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Social and Cultural Issues: The impact of Digital Divide on Development and How Satellite Addresses This Problem

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The impact of Digital Divide on Development and how Satellite addresses this Problem.

Introduction

The present-day East Africa has more member states than the former East African community, which comprised – Uganda, Kenya and Tanzania. The focus of this paper is to examine the factors have contribute to and /or sustain lack of access to education for the vast majority in the three counties. The paper will further examine how these factors in tandem with information technology have impacted education, and what developments have been made to close the gap.

Background

Like any other country in Sub-Saharan African majority of the people in East Africa live in the rural areas. Demographic[1] reports indicate that Kenya has about 31 million people but only 20% live in the urban areas. Uganda has 23.3 million yet only 13% of the population lives in the urban areas, while Tanzania, which is the largest and the most populated country in the region with a population of 35.5 million has only 25% of its population living in the urban areas (see table 1). East African countries have predominantly agriculture-based economies with 80% of the workforce employed in the sector[2] ("Kenya" 1998). Although the rural people are the ones who sustain the economies of these nations, they are the most economically, and educationally disadvantaged lot.

Access to Education

The origin of the Education upheavals in East Africa can be traced to colonial era as the colonialists concentrated development of schools in the urban areas. But the governments in the

region have no excuse for maintaining education systems which only favor and perpetuate elitism and social class for a minority (less than 20%) at the expense of the rest of the vast majority of the population in a country. Even in this time of information and communication technology upsurge, majority of the people living in rural areas in the region are faced with lack of access to education, electricity and telephone services compared to those who live in the cities. It is no wonder that East African counties have not yet realized much progress in socio-economic development since independence in the early 1960s. Poor governance, lack of democracy, corruption in the and by government leadership as well as bad education policies are some of the causes. There cannot be any sustainable development without mass education of the citizens, good governance, and information technology in a country.

Analysis of education indicators

Although the statistics[3] (see figure1) suggest that some progress has been made in primary school enrollments, universal access for education in the region is yet to be achieved. Furthermore, a closer look at these figures reveals disturbing trends. Gross enrolment ratios for primary level averages about 94%, secondary level about 24% but the tertiary is only about 2-5%. The net enrolment ratio for primary school level averages 25% less than the gross enrolment ratio, suggesting high dropout rates. Less than 50% of those enrolled in primary school go on to secondary school, with university net enrolment ratio being less than 2%. In 1990, for example, Kenya had only 7.5% of all high school graduates qualified for college and university but not all were absorbed into universities and colleges. Mwiria and Nyukuri, (1992) reported that the effective enrolment ration for that year was less than 2%.

Although some progress has been made in primary school enrolment level, generally gross enrollment ratios (GER) in all the three countries have been on the decline. In Kenya, GER[4] has been declining from 1990-1998 as indicated in **table 2** and figure 1. These trends are similar for all the three countries. Comparatively, Uganda's primary level enrolment has even improved more than in Kenya and Tanzania, from 87% in 1980s to 123% in 1997, although it dropped to 117% in 2000 [**source]**. This has only been possible due to drastic changes in the education policy and the overhaul of the education system. Elimination of fees for primary education greatly improved access to education for the poor. This helped in closing the gap between the rich and the poor, which for example, in 1992 was (82.1/51.1) but in 1999 it was only (85.1/83.7. Sadly to say, tertiary gross enrolment rate is 2 with [F/M] being (1/3). Source: www.worldbank.org/education/ . But the country has very low enrolment rations at secondary and tertiary levels.

The question is how can one talk of development in East African with such poor education statistics. Absence of mass education has seriously hampered development in East Africa and Africa as a whole. This is because education and knowledge play critical role in development. This central role of education in developments was underscored in the report of Independent Commission for Population and quality of Life (ICPQL) which clearly states that "education is one of the keys to social development, and virtually every aspect of the quality of life" (ICPQL, 1996:p170). In its recognition of the central   role of education in development, World Bank report states: Higher living standards, better health, increased productivity, improved well-being for women and their families and good government all depend on wide spread education. In an error of rapid technological change and international economic integration, an educated,

adaptable work force enables countries to prefer. The reverse is also true: countries without the labor force are likely to be left behind and shut out of this prosperity. Indeed continued lack of access to education and learning opportunities will continue to have devastating effects in this region.

