ICT for Higher Education in Sudan: Issues and Perspectives

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ABSTRACT

Educational development and reform for any nation have always been characterized by the government's efforts to adapt education to national development needs. The heart of educational development and reformation, as in for developed and developing countries, has always been basic and technical education development with an aim to provide quality education for human resource development to meet the needs of the social, economic and political development of the country. The first section will conceptualize the role of ICT in developing economy and the global trends in ICT Practices, while the second section will give a brief of country profile, economic profile along with the impact of the peace agreement in Sudan, and will also highlight the present education system in Sudan stressing on the state of higher level education.

Keywords: ICT, Higher Education, Developing Countries & Education System.

INTRODUCTION

Information and communication technology (ICT) has become, within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education process, alongside reading and writing. Within the past decade, the new ICT tools have fundamentally produced significant transformations in industry, agriculture, medicine, business, engineering and other fields. They also have the potential to transform the nature of education-where and how learning takes place and the roles of students and teachers in the learning process.

ICTs have changed the nature of work and the types of skills needed in most fields and professions. While they have, on the one hand, created a wide array of new jobs, many of which did not even exist ten years ago, they have also replaced the need for many types of unskilled or low-skilled workers. These trends pose new challenges to educational systems to prepare students with the knowledge and skills needed to thrive in a new and dynamic environment of continuous technological change and accelerating growth in knowledge production.

ROLE OF ICT IN DEVELOPING SOCIETY

Information technology presents tremendous challenges and opportunities to society. The manner in which the country meets the challenge of information technology will largely shape its economic and social future into this century. A spectacular array of knowledge and information interchanges and processes lies at the heart of the information age. The capability of peoples and communities to be educated and trained in these new technologies is central to the appreciation and mastery of this new age.

The role of education and training aspects of ICT in capacity building & developing economy:

The challenges of the information age are not confined to any one sector but pervade all sections of society. Technological changes are leading to pressures on politics, work, education and social organizations. And these changes are going to force change as profound as that shaped by the industrial revolution, but at a much far faster pace. The question is not whether profound change will happen, but how our existing social structures will adapt themselves to these inevitable changes. The use of training and education will largely determine how these structures can deal with today's rapidly changing society.

Third World Nations need to develop an effective science, technology and innovation policy to spearhead this drive. Such a policy must be directed at specific actions such as research and the transfer, diffusion, rapid absorption and application of technology, with particular emphasis on the greater use of information technologies. In addition to the broad, societal needs outlined above, there are a number of specific sectoral needs of the information age.

Education it is clear that any society wishing to capitalize on information technology must invest heavily in education. Educational institutions must not only gear their efforts towards enabling people to master the complex and rapidly changing technologies themselves but also need to explore how such advances can be linked to, and influence, the wider business and commercial world. Degree, Diploma and specialized certificates programs, in particular, have a vital role to play in meeting the challenge ahead.

Training is a fundamental requirement of the information age. Countries coming to grips with competition and change in a dynamic and external environment should emphasize on more training. New entrants to the labor market must be trained in the skills and technologies associated with information technology, and existing public and private sector staff must be moulded to perform different tasks in a more flexible and innovative manner.

EDUCATION AND TRAINING FOR TECHNOLOGY

It has been argued by educationists and reformists that in striving to meet the wide ranging needs of IT, country's higher education system must maintain a strong diversity. Even vocational higher education is not that far inferior to university education. Society needs a broad continuum of graduates with different mixtures of knowledge and skills. It is required to have variety and flexibility in form, context, length, access and output. In this context, many students are taking the Private Technical College route specializing in areas of ICT and computers, which commands a very strong job opportunities in this sector.

Tertiary education can play a vital role in helping Third world Nations to exploit new opportunities in the information technology sector. Innovation, based on the application of science and technology, is now the mainspring of international economic competitiveness for any developing economy of the world.

Training should be seen as an investment rather than a cost and should be the focus of strategic planning like in most of the competitive economies. Training initiatives undertaken by developed nations bring many spin-off benefits to the wider economy, those having abundant natural resources and scope for development. The information age also requires emphasis on technical training to ensure that the labor force has the right skills balance.

GLOBAL TRENDS IN EDUCATIONAL ICT PRACTICES

As mentioned clearly by Middlehurst (2003) in his study on challenges and choices for Higher Education Institutions that increasing faith in the power of technology has seen an enormous increase in the use of ICT in education institutions world wide. This trend has further led the emergence of a number of non-traditional

HE providers competing for the student population among themselves, and with the traditional university.

