

ICT: Opportunities and Challenges of Third World Tertiary Institutions

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Abstract

The challenges and profound opportunities of Information and Communication Technology (ICT) are quite unique and unparalleled in the world history. It is happening at an extremely fast pace; impacting all corners of the globe; ubiquitous in effect; unlimited by any natural laws or rules; multidirectional in revolution; insatiable in demand; its report is ear-splitting, gut-wrenching, jaw-dropping and heart-stopping. In this paper, we present the opportunities and consequential challenges it poses on the citadel of knowledge in the third world countries. We assess both the development of ICT and ICT for development of third world countries through universities as an unbiased agent for development in order to bridge the digital divide.

Keywords: John Dewey, Digital divide, Third world nation, Technology, Telecenter

1. Introduction

Amongst various technological advancements of the 20th century, the adoption and use of modern information and communication technology (ICT) the world over has been profound. Though the term 'information and communication technology' generally connotes 'The Internet', computers and email, this term actually denotes all forms of technology used in collecting, storing, editing and passing on information in various forms (Jager & Lokman, 1999).

The impact of ICT has revolutionized the way we conduct day to day activities. It has revolutionized a country like U.S. which was formerly an industrial society to an information society (Marcel J.D., 1999). Its level of adoption and implementation has affected the socio-economic echelon of nations world over. It has become a new means of factoring nations into developed or underdeveloped country. A wide valley commonly referred to as digital divide has been created. Bridging such divide has now become a major concern of third world nations as well as concerned organizations like United Nation Development Programme (UNDP) and New Partnership for African Development (NEPAD). They work in close partnership with key public and private sector players to craft comprehensive regional and country strategies and implements plans to help transform the digital divide into a digital opportunity for third world economy regions by connecting them to knowledge, experience and resources from across the region and around the world.

A report released at the World Summit on the Information Society by NEPAD in its Association of African Studies annual meetings, November 2004 identified a significant role for information and communication technologies (ICT) in strategies for African development.

2. USA case study

(Grupp & Maital., 2000) refer to Robert Solow's classic 1957 paper (Solow, R., 1956), where he showed how technical progress could be measured using a growth accounting framework. This source of growth analysis tried to determine what proportions of recorded economic growth could be attributed to growth in the capital stock, labor force and changes in overall efficiency. (Solow, R., 1956) attributed a significant part of the continuous growth in average incomes amongst certain countries like the United Kingdom, France, Germany and United States to technological progress. This method has been widely applied to analysis of countries and industries and in numerous cases, it has been discovered that the difference in capital per unit of labor amongst countries of different levels of development was not as significant as the difference in their level of technological advancement (Grupp & Maital., 2000).

In the 1990s, while the US banking sector experienced a 3.5 percent rise in value added per worker, overall labor productivity rose by less than half that rate (Grupp & Maital., 2000). (Grupp & Maital., 2000) posed the question: Why did labor productivity in banks outpace that in the overall economy? Was it because of massive investments in information and communication technology, or was it because of economies of scale (in part due to mergers, downsizing and improved efficiency). They propose a possible solution lying in (Solow, R., 1956) Solow's research. Here they made use of his findings that a majority of nations' economic growth was attributable to 'technical change', or 'total factor productivity growth', which he proposed measuring as a 'residual', based on a so-called 'production function approach'.

Consequently, ICT has been discovered to be an indispensable tool in the development process necessary for bridging economy divides between developed and underdeveloped nations. ICTs have the capacity to increase productivity, that is, to create more cost effective output with the same or less input (IICD, 1998). They also have great potential for expanding economic growth. They speed up transactions and as they develop and spread more markets, more goods and more services are created. In recent times, increasing emphasis is being placed on the importance of usable knowledge for development and the development of knowledge-based societies. In this realm as well, ICT has numerous significant prospects. It has the potential to ensure the widespread use and dissemination of information and thus facilitate information sharing and knowledge creation irrespective of geographical location or time. It is generally considered capable of creating earning opportunities and improving delivery and access to health and education. It also provides increased opportunity for transparency, accountability and effectiveness of government, business and non-profit organizations — all contributing to an enabling environment for development (United Nations Development Program (UNDP), 2002).

