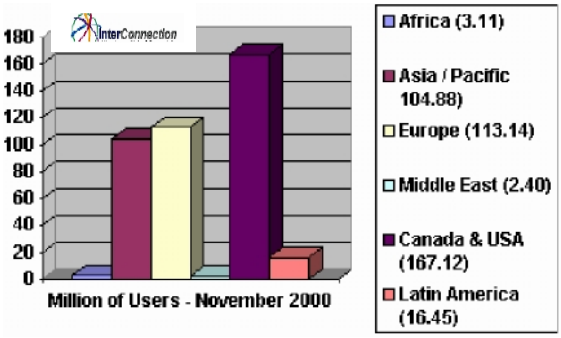
Crossing the Digital Divide: Strategies and Implications

The Digital Divide has been defined as "the gap between individuals, households, businesses and geographic areas at different socio-economic levels and their opportunities to access information and communications technologies". (Koss 77)



The global digital divide is a phenomenon which separates East from West and the fact that nearly 90 % of all Internet users are in industrialized countries, with the United States and Canada alone accounting for 57 % of the total, shows the extent of its existence today. In contrast, Internet users in Africa and the Middle East together account for only 1 % of all global Internet users. (ILO 2001) Less than 1% of the people in South Asia are online even though it is home to one-fifth of the world's population. Industrialized countries, with only 15% of the world's population, are home to 88% of all Internet users. (UNDP 1999)

Barely 6 % of the world's people have ever logged onto the Internet and 85 to 90 % of them are in the developed countries. (ILO 2001) This means that the remaining population in less developed countries is effectively invisible to the ICT revolution. The idea of providing equal accessibility to the digital world seems daunting given the fact that most of the people living in developing countries have never heard a dial tone, let alone sent an e-mail or downloaded information from the web. (Ulfelder 63)

Challenges to Internet Access

Tools necessary for crossing the digital divide and accessing the Internet include hardware and software as well as the cost of connecting to the Internet; an often significant on-going cost which is dependent on Internet service providers (ISPs) and their charges. Free ISP access is a growing trend, with projects like the Telecom Egypt's plan for free dial-up Internet access in Egypt being instituted in other developing countries especially those in Latin America. However, connectivity continues to be a considerable roadblock to many trying to enter the information super-highway.

The invisibility of the developing world is principally due to the lack of connectivity as the telecommunication infrastructure is uniformly poor or lacking in these areas. An ILO report has found that, "The level of national income is strongly related to ICT diffusion and is clearly the distinguishing feature of the divide between industrial and developing countries." (ILO 2001) The availability of telecommunications therefore is not a consequence of development, but an empowering force behind it.

The Impact of the Digital Divide

As the Internet helps to create new ways of doing business and communicating it also creates a disparity between the haves and have-nots, perhaps faster and more significantly than any other movement in history. However, there are valid questions about its social relevance in the greater scheme of things and the priority that it should be given development concerns. There are those who ask what good information and communication technology does for this disenfranchised population. There are those who feel that "you can't drink a computer" and that water is a much more important issue for those suffering from this sort of inequality or disenfranchisement. (Roach 2001a) The answer to these concerns is that it is not a trade-off of either/or but that ICT offers solutions; solutions that aid by supplying information to support health, education, and enterprise efforts. It can boost efforts to address the complex and more profound problems of famine, AIDS, infant mortality, and war related relocation problems. It can also supply information which can help to encourage gender equality, education and self-sufficiency. Rodrigo Baggio, the founder of Committee to Democratize Information Technology based in believes that "the computer is more than a machine. It's a tool that can turn poor and underprivileged people into active citizens" (Koss 80). Nelson Mandela echoes this feeling when he advises that advances in ICT "should be geared towards enhancing global citizenship and global economic prosperity." (Mandela 1995) Technology alone is not a panacea and ICT is not a magic bullet, but it can be part of the solution.

