, data, text and images. Mind set is defined as people's general attitude and the way in which they think of things and make decisions. This paper discusses the need for mindset applications of entrepreneurship in information and communication technology.

key words: Entrepreneurship, Mindset, Information, Communication and Technology.

Introduction

A major aspect of the new technologies that has impacted on all is information and communication technologies (ICT). ICT has changed how people live, work and even play (Berenfeld, 1999). It has made knowledge a very important fact of production. In the history of civilization, no work of science has so comprehensively impacted on the course of human development as ICT. It is changing every aspect of human life; communication, trade, manufacturing, services, culture, education, entertainment, research and development, national defense and global security. Therefore ICT knowledge appears to be entrepreneurship oriented. The phenomenon has given rise to the contemporary and advances in our ways of life and mindset too. Information and communication technologies (ICTs) have become key tools redirecting our mindset. Therefore it is pertinent that ICT has revolutionary impact on how we see the world and how we live in it and our mindset too. Iseun (2003) remarked that ICT is breaking old barriers and building new interconnections in the emerging global village. There is a great potential for significant improvement in our individual and national life as a result of the new technologies but our ability to benefit from technological advancement will depend on our mindset and the rate at which it is popularized in our society and used meaningfully in the education of our youths now and next generation.

The education process involves the learner developing the ability to purposefully access information from a variety of sources. He or She analyzes and evaluates the information and integrate it to construct personal knowledge base from which makes mindset intelligent decisions. In our present world which could aptly be described as an information age, this process cannot be undertaken effectively without mindset use of ICT especially in the area of Science, Technology and Mathematics (STM) that require the acquisition of special skills and competences.

ICT is having a revolutionary impact on educational methodology globally. The challenge for school systems throughout the world is that of providing an effective education for all children and young people which will prepare them for inclusive participation in the workplace, social environment, and political sphere and sports arenas etc. But unfortunately over 70 million children worldwide are not in school especially in Nigeria with 4% (UNESCO, 2010). Countless millions more are dropping out of school systems due to the seeming irrelevance of education to their lives (Ainscow and Mileš 2008). When and where will the Nigerian children mindset be on ICT? The major focus in educational system is to ensure that the products at all levels are functional productive contributing to the development of the society.

ICTs have introduced a new era in traditional methods of teachin offering new teaching and learning experience to both teachers and students Hence, the Nigerian education environment should take advantage of this capability to provide mindset easy access of information communication and technologies. This will provide the visualization of educational materials in an innovative and realistic manner. However, in our nation today it is obvious that this revolution in the educational system is not widespread and need to be strengthened to reach a larger percentage of our education system. In a complex society like Nigeria, many factors affect its ICTs use and integration in the educational system which must be addressed to ensure the needed socio-economic development of the country. This paper discusses the following:

- What is ICT?
- Advantages of using ICT for Training Teachers and students in Nigeria
- How the ICT mindset Affects knowledge Society.
- When and where ICT mindset should be provided in teacher Training institutions and schools in Nigeria.

Challenges Affecting the Complete provision of ICT Mindset

• Recommendations.

What is ICT?

Information and communication technologies (ICT) in its applications consist of hardware, software, networks and media for collection, storage, processing, transmission and presentation of information through voice, data, text and images according to (World Bank, 2002). Also Cox (1999), defined it as the study which involves the process of representing physical, hypothetical or human relationships, employing collection, creation, storing, retrieving, manipulation, presentation, sending and receiving of information as such. He went further

to refer ICT as electronic or computerized devices and associated human interactive materials that enable the user to employ them for a wide range of teaching and learning processes. According to FME (2009) ICT is the art and applied sciences that deal with data and information. It includes all equipment of computational machinery, computers, hardware, software, tools, methods, practices. Processes, procedures, concepts, principles and the sciences that come into play in the conduct of information activities like acquisition, representation, processing, presentation, security, interchange, transfer, management, organization, storage and retrieval of information.

Therefore, ICT is an indispensible part of the contemporary society. ICT has been with us but its application and mindset has been a matter of concern especially in developing countries like Nigeria. Advanced nations of the world have used ICT to a greater advantage. In education some of the technologies that are being used to enhance teaching and learning are radio sets, television, video

discs, computers, smart phones, e-library, virtual library, virtual classroom, virtual laboratory, podeast, webcast and etc.

The use of the new technologies requires skills and competences which must be acquired by both the teachers and students. The application of ICT in education will continue to grow and recent advances are likely also to increase their range and applications dramatically. Access to the tools will become a matter of critical importance and mindset for the schools and the science teachers. They will seek to become viable and effective in teaching their students. They will also provide them with adequate skills, capacity to live in a mindset technological oriented world.