Two strategies were highlighted by NEPAD in realizing its objective. This includes dual strategies of ICT Development (ICTD) and ICT for Development (ICT4D) (Colle, R. D., 2004). (Colle, R. D., 2004) argued that universities in developing nations are potentially important players in both of these NEPAD strategies, and that the "eReadiness" of universities is a vital issue in [rural] development. The eReadiness of universities is clearly relevant to the global creation and distribution of knowledge – which, in turn, is a core challenge in the world's thrust toward the Millennium development goal.

(Colle, R. D., 2004) argued that colleges and universities are enduring entities in most nations, and the social role of the university historically has been to create, store and diffuse knowledge, a collection of activities that partially parallels some telecenter operations. Yet, few major programs link universities to telecenters as an institutionalized source of information, knowledge and training – the basic commodities of a telecenter.

(Jamus Jerome Lim., 2000) asserts that innovations that arise from ICT capital are supported by four main factors: the degree of ICT utilization, the level of ICT education, the amount of participation in innovative activity, and the existence of an entrepreneurial spirit and atmosphere. Rasiah argues that these are best captured by, respectively, the level of PC and Internet penetration; the literacy level and the number of science graduates; the number of scientist, engineers and technician involved in Research and Development; and the level of entrepreneurs and start-ups in an economy.

(Colle, R. D., 2004) and (Jamus Jerome Lim, 2000) reiterates the importance of university educational system in realizing the millennium goals as stated by NEPAD, hence the need to explore the opportunities and the obvious challenges it poses the universities.

It seems the future of ICT development in the third world countries therefore lies majorly in the hands of the academia. In response to this assumption, (Colle, R. D., 2004) reported that recently this relevance issue was raised when the National Alliance for Information and Communication Technologies for Basic Human Needs came into being in India and immediately set a goal of bringing all of the nation's 600,000 villages into the modern "information society" by 2007, the 60th anniversary of Independence and it was proposed that the agricultural

universities in India be explicitly included in the National Alliance. In reaction to this, the following terse response was received:

The universities have failed miserably in many respects. Most university faculty have no clue to life outside the campus nor have they any social concerns. Sorry for being very forthright or even blunt.

The same was reported of traditional university by corporate American society which led to exponential numeric growth in corporate universities. (Marcel J.D., 1999) reported that the corporate movement is occurring because U. S. higher education is not meeting the lifelong learning needs of workers in a changing economy.

There exists shared expectation globally from the entire stakeholders directly involved in educational sector- the students, lecturers, universities administrators and the expectant society. The students expects the university to be up to date with latest technology tools and expects the lecturer to be up to the task of impacting latest knowledge, the lecturers in turn expects the university to provide the latest information technologies for their research and teaching, while the (government founded) universities expects the government to release more money for educational funding as well as generating more fund by setting up satellite campuses, and lastly the expectant society and industries requires a more educated work force.

It must be stated emphatically that the third world educational institutions has failed woefully in meeting the technological demands of their immediate society and the society has lost confidence in the system. They wait too long and assumed their traditional mannerism of consumer of technological products. They are finding it increasingly difficult to fully utilize the opportunities provided by the ICT let alone contributing to the development of ICT. They have failed in learning from the history of American society that transited from agrarian society to industrialist and now transformed into an information or knowledge society by continuing reconstruction of experience as defined by John Dewey.

The standards of education as well as available educational facilities in most third world countries' universities are generally low. However, in the recent past, numerous governments have realized the critical role of education in development and are making efforts to improve the standard of education in their nations. In the same light, many are realizing the important role that ICT could play to foster this process. Though the adoption and use of ICT generally has been relatively slow in most African countries, where access to ICT exists, those in the education sector have been among the prime movers and shakers in its use and spread (Perkins, Snodgrass, Gillis & Roemer, 2001).

Consequently, institutions of learning across sub-Saharan Africa are making moves towards the development of information and communication technology systems and the incorporation of these in their programs. Nigeria, Egypt, Uganda and Tanzania are cases in point. The University of Dar es Salam, Tanzania has actually developed a comprehensive ICT master plan that is in line with its rolling strategic plan (Perkins, Snodgrass, Gillis & Roemer, 2001).