An example of this sort of solution at work occurred in Ecuador where farmers were suffering from a pest that was destroying their potato crop. They could get no answers from their Ministry of Agriculture, but after an ICT project director helped them post a message about the problem online, they got suggestions of strategies they could adopt to eradicate the pest and found a solution that worked within a day. They were able to save their crop and consequently their livelihood. Technology stirs economic progress; it raises living standards and improves quality of life. (Ulfelder 65)

Another social impact of the consequences of the digital divide is the effect that the lack of access to reliable communication and information technologies (ICT) and the resulting feelings of disenfranchisement have had on global security risks. The inequality of access can be dangerous as it can encourage frustration and feelings of powerlessness. In Somalia the one main ISP, has been closed down along with all the existing Internet cafes because of fears that the terrorist Al Qaeda network was linked to the Somalia Internet Company and the related money transfer business al-Barakaat. This has had a devastating effect on the Somali people as more than 80% of them are dependant on money earned outside the country and transferred via this service. (Barise 1)

The idea of spreading democracy using technology and thereby fighting terrorism has also been bandied about. Freedom of communication just like freedom of speech engenders democracy, which is one reason why totalitarian governments ban it. It has also been said that the frustration regarding lack of equality of access to the online world may have been a factor leading to the September 11 attacks. (Kirkpatrick 2)

The International Labour Organization reports find evidence of a higher level of Internet use where political and civil freedoms exist. (ILO 2001) On the other side of the coin, however, is the possibility that interconnectivity can bring with it opportunities to spread offensive ideologies and recruit followers, enable the transfer of illegal money, communicate about criminal dealings and encourage and enable the spread of pornography and gambling. Specific strategies will have to be developed to deal with these sorts of threats, as the spread of ICT is inevitable and there are clearly obvious benefits that come along with the risks that this access and interdependability allow.

What are some practical strategies for bringing about the benefits which come with ICT? How is this inequality currently being addressed and what are some strategies which empower people to cross this digital divide? What kind of bridge will we need to span this increasing divide, without allowing the smaller countries who cannot keep up with the effects of globalization to fall into the divide?

Tools which Empower

Hardware, software and connectivity are essential tools for entry onto the information highway. Because of the need for a small portable inexpensive device which would enable an affordable such entry, engineers in India designed the Simputer, a small hand-held micro-computer using the free open-source Linux operating system which sells for around $200. (Simputer 1) Refitted Sony Playstation consoles running Linux and Java and selling for around $300 are also relatively inexpensive ways to distribute hardware and enable more people to share in the world's information. The effort to distribute these devices which can utilize an 80 gigabyte hard disk is being led by 70 technology companies in the World Economic Forum. (Roach 1) The "Popular PC" or "Computador Popular" was developed by Brazil's Federal University of Minas Gervais. This device lacks a floppy or hard drive but has a 500MHz-equivalent processor, 64MB of RAM, an Ethernet card, a 56K modem, 14 inch monitor, sound and video cards, serial and USB ports, a mouse and a keyboard. Low-income households can purchase these for about $300. (Anderson 1) Shared devices that allow easy-to-use interfaces with sound, touch and audio are essential in order to reach all levels of the population in many cultures where literacy is still low.

Software is also an important factor in enablement. Free software sites are becoming more common. For example, Katim Touray has developed a website, FSDev.org specifically to provide this service to developing countries. ITrainOnline is another site which offers resources and training specifically geared to developing societies. (ITrainOnline 1)

Connectivity can be increased by using mobile networks and satellites. Mobile networks can reach quickly into regions where fixed networks are slow to emerge and they can bypass the often highly regulated state-run telecommunications monopolies. BusyInternet, an American-Ghanaian ISP based in Accra has avoided the country's infrastructure bottlenecks by putting in their own link to the national electricity grid, their own generator and a satellite dish for increased bandwidth. (Roach 39) The World Space

Foundation also bypassed the insufficient available telecommunications infrastructure by providing digital satellite broadcasts which link special radios connected to both adapter cards in a PC and micro-dish receivers to geo-stationary satellites which were then connected to the Internet. This is helping those in the Arid Lands Information Network-Eastern Africa who lack telephone lines. (ALIN-EA 1) Increasing accessibility to satellite communication is clearly an effective and efficient way to leapfrog over the digital divide.