Nowadays, the traditional university no longer has hegemony over the provision of higher education. In rising to the new challenge, it is turning to ICT to improve the quality of its operations, and also to reach for students in destinations beyond the traditional physical boundaries. At the same time the increasing use of ICT in higher education institutions is set within a context of wider economic, social, and political changes affecting countries worldwide.

Thus, the rationales and choices made by institutions for their ICT applications are influenced by a variety of macro and micro environments, and consequent perceptions of competition and the need for collaboration. Issues such as the digital divides, literacy limitations, financial constraints (largely developing countries), changes (increases) in student enrolment numbers (which is a global phenomenon), global technological developments, and competition between and among HE institutions and the emergent providers of higher education (global phenomena), are examples of the forces that drive change contexts (Middlehurst, 2003).

We can give examples from some countries that are also in process of implementing ICT in the higher education system for nation's growth:

AFGHANISTAN

Currently undergoing a large scale restructuring effort, Afghanistan has neglected its educational system because of recent wars and political instability. In this effort of gaining a centralized educational system, television sets are being sent to various villages across the country, and the aim is reaching students with educational broadcasting.

NEPAL

Nepal is an agricultural country that has an income per capita of less than US$ 250. More than four fifths of the population depends on agriculture as the main economic activity. The major ICT investment is the scholarships granted by the Ministry of Science and Technology to the unemployed youths

SUDAN: COUNTRY PROFILE

With an area of 2.5 million km^2, Sudan is the largest of African countries. Its vast size permits considerable variations in relief and vegetation: the north is a rainless desert; in the center there are wooded Savannah lands receiving monsoon rains ranging between 500 and 1500 mms annually; thick equatorial forests cover southern parts where precipitation reaches 1800 mms.

With strategic position in Africa, neighboring nine countries, and huge natural resources including the new discovered oil and gold and with the settlement of the southern Sudan conflict and the signing of peace agreement, the country became viable to receive financial and technical support from various donors.

ECONOMY OF SUDAN

Sudan's primary resources are agricultural, but oil production and export are taking on greater importance since October 2000. Although the country is trying to diversify its cash crops, cotton and gum Arabic remain its major agricultural exports. In recent years, the GIAD industrial complex introduced the assembly of small autos and trucks, and some heavy military equipment such as armored personnel carriers.

Extensive petroleum exploration began in the mid-1970s and might produce all of Sudan's needs. Significant finds were made in the Upper Nile region and commercial quantities of oil began to be exported from October 2000, reducing Sudan's outflow of foreign exchange for imported petroleum products. There are positive indications of significant potential reserves of oil and natural gas in southern Sudan, the Kordofan region and the Red Sea province.

In recent times, the government has worked with foreign partners to develop the oil sector, as a result of increased oil export, Sudan earnings from this sector have gone up from $500 million in 2000–01 to $1500 million at the end of 2005.

Some of the economic indicators of Sudan in recent years are presented in Table 1.

It can be observed from the above table that the economy of Sudan has improved over the years and with the recent peace agreement it will continue to stride in the areas of development.

SUDAN PEACE AGREEMENT

The government of Sudan and the Sudanese People's Liberation Movement (SPLM) in the South has signed a permanent peace accord, ending Sudan's 21-year civil war. This is a final comprehensive peace agreement. It is the culmination of a more than two years of intensive negotiations which was mediated by the regional Intergovernmental Authority on Development (IGAD). This peace agreement marked the end to 21 years of civil conflict that has claimed the lives of more than two million people and displaced four million more from their homes. A peaceful Sudan would serve as an engine for growth and breadbasket for East Africa once oil revenues and other resources are used for rebuilding infrastructure, economic development, and education.

EDUCATION IN SUDAN

Education is envisaged to equip recipients with knowledge and skills and assist to constitute human capital that empowers them to promote new values and to bring about change in their lives and in their communities. The educational system in the country therefore exercises a determining influence on the socio-economic and cultural development in the country.

On the other hand education promotes labor productivity growth and social development and spreads value and solidarity, tolerance social justice and environmental awareness for women, education in addition to its high private rates

Table 1. Sudan economic indicators

Indicators	1995	2000	2003	2004	2005
Current account balance (Billion US$)	-1.475	-1.84	-1.457	-1.366	-1.089
GDP based on (Purchasing Power Parity) per capita GDP (US$)	1295.69	1779.91	2025.334	2127.666	2220.681
GDP per Capita, current price (US$)	257.192	391.978	529.726	586.46	643.31
GDP current prices (Billion US$)	7.189	12.191	17.793	20.211	22.747
Inflation (Index, 1995=100)	100	501.05	613.142	652.996	692.176

Source: International Monetary Fund, World Economic Outlook Database, September 2005

of return, is found to be inversely connected with fertility and to increase child survival rates and better health.