This was quickly taken into consideration by NEPAD and the question of universities' relevance to the world around them, and especially to the challenge of being an active player – “an anchor of a broad-based poverty alleviation strategy” in an increasingly Knowledge-based economy was raised. Five dimensions of what university eReadiness means were quickly highlighted; these include:

- (1) ICT facilities and network access for the university community;
- (2) Personnel available to support design and production of digital materials such as CDs, web pages and distance learning (training) packages;
- (3) Academic programs including field experience that prepare students for applying ICTs to community development;
- (4) University policies that apply to faculty participation in outreach programs New Partnership for African Development;
- (5) Respondents' ICT posture, for example, what is their disposition regarding the use and efficacy of ICTs in education and learning.

Based on their research and observing ICT and development initiatives around the world, an initiative to build the ICT4D capacity in a regional group of African universities was proposed the intent of which is to demonstrate the potential of universities as partners in such ICT-related development activities as community telecenters, and to persuade important policy-makers to factor universities into their ICT policies.

The components of the initiative, express as outputs, include:

- A consortium of networked east/southern Africa agricultural/technology departments/universities to collaborate with a North American university consortium in ICT-for-development programs;
- Creation of a university-based center of excellence (ICT Resource Centre) in east/southern Africa for supporting the university consortium's ICT activities including practical training, production of educational and training materials, collaborative research, and exchange of information, knowledge and experience;
- A model curriculum and learning materials for ICT-for-rural development academic and training programs, adapted to the learning culture of the participating universities;
- A cadre of trained ICT for rural development "champions" on the staffs of the participating universities, accomplished through collaboration with U.S. universities;
- An explicit policy and program at each participating university for recruiting students and in-service training candidates into ICT-for-rural development courses and workshops;
- A plan of action for establishing communication linkages among ICT policy makers in Government, faculty in universities, scientists in research institutes, agricultural enterprises, farmer groups and rural communities especially to promote development issues such as the Millennium Development Goals.

3. Array of Opportunities

IT-based teaching and learning has distinct advantages:

- Provides access to enormous quantities of information available through the Internet and on-line databases;
- Eases the limits of time and space for educational activities;
- Brings the best lecturers to students via multimedia so that "those of the best will drive out those of the merely good" ;
- Enables self-paced learning, sensitivity to different learning styles, and continuous assessment of progress;
- Makes the teaching and learning enterprise more outcome-oriented, which enhances the ability of institutions to stimulate experimentation and innovation;
- Increases learning productivity, especially in areas of "codified knowledge and algorithmic skills";
- Empowers students to have greater control over the learning process and benefits associated with active learning and personal responsibility.

4. Major Challenges

It was further observed that the major challenges faced by African universities include the following:

- technical obstacles to participation in increasingly global intellectual communities i.e. lack of technical skills or knowledge on how to use technological equipment amongst University staff and students;
- redefining the nature of quality within international and local contexts;
- lowering costs through economies of scale; increasing access and gender equity;
- positioning higher education as a responsible partner in building democratic society;
- unavailability or shortage of technocrats for servicing, repairing or installing of technical equipment.
- lack of financial resources for spares, replacement of equipment and purchase of software as well as specialized labor;
- challenges emanating from the presence of computer hackers, internet fraudsters and viruses;
- unavailability of technological infrastructure as well as equipment for information technology set up in some remote areas of the region;
- illegal access to data bases by unauthorized personnel.

However, it has been proved in many cases that economic and social development today are reflections of the ability to establish a synergistic interaction between technological innovations and human values, leading to a new set of organizations, institutions and life patterns that create positive feedback loops between productivity, flexibility, solidarity, safety, participation and accountability, in a new model of development that could be socially and environmentally sustainable.

The intent of this paper is to react to these much purported issues by many in the case of developing African and some other third world countries. As challenging as they are, there are many other inherent limiting “third party” African factors/problems that are undermining successful implementation of policies, effort and fund provided by multinational agencies.