Learning process in E.A seriously lacks behind and as (Botkin, Elmandjra & Malitza, 1979, p9) state, "such countries will be left behind leaving both individuals and such societies unprepared to meet the challenge posed by globalization of and failure of learning means that human preparedness remains underdeveloped." Emergency of new information and communications technology (ICT) has worsened the state of education in East Africa in particular and Africa in general. The educational crisis in East Africa has been exacerbated by the advancement in information technologies, where the majorities are being alienated because of digital divide.

The current state of education in East Africa should force educators and policy makers to ask the question: *what technologies are available, suitable, and affordable which can be used to provide easy access of education by majority of the people and to close the digital divide?*

What is digital divide?

The term "digital divide" refers to the gap between those people and communities who have access to, and can make effective use of information technology and those who neither have access to nor can they effectively use the technology. The pervasive use of computers in all aspects of everyday life underscores the need to address the digital divide (DD) in the region. This is because more than ever, unequal adoption of technology excludes many from reaping the

fruits of the economy [Source]). It is this aspect of information technology (widening social gap) that if DD is not addressed well and promptly, the gap between the different levels of digital divide mentioned above will continue to widen. But the group that will be most hit is the rural populations in the developing countries.

http://www.digitaldividenetwork.org/content/sections/index.cfm?key=2

East Africa, as a developing region, is faced with different levels of digital divide: (i) digital divide between E.A and developed countries; (ii) digital divide between and among the East African counties (and Africa as a whole); and (iii) digital divide within each country.

(i)   Digital divide between developed countries (DCs) and developing or emerging countries (D/ECs) exists mainly because technology is created and developed in and by the developed countries. Developed countries monopolize and control the flow of technology to the developing countries. The factors which determine which developing country gets what and how much technology from DCs is influence by such factors as strategic, political and economic vantage the DC gets.

(i)   Digital divide between among E.A countries is due to lack of bilateral and free trade agreements, as well as political hostilities between neighboring countries.

(i)   The third level of digital divide (DD) the one within a country between the elites or the rich in the country and the peasants. The elites who control the government make sure that they have the best education, communication

infrastructure and other social amenities at the expense of the rural people. The

analysis of digital divide in this paper is discussed in light of these three level

There seems to be a common thread connecting these levels of digital divide

and that is the economics. Regardless of where it occurs, digital divide is

strongly connected to poverty and wealth.

Information and telecommunication infrastructure

Access to education has greatly been improved by the use of information and communication

technologies which is founded on the augmenting relationship between computers and

telecommunications technologies. It therefore means that communication infrastructure that was

originally built for telecommunication such as terrestrial telephone line is essential. Infrastructure

has been defined to include "including telecommunications, broadcast, computer hardware and

software, the Internet and related human resources."(See

http://www.aau.org/engish/documents/aau_intreort-p12.htm p1).

Lack of wide spread terrestrial telephony infrastructure in East African is a serious problem to

the establishment and application of information technology in the region. There is very poor and

skewed development of telephone line connectivity in the region. In each of the three countries,

fixed communications services are limited to the major cities while rural areas where the vast

populations live have very little or no infrastructure at all. Although about 89 million people live

in the region, fixed main phone line are at the rate of 5 per 1000 people (source). Even where the

infrastructure is available, services are expensive, of poor quality, and unreliable (**Wanyeki

&Lukalo, 2000 source and page**). The poor or lack of development of communications

infrastructure has been perpetuated by state monopoly, poor policies, and over protection of telecommunications sector.