The provision of basic education for all depends on political commitment and political will backed by appropriate fiscal measures public, private and voluntary.

As for higher education in a development setting:

As the nature and dimension of socio-economic and cultural factors have significant bearing on the quality of life of people, the search for solution for bringing about desirable improvement has been a continuing process in which the role of human resources development through education is duly emphasized.

The impact of development of human resources is intense and pervasive on all sectors of growth and is closely associated with the system of providing education and training. The effectiveness of the educational system is, however, primarily dependant on the availability of adequate finance to meet the requisite costs of the provision for the development of higher education and research.

The system of higher education, being chiefly responsible for preservation, generation and dissemination of knowledge and skills of the highest order, exercises a determining influence on the socio-economic and cultural development in the country. A World Bank report identified universities in developing countries as having three major roles:

a. Producing high level manpower to fill scientific technical, managerial and teaching job.
b. Carrying out research to generate knowledge and innovation relevant to the country's development.
c. Providing advisory services to assist development.

Noting that the principal output of higher education, are high level manpower, knowledge and innovation (research) and development advisory services, the World Bank identified number of hypotheses which can be reformulated in the context of Sudan. Higher education in Sudan had mirrored the different phases of economic and social change in the country.

The institutions of higher learning in the country, particularly specialized universities and colleges, have to use non traditional higher education infrastructures with a view of availing more efficient modes of learning. The installation of adequate infrastructures and intensive training of and the setting of knowledge information storage servers and date bases and e-learning platforms are mechanisms to serve that purpose.

HIGHER EDUCATION SYSTEM IN SUDAN

Higher education plays an important role in providing the generation with the necessary knowledge, values and skills to shoulder the responsibility of the overall development and to play their roles in different walks of life. Higher education provides the society with the intellectual, professional, scientific, educational, political, cultural and administrative personnel for development. It is considered the main tool for development and the more vivid source for scientific research.

Higher education is provided by universities, both public and private, and institutes and colleges of technical and professional education. The National Council of Higher Education is the government body responsible for higher education. Since 1990, many government universities have been created, mostly in the provinces. A few private tertiary institutions have also opened.

I. ***Main laws / decrees governing higher education:***
Decree: 1991 Higher Education Act Year: 1991
Concerns: Higher Education

II. ***Languages of instruction:***
Arabic, English

III. ***Stages of studies:***

- **Non-university level post-secondary studies.**
  University studies
  a) University level first stage: Bachelor's Degree.
  b) University level second stage: Master's Degree.
  c) University level third stage: Doctor of Philosophy.
  d) University level fourth stage: Higher Doctorate.

The National Comprehensive Strategy in the education domain:

In the field of higher education, the National Comprehensive Strategy has got concerned with realizing the resolutions of Education Revolution with the objective of achieving the following:

1. Revising higher education legislation and laws.
2. Increasing the number of higher educational institutions.
3. Qualifying of teaching staff.
4. Authentication of knowledge.
5. Encouraging scientific research related to the solution of the country's development, economic and social problems and linking the higher education with the environment and society.

EXPANSION OF HIGHER EDUCATION

The first half of the decade of the nineties witnessed the expansion of higher education through out the Sudan. The number of universities has increased from 10 in 1990 to 54 universities in 2005. Also public higher Institutions have increased from 7 in 1990 to 27 in the year 2005. The government of Sudan believe in the necessity of expanding higher education to meet the community demands and to reach international rates which in some countries reach 60 % of those in the age group 18 - 24.

ICT FOR HUMAN DEVELOPMENT & EDUCATION IN SUDAN

Despite the high tide of expansion in the field of ICT that shaped the international relations in today's economic and social life, resulting in unprecedented human advancement though out history of mankind, yet the benefits of putting to use ICT is not evenly realized by developing countries especially in Africa. This is attributed to a number of reasons, to mention a few, the non-preparedness of most of the countries in terms of institutional and operational capacities for running ICT system.

Sudan experience of the last two decades in building and capitalizing on ICT as a gateway for sustainable development is a landmark in Sudanese history. The experience tells how the institutional, legal and regulatory frameworks were reformed to advance ICT as tools for integrating the economy into the global market spheres. Moreover, staging a country, long been isolated and burdened by foreign debt, to new development horizons.

It is worth mentioning here that still the roles and functions of teachers in the standard classroom setting has not changed due to the traditional instruction methods used. The students are still taught through verbal instruction, and do not have the chance of autonomous hands-on execution of ICT possibilities. Moreover, as the curriculum undergoes frequent changes, the available software becomes insufficient, and the teachers are limited in terms of exploration possibilities.