The first one is CONCEPTION PROBLEM. The way in which ICT is conceived: as a private good instead of a public good; this makes ICT an important source of economic and political power for the government and cooperate ICT providers’ in most of these countries. The exploitative nature of the ICT provider is so alarming. They are justifying their actions based on the initial cost of setup.

The second one is the presence of commune economies in third world countries, which attract ICT investment and concentrate it only where profit and government support can be easily obtained.

The third is poor service delivery by cooperate ICT provider: an average GSM subscriber has used or uses at least two different provider’s lines due to unreliability and exploitative mind set of the providers.

Conclusively, civil conflicts (very frequent in third world countries) have an important effect in the Digital Divide as it can distribute information access following a political, religious or ethnic pattern, and at the end, it might even widen the gap rather than reduce it.

5. Proffering Solutions

The exponential growth and impact of technology on third world nations culture over the past few decades should compels educational institutions to reflect upon their foundational purpose-their philosophy of education as argued by John Dewey (1859-1952) (Dewey, J., 1987).

The philosophy of education that has the potential of addressing the needs of our time as observed by (Jager & Lokman, 1999), technological and otherwise would be an appropriation of John Dewey’s philosophy as it might apply to the current situation in some of the third world nations universities. There must be a paradigm shift.

A case can be made that in this era there are tendencies to reprise the educational philosophy in vogue in the last decade of the 19th century and early 20th century, namely, a subject matter orientation to education. The Progressive Movement spawned in the early part of this century was a reaction to the Traditionalism of the time. The Progressives, with John Dewey (1859-1952) as a philosophical hero, critiqued Traditionalism’s view of learners as passive vessels into which knowledge is poured (or forced into) for the learner’s own good. His writing on philosophy and education was prolific with over 5,000 pages in articles and 18,000 pages in book form (Dewey, J., 1987; Dewey, J., 1963; Boschee, F. & Schmoll, J., 1981) Dewey challenged this subject matter dominated view of education by promoting the idea that learners need to discover how to reflect critically upon their experience as well as on the subject matter presented to them.

He recognized that some proponents of Progressivism deserted subject matter entirely in favor of a student-centered, process approach to education. Dewey disavowed this dualistic view. He clearly valued both subject matter *and* educational process. Dewey’s passion for fighting against dualisms and “either/or” mentalities led him to write *Experience and Education* (Dewey, 1938/1963) in which he asserts that the interaction of subject matter and process is the art of education, and engaging the continuity of human experience is central to the art of living. Thus, very early in the 20th century, Dewey was pleading for holistic education in a world of increasing specialization.

In response to this challenge, the African Regional conference was held in the year 2005 where it was reported that African Universities and High Level education Institutions are breaking with outmoded traditions and embarking on major institutional and academic change, including new financial models, course structures, and governance practices. African governments increasingly recognize the value of these reforms in national development and poverty alleviation. Other factors promoting change in universities are processes of democratization, decentralization, and economic reform that grant greater autonomy to public institutions and hold them accountable. Among global factors helping to transform the scope of university practice and management, the revolution in information and communications technologies (ICT’s) is one of the most powerful (Nurturing ICT Research, 2005).

The fact of the truism is that many universities in the third world countries are under founded and because they are under estimated. Most staff, students and graduates of such institution are under equipped. These are supposed font for research and Information dissemination.

6. The Way forward

- “End to End approach” that has no “in-between”: The concerned multinational organization should form a force that direct monitors the successful implementation of project in various third world countries by deploying their staffs and use of un-biased academic font. Less or no support should be expected or solicited from local providers whose main aim is to milk the society dry;
- “Bottom-up” or “rural-urban” approach should be adopted in order to adequately bridge the digital divide between the rural and the urban centers. The implementation should start from villages to towns and then to cities. This will involve huge cost but this will save from cost of short cut. This must be done if we really want to bridge the digital divide in no time and experience rapid economic and educational transformation;
- Paradigm shift: There should be an all round reform in the educational policies and curriculum in secondary and tertiary institutions;
- Establishment of cooperate universities: Universities established by cooperate organizations towards meeting their technological demand and redevelopment of their immediate society;
- Adequate collaboration or exchange between cooperate and traditional universities;
- Adoption of John Dewey philosophy of education;
- Creation of competitive market environment for the telecom sectors;
- Facilitation of shared communication facilities, telecentres and co-operatives;
- Build greater human capacity for IT;
- Strengthen educational facilities at all levels of education and training.