Advantages of Using ICT for Training Teachers and Students in Nigeria

The history of the utilization of media materials in human communication started as far back as the Stone Age era where the surfaces of rocks and stones served as the medium for counting devices, communication devices and now visual information. This later developed to the use of the blackboard, chalkbo. rd and later printed materials which were combined with verbal communication. These were effective then because the teacher was the only source of knowled je and information. As new technologies were developed in the area of entertainment and information dissemination there were distractions in the classroom as student became restless so much that educators were challenged to research into other media of disseminating information (Shabani, Okebukola and Obanya, 2011). They remarked that the outcome of research to make learning interesting brought about technologies in the classroom.

There is no gain saying that ICT has had great impact on every facet of human existence in our world today. Education as a field of endeavor has certainly been influenced by information and communication technology especially in developed countries. The application of ICT in education has made significant impact on the quality and quantity of teaching, learning and research in the traditional and/or distance educational institutions using it. (Kwache, 2011) Institutions that encourage their teachers and learners to use ICT are more efficient and productive. ICT enhances teaching and learning as it involves the usage of a variety of tools to enhance and facilitate teachers' pedagogical activities through its dynamic, interactive, flexible and engaging content. According to Mohammed and Ekpunobi (2003), Otuka (2010) and Kwache (2011) suggested that the use of ICT in teacher training institutions like colleges of education and colleges of technologies will certainly do the following:

- First The second second
- The teacher develops mindset interest and confidence in his/her work.
- > It improves the teachers' mindset for handling of large classes.
- Teachers studying by distance or long vacation programs have access to information from their lecturers or other sources e.g. the internet.
- It enhances the quality of teacher education by exposing pre-service and in service teachers to resources and information beyond their immediate horizon.
- It provides mindset opportunities for teachers who might want to combine work and learning to do so at their own pace.
- It sustains mindset of lifelong learning.
- As a social process it enhances interaction and collaboration not only among institutions but also teachers either trainees or serving.
- Trained ICT school heads and managers will appreciate ICT requirements and support their provision.
- > It promotes the teachers' capability to carry out meaningful research.
- Trainees have the option to select learning materials that meet the level of their knowledge and interest.
- It helps the teacher to develop computer and other interest skills that are transferable to other facets of the trainees' lives.
- It promotes effective and efficient education.
 But the problem lies on the mindset implementation of ICT in all schools and colleges.

How Mindset ICT Affects Knowledge Society

The term 'knowledge society' generally refers to a society where knowledge is the primary production resource instead of capital and labor. It may also refer to the use a certain society gives to information: a knowledge society 'creates shares and uses knowledge for the prosperity and well-being of its people. According to Adams (2000), characteristics of knowledge society are:

• Its members have attained a higher average standard of education in comparison to other societies and a growing proportion of its labour

force are employed as knowledge workers i.e. researchers scientists, information specialists, knowledge managers and related workers;

- Its industry produces products with integrated artificial intelligence;
- Its organizations private, government and civil society are transformed into intelligent, learning organizations;
- There is increased organized knowledge in the form of digitized expertise, store in data banks, expert systems, organizational plans, and other media;
- There are multiple centre of expertise and poly-centric production of knowledge: and
- There is a distinct epistemic culture of knowledge production and knowledge utilization. The African Leaders in ICT (ALICT) shows four main pillars of a knowledge society in Africa. They are Education, ICT, Science and Technology, and Innovation.

Figure 1 shows African Leaders in ICT (ALICT) pillars of the knowledge society



Figure 1: African Leaders in ICT (ALICT) pillars of the knowledge society

At the 2007 continent-wide African Knowledge Economy Forum on Utilizing knowledge for Development, the pillars of Innovation and Science &Technology were considered to present a single pillar, which was referred to as Innovation (incorporating Science & Technology). With regard to education, lifelong learning is regarded as a requirement to keep pace with constantly changing global job markets and technologies. Figure 2 shows Mindset ICT as an enabler of the innovation and education required for development and sustenance of a knowledge society.



Figure 2: Mindset in ICT as enabler of the knowledge society.

It is important to note that ICT use in education and development to build a knowledge society is not simply about 'ICT literacy' i.e. learning to operate the technology but also about building higher order skills, such as knowing and understanding what it means to live in a digitized and networked society and use digital technology in everyday life. The growth of ICT networks alone will not build a knowledge society. Thus, ICT is a facilitator for major education and development reforms, but not a sufficient condition. If societies are to harness mindset ICT effectively to build knowledge societies, the implications are that there will be changing skill requirements for students and employees, as well as changing roles for educators and employers. For example, the growing importance of ICT has placed increasing emphasis on the need to ensure that learners and workers are information literate (including having higher order skills). Likewise, universities and employers are faced with a need to provide formal instruction in information, visual, and technological literacy, as well as in how to create meaningful content with today's tool. This requires education institutions to develop and establish methods for teaching employers to continue

to engage in training, mentoring, and professional development practices that achieve similar aims, but within the workplace.

As learners learn the skills of using ICT in education, the professional role of academics as mentors able to impact the wisdom that only experience can provide will grow in importance. Seen within this context of social transitions towards a knowledge society, UNESCO outlines the following as broad reasons for growth in use of ICT within education systems:

- Development of knowledge-society attributes in students, including higher order thinking skills, lifelong learning habits, and the ability to think critically, communicate, and collaborate, as well as to access, evaluate, and synthesize information.
- Development of ICT skills and competencies in students, as preparation for operating in an ICT-rich workplace and society.
- Resolution of structural problems and deficits in education systems.