East Africa must develop its knowledge-based economy to supplement its agricultural economies lest it would mean (Farrell, 1997) further marginalization of these economies from the main stream global development. Presently, some of the negative forces included high license fees for new entrants, slow licensing procedures, high import duties, and failure to address high call charges. Michael Jensen (1999) noted that the high cost of local or long distance line usage, scarcity of intraregional links for traffic and relatively high subscription costs limited the potential benefits of the spread of Internet access. In addition, lack of democratic governance and political stability are keys elements in attracting foreign investors. Koos Bekker (1999) indicated the need to develop a positive environment which would enable private financing to provide the basis for Internet development. (http://www.aau.org/english/documents/aau-ictreport-p2.htm)

Why Satellite Communications Technology?

Given the limited information delivery systems and poor terrestrial communications infrastructure in the region, satellite communication becomes one of the best available means to meet the communication and educational needs of the masses in the region. As discussed earlier, the countries in the region have poor or lack fixed communications infrastructure, hence services are limited to the major cities while rural areas where the vast populations live have very little or no infrastructure. Satellite communication is most suitable in this situation because satellites have a vantage point. They can receive and transmit high-quality electronic signals almost anywhere on the earth (Flournoy, 2003). Also satellite communications does not demand extensive wire infrastructure in order to broadcast information. They can also be used for point-

to-point relays in support of communication among individual users, or for point-to-multipoint broadcast of audio, video or data aimed at vast audiences (Flournoy, 2003; Elbert, 1999). Such capabilities would enable rural communities and schools to get connected to the world of World Wide Web.

Satellites also hold great promise for Africa in insuring that its nations are not isolated from the global economy and in insuring that they are competitive in world wide communications network growth. Although in the short term it may appear that the use of satellite is short-circuiting the development of terrestrial telecommunication infrastructure, satellite is the only logical choice for immediate mass education delivery in the region.

Another powerful aspect of satellite communication network is the capability to deliver Internet content directly to the network's endpoint bypassing congestion within the network's core (Flournoy 2003). This is important for East African countries because the available terrestrial infrastructure is analog and connectivity is extremely slow. Therefore satellite services offer direct, quick and efficient means of communication for home users, schools and businesses by direct uplink/downlink to the satellite network itself. Developing countries like Kenya, Uganda and Tanzania have minimal wireless or wired communications infrastructure. Such countries can reap the benefits of satellite broadband services and their respective applications, by contracting with providers currently operating in the region. The cost and effort of installing 18-inch dish antennae on the roof of a school or learning center and paying a small monthly subscription fee will be affordable to some schools now.

In the long run, satellite services in the region will create the need and the means necessary for building terrestrial infrastructure. Using satellites in conjunction with computers and telecommunications creates powerful information delivery systems. Moreover satellites provide competition for the terrestrial telecommunication networks, thus improving services and lowering prices both for equipment and services.

Access to Equipment and Services

A distinguishing feature of the new information and communication technologies is the capacity to enable interactivity. From a learning perspective this is critical because it enables learning formats that were previously only possible in a face-to-face environment. They also permit interactivity both asynchronously as well as in real time, thus enabling learning independent of time and place to occur (Farrell, 1997). Even in the developed countries, access to the necessary appliances such as computers, modems, and voice and video conferencing equipment, is very uneven among socio-economic groups. If technology is to be effective in meeting learning-for-development needs, access to the necessary tools must be made available on a mass basis as a matter of public policy. Otherwise, the gap between those who benefit from the global knowledge economy, namely those in the more developed countries, and those who do not, namely those in the developing countries, will continue to widen.

Technical and policy Feasibility

Satellite technology is now feasible in East Africa and there is no excuse whatsoever for not using the technology to improve education in the region. The governments in Africa have finally realized the need for closer cooperation among the nation to any developments to take place. This realization has led them to join *Commonwealth of Learning* (COL). This organization to

which East African countries are members, according to Shrestha (1997), is an intergovernmental organization created by the heads of governments in 1998, to improve access to quality education and training by promoting the development and sharing of information, resources, and technologies. COL serves as an example of crucial initiative that crosses national boundaries. It helps in the is development of cooperative activities among countries and institutions and, by doing so, opening up new opportunities for sharing resources, widening access, and raising educational quality.