Leapfrogging

Technology leapfrogging is defined as "The implementation of a new and up-to-date technology in an application area where at least the previous version of that technology has not been deployed." (Davison 2) This leapfrogging is inevitable and something that happens automatically; for instance, no one being introduced to a computer today needs to understand punch cards or mainframes and latecomers to technological development are actually sometimes better placed than those using older technologies as they are not hindered by investments in obsolete technology that they are reluctant to abandon.

The environment surrounding the development of new technologies must be coordinated internationally while being geared to local and regional differences in implementation of educational, financial, and social philosophies and policies. For instance, telecenters where access is shared are not only more economically feasible but the concept of sharing oral literature, information and telephones, where they exist, is part of many developing countries cultures. A recent study by eMarketer in Brazil found that the nation is home to 40% of South America's Internet users even though only 5% of Brazilians actually have Internet access. (Anderson 1) Clearly there are many people sharing one Internet connection.

Regional distribution of hardware and software has taken place via the use of elephants to deliver hardware to support the Non-Formal Education Department's work in Chiang-Mai Province in Thailand. (CNN 1) Camels are being used for the Camel Mobile Library Service in Kenya (Tate 1) and Discovery Inc. is responsible for the development of Donkey-Drawn Electro-Communication Library Carts which carry solar TVs and VCRs in Zimbabwe. (Ifshin 3)

Post-digital Literacy

Efforts towards delivering the hardware and software and connecting populations to the Internet may be increasing but the factor that is even more important in this enabilization effort is that of how ICT will be integrated into the lives of those who had not been a part of the earlier technological revolutions. This effort is crucially important. The inequality in IT resources can be dealt with by various methods of supplying the hardware, software and communication needs but these measures in themselves do not solve other adaptation concerns. It is inevitable that ICT will spread to all regions of the globe, much as television and the telephone have, but the imposition of this new and

potentially interactive technology opens up the question of post-digital literacy and that of the necessity for evaluation of the information provided via the Internet.

Leapfrogging in literacy and the philosophical problems related to education are necessary in the same way it is necessary for the developing populations to leapfrog over DOS and 5 1/4 in. diskettes. They will also have to use the newer currently unfolding methodologies of engaging with the new technologies. For instance, it is no longer so crucial to know whether a person is right or left-handed since technology eliminates these differences, because both hands are now necessary to write on a keyboard. (Ferriero 58) An integrated approach is needed. You can put computers in all the schools, but you must also train the teachers in post-digital literacy. The social context for the introduction of ICT will have to be developed and a synergy between the new context and the technology must not be embedded to the detriment of the current society. (Davison 5) This paper does not intend to tackle the debate surrounding the concept of globalization or even the ethical dimensions of a seemingly Western imposition of technology into areas that have not yet adapted to this technology upgrade. The attempt here is to see how those willing to jump on the ICT bandwagon can be accommodated. Cultural values interact with technology in ways that give strong indicators of the degree of acceptance or rejection of programs and these patterns influence the speed of the social adaptation.

According to Paulo Freire, the great Brazilian philosopher-educator, literacy has always been seen as a positive value in the modern world as this ability to reflect and act allows human beings to fulfill their destiny. It allows one to act with intention upon the literate world, to allow one's inborn ontological vocation to lead to a new sense of dignity and happiness. (Freire 20) He has stated that literacy is a key to breaking a hidden cultural code—a key to a future which includes socio-economic benefits. Computer literacy further provides an additional key into a virtual world with unknown and expanding potential.