When and where will mindset ICT be provided in Nigeria?

- According to Otuka (2012), as a matter of policy and urgency too, schools from primary, secondary, and tertiary whether private or public should be equipped with minimum specified number of computers in an ICT laboratory and be put into effective use for both teachers and students.
 - Government should take an active role in organizing awareness through media workshops and seminars.
 - Study tours and field trips at the national, state and local levels can a educational administrators on how ICT can support educ administration and how it can impact to classroom teaching and learning processes.
 - Government should collaborate with private sectors and NGOs to fund ICT in Nigerian schools.
 - ICT should be combined with more traditional technologies such as books and radio and be more extensively applied to the training of teachers.
 - Create mind ICT awareness and ensure universal access in promoting ICT diffusion in all sectors of national life.
 - Create mindset enabling environment and facilitate private sector (national and multinational) investment in the ICT sector.

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- Encourage government and private sector joint venture collaboration
- Develop human capital with emphasis on creating and supporting a knowledge-based society.
- Build a mass pool of ICT literate manpower using the NYSC, NDE, and other platforms as a train-the-trainer scheme for capacity-building.

Challenges Affecting Complete provision of Mindset ICT

The major challenges identified in the Teacher ICT training and Schools are:

- Internet users' penetration is still low at all levels of teachers' education. The available bandwidth is low and because of heavy reliance on private providers using satellites, the cost of access to the internet is high.
- Interrupted electricity supply or nor supply at all.
- > Dumping of obsolete hardware and software in institutions as donations.
- Low percentage of teachers who have ICT skills and the task of massive ICT training to correct and develop the huge human kind resources base at national and instructional levels.
- Poor funding from Governments, Federal, State and Local Governments.
- Lack of monitoring and evaluation.
- Phobia for technology on the part of teachers resulting in the poor utilization of existing facility.
- Most of the bodies that provide in-service training for teachers at Basic and Post-basic levels do not include ICT.
- ICT policy on Education not accompanied by a detailed implementation plan or commitment from governments to implement the policies. (Aspect of this is available in the Roadmap).
- Shortage of ICT professionals and lack of educators with ICT skills.
- ICT Equipment: Equipping schools and colleges with ICT equipment is expensive due to hardware and software purchases as well as the recurrent costs associated with maintenance and support.
- > Near absence or complete absence of ICT facilities in the rural areas.
- some instances, and in others there are no aids or support by the government at all (Albirini, 2006)

Recommendations

According to Otuka (2012), based on the discussion so far, the following suggestions were made.

- Africa is now on its way to be connected to the rest of the world through submarine optic fiber cables. I hope this will improve internet services and reduce cost. When this happens, teachers should be encouraged to make appropriate use of internet facilities.
- There should be awareness campaign at all levels as teachers' interest in ICT is low.
- Education Resource Centres in the state should be provided with ICT facilities that will be accessible to all teachers within the zone for practice.
- Intensive well planned in-service training for Basic and Post Basic teachers on ICT. This should be carried out in phases at local government, state and federal levels.
- NUC should design and provide the curriculum for B.Sc/B.Ed Computer science and the NCCE should revise the one for colleges of Education. ICT change fast.
- The policy should be specific on the minimum ICT qualification for teaching. The issue of International Computer Driving License as the basic minimum certification for literacy is not clear.
- Teachers may be more willing to participate in professional development activities if they become an important factor in their promotion exercise.
- ICT should not be restricted to a single course but should permeate at courses in the teacher training programs.
- Government should ensure that costs of connectivity, equipment maintenance and support are affordable for individual, institutions or ensure that there is provision to cover the costs centrally.
- Make ICT literacy a requirement for employees to the teaching profession and set deadline within which those already in the field should obtain the minimum ICT literacy certificate.
- Teacher trainees at all levels and their trainers should be directed to possess computers by the institutions authorities. (Loans could be arranged for them through the banks).

- The adoption of ICT international standards and its inclusion in the Nigeria curriculum and particular in the teachers' education curriculum.
- Continuous and periodic training of teachers on computers and ICT skills acquisition.
- Funding government at all levels should make ICT a matter of priority, provide the funds specifically needed for the training of teachers in computer education who shall in turn be equipped with ICT knowledge and skills to teach pupils/students computer and/or ICT basics.
- Above all, there should be an attitudinal reorientation of expected users of the ICT related facilities so that society will be in a better position to adopt new ICT innovations such as new pedagogical methods, access to remote resources, collaboration between individuals and groups of people in more widely diverse geographic locations, online experts and mentors, virtual learning communities, home/school communities. This is because cultural perceptions seemingly have a significant impact on a teacher's adoption of ICT (UNESCO, 2000 and Albirini, 2006).

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