Each country has instituted privatization and deregulation of the telecommunications sector. This is commendable because it opens up the sector to competition, foreign investment, and new technology. Over protection of telecommunications sectors by the East African governments has done more harm than good. Lack of competition has led to poor service that is unacceptably expensive. For this reason there is need for further opening up of the sector will make the telecommunications industry more competitive. To lower prices and bring services closer to rural and marginalized populations (Lukalo & Wanyeki, 2000). Each country in the region, as a matter of urgency, needs a national telecommunications policy that addresses universal access to ensure the provision of basic telecommunications services to rural areas. Lukalo and Wanyeki state that the primary reasoning behind privatization and deregulation is that competition creates more and better services at reasonable prices.

The current level of deregulation of the industry is already bearing fruits as already attracted a number of satellite-based mobile and internet telephony service providers in the region. Now communication by phone is possible in the remotes areas of northern Uganda and the other neighboring countries. But advanced communications technology requires access to a reliable,

efficient, and affordable telephone line network which is lacking in these countries (Weidman & Ogot, 1997). This emphasizes the importance of and the need to use satellite communication to overcome these barriers.

Present and Future of Satellite Communications

Africa already has it own satellites and the ones that cover east Africa region include Intelsat, PanAmSat, Inmarsat, and NileSat. The Regional African Satellite Communications Organization (RASCOM) is responsible for organizing signal allocation and general satellite traffic control in Africa. As governments in the region have eased control over the telecommunications sectors (though not fully), mobile cellular providers have come in and it is now easier to communicate with people in the remote areas of the region. Gilat's very small aperture terminals (VSAT) technology provides instant infrastructure at low initial investment and low per-minute operating costs. Service providers are able to offer affordable rates. The success of VSAT networks in rural telephony and enterprise applications has prompted African education officials to embrace the technology. With auspices of World Bank, Gilat provides VSAT network that will bring broadband Internet access to the region.

Technology in Uganda goes wireless

Uganda's decision to take the lead by plunging into technology and the success it has made so far, challenges the other countries in the region to do the same. Uganda's success in using satellite communications to reach the rural communities and schools proves that the technology is feasible, affordable, and it works. In 1997, Uganda became the first country to participate in the World Links' project, a joint collaboration between the World Bank's World Links for

Development program (WorLD) and the non-profit World Links Organization. The goal for Uganda government and World Link and other organizations is help   increase educational opportunities in the remote areas of Uganda (p.2) and to bridge the digital divide between the rural and urban communities. Through this collaborative approach, in 2000 and 2001 thirteen high schools and one Teachers college geographically dispersed throughout 11 rural districts around the country received satellite connectivity and modern computer technology. These schools were given a satellite dish, TV and VCR for receiving regionally tailored education programs. In partnership Uganda government, MultiChoice provides free monthly satellite subscription for a educational programs.

The multilateral effort to connect Uganda's most remote schools to the Internet via VSATs began in January 2002 and is planned to continue through 2004.The first National Wireless Satellite-based school project was officially launched at Ndeje Senior Secondary School in Uganda. During the ceremony the Uganda Minister of Education said "the VSAT project will play a vital role in enhancing the strategic objectives of the Ministry of education, as a tool for achieving universal access, provision of equitable and quality education, and enabling effective communication to support decentralization". The World Link's VSAT (very small aperture terminals) project, which is sponsored by World Bank, is a part of ongoing global initiative to use innovative technology to bridge the digital divide. Installation of the Ugandan VSAT network represents a turning point for the rural communities in the country, since most of them do not have even the most basic telecommunications infrastructure. Certainly, the Wireless Satellite-Based Schools Connectivity Project underscores the importance and appropriateness of the technology as the step toward achieving mass education in East Africa. The partnerships between Gilat, national posts and telegraphic telecommunications (PTTs) and service providers

has enabled use of VSAT equipment for corporate networking applications, rural telephony, d Internet access and distance learning in Uganda. By engaging domestic partners, specifically Uganda Telecom Ltd and the Uganda Public Library Board, the international consortium was able to create a model that would help bridge the rural-urban digital divide in Uganda.