Literacy and education cannot be bypassed, as both are vital for reaping the greatest advantages from the emerging digital era. We need to leapfrog over some of the old educational philosophies since many of these only deal with ways to interact with older technologies using older methodologies, however, we do want to retain whatever traditional methods will still be applicable in the new digital world. The promotion of education, literacy in general, and digital literacy in particular, is a challenge facing all countries. (ILO 2001) New methods of education and literacy must go along with the technological leapfrogging that is taking place as educational reform is inseparable from social reform. (Finlay 61)

Paulo Freire states that consciousness is intentionality towards the world, the awareness that the world is not a massive presence to which one can only adapt but a scope or domain which takes shape as one acts upon it. Every human being is capable of critically engaging the world through "praxis" a dialectical unity of reflection and action. (Friere 13) So, when one engages in reflection, perhaps even upon interacting with a computer screen and mouse pad and then acts to transforms the world---he/she is in effect "naming the world". (Friere 61) This is a humanizing activity where people are

humanized via dialogical encounters as opposed to being educated using a "banking mentality" which begins with a false understanding of people as objects without the ability to reflect and act where a teacher, or even a computer, deposits information into the minds of passive receiving students much like you deposit money in a bank. They have information imposed upon them in an oppressive way which removes the ability for them to reflect and then act. (Freire 46-7) Following Freire's philosophy, the introduction of new technology must be handled in such a way that it is not seen to be an imposition but something that can be "named" and as such become part of the "world" of the learner.

The capacity to create knowledge rather than merely receive and remember it is affirmed in Sugata Mitra's Hole-in-the-Wall experiment which displays technology leapfrogging by placing some of the newest technological tools in the hands of barely literate Indian children. (Mitra 2002b 3) They grasped this technology by interacting using Mitra's "minimally invasive" educational technique. A computer was provided via a hole in the wall of the NIIT (National Institute of Information Technology) building which faces out on a well-used path leading to a public garbage dump and toilet area.(Mitra 2002a 1) The users who were attracted to this computer monitor were mainly the children who were not used to interacting with any type of technology and who had trouble finding pencils and paper to draw or write with. Mitra claims they achieved base level "computer literacy" defined as the ability to use the mouse, to point, to drag to drop to copy and to browse the Internet, almost instantly. Mitra feels that, "there ought to be a kind of learning where the learner decides what the outcomes should be, and how they should be met. As adults we often do that, but we don't expect our children to do that, and we often don't allow them to do that". (Mitra 2002b 2)

The adults who saw the computer wanted to know what was going on. They asked, "What's this thing for?" and they asked where the teacher was who was supposed to teach them. Mitra feels the teacher's job is very simple—it's to help the children ask the right questions and to facilitate. The bonus is the ability to employ Friere's concept of Conscientização (critical thinking) in order to effect change in one's world. Does this minimally invasive concept of letting subjects teach themselves amidst peer discussions work? This sort of experiment is clearly not a total solution but it may provide a clue in effective methods of introducing the benefits of IT. Emilia Ferriero says that, "There are children who access written language through magic, a cognitively challenging magic and children who access written language through "basic skills" training. By and large, the former become readers, and the latter functional illiterates. (Ferriero 60) If Mitra's methods work they can be a pragmatic way of bringing a "cognitively challenging magic" to reality.

Both Paulo Freire and Sugata Mitra saw that once the tools of literacy and computer literacy opened the world, the future was boundless and they only needed to facilitate the learning by answering the questions that emerge.

Freire says that the educator must be "imbued with a profound trust in man and the creative power of humankind. To achieve this he must be a partner of the students in

his relations with them. A parallel can be drawn here with the experience that the famous former slave Frederick Douglass had. His master said to his teacher “If you teach that nigger how to read the Bible there will be no keeping him”. Well, Douglass did learn to read and indeed he was not kept but entered public discourse with a vengeance. (Finlay 69) Perhaps the same thing can happen to these children of Kalkaji who learn by using the Hole-in-the-Wall and others around the world who approach this new frontier enabled by ICT advances and post-digital literacy methodologies.

Responding to change is extremely important for the survival of humankind. This applies to the effort to close the divide. It will widen if the appropriate strategies and applications are not implemented in a timely way. Then the group on the less privileged side of the divide will find it harder and harder to cross to the other side. We need to see strategies put into action which will allow a post-digital literacy, one that both Freire and Mitra would approve of, to take place using the current tools of technology. We also need to make sure that the divide between the haves and the have-nots does not become one of knows and know-nots.