Development in ICT in Sudan is represented by a gallant expansion of infrastructure and capital investment including management systems and human capital. Still areas pertaining to expanding the ICT markets in terms of product, distribution, quality of ICT products measured by their suitability to broader use, and affordability of the services.

Importantly establishing the link and measures with the economic and employment opportunities for individuals as well as society at large. These poses stubborn challenges to ICT advancement that would really support its expansions and reduce the risks of unguided competition that would probably lead to diminishing returns on investments and ultimately lead to crowding out effect of the actors adopting supply led strategy rather than demand pull strategies.

In view of the above, the UNDP is intervening to assist the government through its ICT institutions to collectively part sharing the interventions that promote ICT for human development and education. A process, which will assist formulating national strategy involving all stakeholders within the UN ICTD programme framework.

DEVELOPMENT STRATEGY TO NARROW THE DIGITAL GAP

ICT investment requires a tremendous amount of resources, particularly in the current period after the oil exploration in 2000. The program to narrow the digital gap should, therefore, carefully design and implemented. At least two primary concepts should be taken into account in developing the strategy.

Table 2

Program	Projects
Informatics Polices & Legislations	1- Drafting & ratifying Informatics & related Financial Legislations.
Establishment of a National Information Network	1- Drafting & ratifying National Information Network Law. 2- Design of Database and its Operating System. 3- The Interconnection of Local Networks. 4- Training.
Infrastructure Development	1- Creating the National Committee. 2- Development of Human Resources. 3- The Feasibility Study Model. 4- Network of National research Center. 5- Hardware Industry. 6- The Super Gateway. 7- Sudanese Silicon Valley.
Content & Electronic Publishing	1- An exploratory project in education content delivery. 2- A model Sudanese Cultural content.
Informatics Services	1- The program of the Digital Library. 2- Assessment of size of the present Information Services.

Source: Ministry of Higher Education and Scientific Research, January 2004

The first basic strategy is to make use as much as possible the existing domestic capacity, human resources as well as hardware infrastructure. For domestic connectivity, the strategy should be designed to capitalize from the existing communication infrastructure (fiber optic, copper, satellite, and microwave). Such concept will protect the higher education sector, as one of the social sector, from the technology's high obsolescence rate.

The higher education sector, collectively, is a large market for any domestic providers. Although the population who can afford using the ICT infrastructure is mostly between 40-50 years old, a substantial proportion of it does not possess adequate IT skill. Investing in younger generation, as a potential customer for the future is, therefore, imperative for ICT service providers. The future is not too distant either, since within 3 to 5 years they will be graduates and become an individual user, or even representing their employer to become institutional users.

The second basic strategy is to rely on the new paradigm concept, which has been chosen as the strategy for the national higher education development. The concept that rely on merit based tiered competition, user participation through proposal based competition, and higher accountability, is considered as the best suited strategy for higher education.

CURRENT DEVELOPMENT PROGRAMS

Knowing the fact that ICT capacity is an essential part of the future knowledge economy [World Bank, 2001], the Ministry of Higher Education considers ICT development at high priority. Within the auspices of the Ministry of Higher Education there are a few ongoing programs being carried out.

CONCLUSION

The Information and Communication Technologies (ICT) provide very forceful instruments to bring higher education to the Third World. However, as has been pointed out in several of the studies reviewed, "technology by itself is not a solution to any development problem; it only provides an opportunity." Further, "a thorough and wide-spread development in Third World countries requires "not only electronic communication policies and regulation but also social aspects.

In order to avoid being marginalized in the future knowledge economy, human development has to be a top priority for the nation [World Bank, 2001]. The ICT could significantly contribute to the nation in providing opportunity to conduct efficient, and yet quality, higher education. Although the peace agreement and the economic development has a tremendous impact to the national capacity to reduce the digital division, a careful, selective, and well-targeted ICT investment program for higher education is well justified.

The ICT could play an important role in higher education sector, particularly by providing the necessary infrastructure for improving quality in the institutions in the country. In addition to the domestic collaboration, collaborative activities among the neighboring countries could also boost efficiency. The higher education sector in these countries has many similar problems that collaboration in solving common problems is strongly recommended. The ICT could play an important role in providing support for the collaboration to happen.

One important and general conclusion is therefore that in order to get a sustainable impact upon the development process of Third World societies, the development of ICT in these countries must be supported both by technical and non-technical applications of relevance to the situation in which people in the country concerned live. Only then will the ICT structures created, contribute towards a development that will benefit the people of the countries in which the ICT is implemented.

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