<div align="center">Conclusions</div>

The world is rapidly changing, different patterns of labor are emerging and pressures of the technologically driven job market now require people to continuously acquire new knowledge and skills. Therefore the current condition of education in East Africa calls for sound policies, appropriate education technology and commitment from the governments to improve access to education, reduce drop out rates a and increase enrolments in both secondary and tertiary level. Given the poor infrastructure, satellite communications will be the best approach as exemplified by the case of Uganda. It is through multifaceted and pragmatic approaches that the digital divide between the rural and urban, as well as between the less developed countries of East Africa and the more developed countries will be closed.

Table 1   Demographics

Indicator	Kenya	Uganda	Tanzania
Population	Kenya	Uganda	Tanzania
Total Population	**30669**	**23300**	35119
Education			
Adult Literacy Rate			
Male	89	78	84
Female	76	57	67
Primary School Enrolment Ratio (Gross)			
Male	89	129	77
Female	89	129	77
Primary School Enrolment Ratio (Net)			
Male	92	92	56
Female	89	83	57
Secondary School Enrolment Ratio (Gross)			
Male	26	15	6
Female	22	9	5

Source http://www.africandemographics.com/files/TanzaniaWeb.htm Retrieved 5/4/03

Table 11: Gross Enrolment Rates in ECCD by Gender (GER 1990-1998)									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
MF	35.4	35.0	33.7	35.0	35.1	35.3	35.7	35.6	34.9
M	35.8	35.3	34.0	35.6	35.4	35.8	36.1	35.8	35.5
F	35.0	34.7	33.4	34.5	34.8	34.8	35.3	35.5	34.3

Source: Ministry of Education and Human Resource Development.

Gross Enrolment Rates in ECD by Sex, 1990-1998
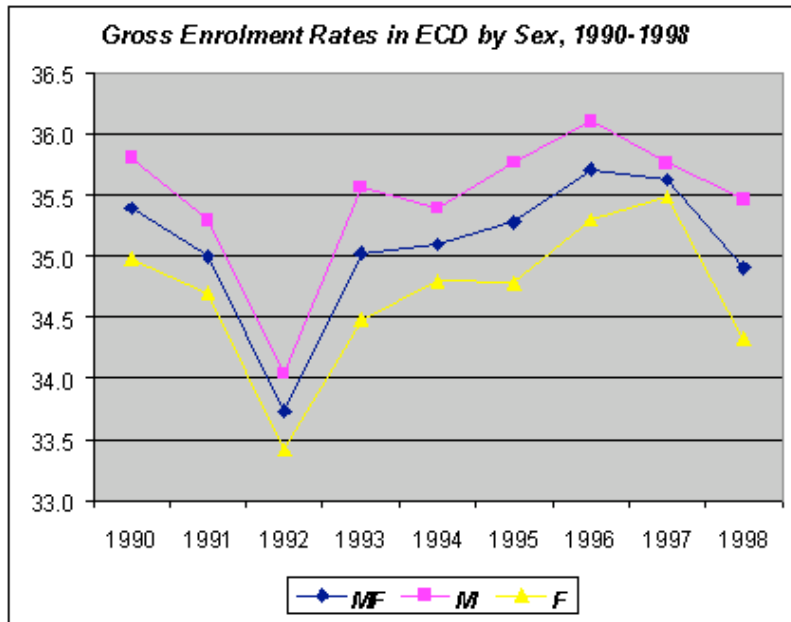
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