Others as suggested by (Tarusikirwa, M.C., 2004) include:

- * Creating an enabling environment in the Information Society
- * Language and content development in the cyberspace: Africa language and content development
- * Indicator for Measuring and benchmarking the African Information Society
- * Industrialization of ICT in third world countries
- * Research and Development: There is a need to conduct research on selected critical issues related to the sector in order to review the current status, opportunities and challenges of ICT industrializations in Africa. In this regard, the African Academia Research Network can contribute significantly through research topics.
- * Lack of technical skills amongst University staff and students

In developing countries depending on where you are, computer literacy is hard to come by. Most lecturers have no access to computers hence lack skills on the use of the computer.

- * Shortage of technocrats

In Matabeleland North Region’s remote rural areas there are very few technical experts on information technology. Therefore the servicing of technological equipment is made very difficult. Computer and software engineers are not easy to come by. Generally, in Zimbabwe technocrats are moving away to “greener pastures” in developed countries, hence the shortage of such skills.

- * Lack of financial resources

With the current economic situation in Zimbabwe, most institutions are curtailed by the level of financial resources at their disposal. Technical equipment is now very expensive. A survey with suppliers of computers and computer accessories showed that most suppliers were out of stock for computers in late April, 2005. They were having difficulty in raising the required foreign currency to import the computer kits. The prizes of computers ranged between Z\$10 million and Z\$15 million. The prize of a printer ranged between Z\$6 million for a small office printer to Z\$8 million plus for a reasonable printer. Laptops were being quoted at Z\$40 million to Z\$50 million plus.

- * Computer hackers, internet fraudsters and viruses
- * Infrastructure and equipment

In Matabeleland North Region, there is scanty technological infrastructure. In some remote places there is no electricity and internet links. Technological equipment such as computers, computer diskettes, VCRs, CD-ROMS, audio and video cassettes etcetera is very expensive and scarce in developing countries such as Zimbabwe.

*Illegal access to databases

7. Suggestions for sustainability

(Roger Sell G., 1997) suggested that the experiences of the California State University System as contained in (Baker, W. J., 1994) and other institutions strongly suggest attention to conditions for successful technological applications and that the following should be carefully considered:

- Workshops, seminars, demonstrations, and travel resources that provide faculty with opportunities to examine and exchange viewpoints about the roles of technology.
- Time and support for faculty to adapt existing instruction and develop new instruction suitable for technology-based instruction.
- Faculty development and hands-on experiences in becoming proficient in the technical aspects of using technology and distance communications.
- Adequate recognition and reward systems for teaching with technology and in distance education programs.
- Infrastructures and technical support in place and working well.
- Serious study of student markets, programs, and courses that are best suited for distance education
- Developing an institution's distance education capabilities and the availability of high-quality materials.

8. Conclusion

In this paper, we have joined other authors in stating the importance of universities in the third world countries in the development of ICT for economic transformation of the region. Facts show the failure of the prevalent traditional universities in meeting socio-economic responsibilities of their immediate community due to technological, economical and moral in capabilities. Lack of readiness due to mis-conception of what ICT connotes was also mentioned as well as the need from paradigm shift taking into consideration the revolutionary impact it has on U.S.A economy. We suggest paradigm shift based on John Dewey philosophy of education. We equally support that telecenters constitute an important force in efforts to build an Information Society and to join the march to the Millennium Development Goals and strongly advocate for “end-to-end” direct monitoring of implementation of ICT projects using “bottom-up”/rural-urban move strategy.

Finally, we emphasize the inclusion of universities in the third world countries, as a valuable actors that create, store and diffuse knowledge seamlessly and therefore advocate for their eReadiness which would be made possible by adequate funding, training and empowerment.

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