As Nelson Mandela once said, "If we cannot ensure that this global revolution creates a world-wide information society in which everyone has a stake and can play a part, then it will not have been a revolution at all." (Mandela 1)

Works Cited

Akst, Daniel and Mike Jensen. Africa goes Online. Digital Divide Network. April 29, 2002. <http://www.digitaldividenetwork.org/content/stories/index.cfm?key=158>

Anderson, Rachel. Low-cost Computers for the People. Digital Divide Network. April 29, 2002. <http://www.digitaldividenetwork.org/content/stories/index.cfm ?key=178.>

ALIN-EA Digital Satellite Broadcasting. Arid Lands Information Network-EA. April 29. 2002. <http://www.alin.or.ke/data/technologies.htm#5>

Barise, Hassan. US Shuts down Somalia Internet. BBC News. April 29, 2002. <http://news.bbc.co.uk/hi/english/world/africa/newsid_1672000/1672220.stm.>

CNN Student News. Teachers Reach Students by Elephant. CNN.com/Education. April 29, 2002. <http://fyi.cnn.com/2002/fyi/teachers.ednews/01/24/elephant.tutors.ap/>

Davison, Robert et al. Technology Leapfrogging in Developing Countries-An Inevitable Luxury? EJISDC (2000):1.5. 1-10.

Ferriero, Emilia. Reading and Writing in a Changing World. Publishing Research Quarterly. (Fall 2000):16.3 52-62.

Finlay, Linda Shaw and Nathaniel Smith. Literacy and Literature: Making or Consuming Culture? College Literature. (June 1991):18.2 53-69.

Freenet Africa Foundation. FreeNET Africa.org. April 29, 2002. <http://freenetafrica.org/bin1/public.html>

Friere, Paulo. Pedagogy of the Oppressed. Harmondsworth. Penguin, 1972.

ILO. International Labour Office. World Employment Report 2001. Life at Work in the Information Economy. Geneva, ILO. 2001. Also available at: <http://www.ilo.org/public/english/ support/publ/wer/index2.htm>

Ifshin, Gail. Digital Divide Africa. FDCH Congressional Testimony. 5/16/2001.

InterConnection. Internet Statistics. April 30, 2002. <http://www.interconnection.org/background/statistics.htm>

Koss, Fabian. Children Falling into the Digital Divide. Journal of International Affairs. (Fall 2001):55.1. 75-91.

McLaren, Peter and Peter Leonard, Eds. Paulo Freire, A Critical Encounter. London, Routledge, 1993.

Mandela, Nelson. TELECOM 95 Opening Ceremony 3rd October 1995, Geneva Arena. April 29, 2002. <http://www.sn.apc.org/sangonet/technology/nmteleco.html>

Mitra, Sugatra.(a) Hole-in-the-Wall. April 24, 2002.<http://www.niitholeinthewall.com/>

Mitra, Sugata. (b) Non-Invasive Education: Street Children and the Internet in India. HvA Teacherslab. April 29, 2002. <http://www.teacherslab.hva.nl/transcripties/html/mitratrans.html.>

Norris, Pippa. Digital Divide; Civic Engagement, Information Poverty, and the Internet Worldwide. Cambridge. Cambridge University Press, 2001.

Roach, Ronald. G8 Passes International Digital Divide Plan. Black Issues in Higher Education. (8/16/2001):18.13. 32.

Roach, Ronald. High-Tech Center to Open in Ghana. Black Issues in Higher Education. (9/13/2001):18.15. 39.

Roach, Ronald. Reconfiguring Devices to Narrow the Digital Divide. Black Issues in Higher Education. (8/2/2001):18.12. 35.

Simputer Website. April 29, 2002. <http://www.simputer.org/simputer/>

Tate, Thelma H. Camel Library Services in Kenya. The Hague. IFLA Professional Reports, 2002.

Touray, Katim. Fsd website. April 29, 2002 <http://www.fsdev.org>

Ulfelder, Jay. Into the Breach. World Link. 15.1 Jan/Feb 2002 63-66.

UNDP Website. Poverty Facts.< http://www.undp.org/idep/povertyFacts.html> Accessed April 30, 2002