

INFORMATION, COMMUNICATIONS AND EDUCATIONAL (ICE) TECHNOLOGIES FOR THE DEVELOPMENT OF ACCELERATED PARTICIPATION IN THE INFORMATION ECONOMY

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*“Knowledge-rich countries and regions are ‘fast’ economies where decision-making is accelerated by access to information through information technology and communications...Knowledge-poor regions are ‘slow’ economies because they are the poorer regions of the planet, from the third world to the post-communist East, (they) continue to build economies based on cheap labour, raw materials, or clunky smokestack production, **the future will pass them by** (emphasis added).”*

Alvin Toffler & Heidi Toffler “Economic Time Zones: Fast versus Slow”
in the New Perspectives Quarterly, Fall 1991, p. 56.

I. INTRODUCTION

This paper is one of a series offered by the LearnLink Project, which is funded by the U.S. Agency for International Development (USAID) Global Bureau Center for Human Capacity Development and other USAID Bureaus, offices and Missions, and is operated by the Academy for Educational Development (AED). In creating LearnLink, USAID acknowledged the ever-growing role of information, communications and educational (ICE) technologies as tools for social, economic, and political development throughout the world.

The LearnLink Project responds to expressed needs in the developing world that benefit from the creative use of appropriate technologies in strengthening educational systems, building democracy by making government better able to provide information and services, and encouraging participation in the global Information Age economy.

This series of concept papers is designed to provide readers with an introduction to technology-assisted models and interventions that have proven successful in a variety of conditions throughout the developing world. Each paper includes a description of the model or intervention; its goals, functions, and capabilities; requirements for successful implementation; lessons learned from previous projects; and resources for further study.

Most of the technologies and interventions described in this series have a wide range of possibilities for implementation, while remaining within the definable scope of the model.

This paper discusses the Community Learning Center (CLC) model, a concept aimed at addressing the overwhelming lack of access to ICE technologies within the developing world. The basic premise of the CLC model is that individuals and communities receive direct and sustained benefits from reliable access to information resources and educational programs available through computer mediation and electronic networking, including access to the Internet.

Unlike other models for the diffusion of ICE technologies into markets, communities, organizations and regions, the CLC is focussed on developing the capacities of a wide, yet clearly defined, user segment which serve as diffusion and market generation accelerators.

II. THE CHALLENGE OF THE INFORMATION AGE IN THE NON-INDUSTRIAL WORLD

At no time in history has the role of information been deemed more important to global political, social and economic development. When Paul Revere made his historic ride through Lexington, Mass., his simple communication changed the course of history. In the Information Economy, more and more people have access to the tools and the skills to change the course of history in their work, businesses and communities. Now more than ever there is a heightened awareness of how timely, accurate and relevant information can help strengthen democracy or transform political regimes, make education and training more effective, improve health care delivery and other social services, and build vibrant communities and economies.

In 1994, for the first time ever, more personal computers than television sets were purchased in the United States. The computer, formerly a device used only by scientists and academics, has become a consumer appliance. This has created a fundamental shift in how we learn, communicate and do business. The Information Economy is now the most dynamic and compelling economic sector in the global economy. More Gross Domestic Product (GDP) is carried on telecommunications lines than moves across the North American highway system and that of most of the industrial world.

Most of the world, however, has yet to experience the impact of industrialism. When the American sociologist, Daniel Bell (1973)¹ first described the shift to the “Post Industrial Society” in the early 1970’s he was signaling a change in an economic trend that had embraced the *industrial* world for more than two (2) centuries. In Africa and much of Asia and Latin America, the Industrial Revolution has yet to hardly be experienced in much of the business, work and human activity that is carried out in communities.

ICE technologies represent a “second chance” for a new global economic model of balanced social and economic development to occur. The “Wealth of Nations” no longer depends solely on land, labor and capital. Knowledge and information, mediated by communications technologies, assumes greater preeminence in what constitutes and generates wealth. And through ICE technologies, the world has come to be a much more interdependent set of communities and markets. Speaking to the 4th European Forum on Teleworking in Rome, in 1994, a Hungarian Ecologist expressed it this way:

¹ Bell, Daniel. The Coming Post-Industrial Society: A Venture in Social Forecasting New York, Basic Books, 1973.

“The bus driver in Bonn makes \$20/hour. In Moscow, he makes \$2/hour and in Kampala .20/hour. But now, because of telecommunications technologies, they all know about one another and increasingly, they all want the same things.”

In the last 35 years there has been a proliferation of new technologies that are making it increasingly easier, faster and more economical to gather, store, process, analyze and share more information with more people in more places and at prices that are within greater reach. Because of its speed and the accelerated exchanges it induces, the increased capacity to communicate or exchange information now goes hand in hand with more productivity and greater wealth.

Computers (essentially data storage and processing machines) and telecommunications technologies (essentially data transfer tools, such as satellites, fiber optics, increased capacity copper wiring, and networking software and hardware) are heralded as the cornerstones of the new Information Age.

In developed economies and societies the “model” that has enabled a vast segment of the population to participate in and benefit from this information and communications phenomenon is based largely on personal acquisition and ownership, as well as individualized access in the workplace. In developed economies and societies the norm is for individual households to have telephone lines, cable television, satellite dishes, and personal computers. Dramatic drops in prices of these types of technologies relative to the average household income in developed economies has enabled this model of personal acquisition and ownership to be established. And in these economies, in many cases where individual ownership is not yet attainable, access to the technologies is provided in the workplace.

In contrast to this developed country model, personal acquisition and ownership, or even workplace access to technologies in the developing world, is far from feasible for the overwhelming majority of the population. The “whirr” of the laser printer, the repetitive “click” of the keyboard and the tone of the digital phone can hardly be heard in most offices of the developing world, even in the capital cities. But this is soon to change.

Accordingly, three key challenges present themselves. And, as always, these challenges bring with them tremendous opportunities.

LIMITED INFRASTRUCTURE

Developing countries are characterized by limited and often poor quality electrical and telecommunications infrastructures. Comparative studies indicate that large gaps exist between developed and developing nations in areas such as household connection to an electrical grid and teledensity (telephone lines per thousand population-see Appendix A for some comparative data). Where access to an electrical grid and telecommunications services is available, often in capital cities and their immediate peri-urban areas, such services are frequently unreliable and of poor quality.

While the challenge of unreliable infrastructure is a compelling one, there is a corresponding opportunity. The fixed investment outcomes of end-of-product-life cycle infrastructure that still constrains innovation in much of the developed world is seldom to be found in Africa, and much of Asia and Latin America. These very-same regions that are backwaters of modern infrastructure represent an opportunity for the development and commercialization of entirely wireless systems build on new ICE technology appliances.

In much of the developing world, where telephony exists, there is one hand-held wireless appliance for telecommunications. The annoyance and the unproductive capital, operating and transaction costs associated with multiple appliances, numbers and systems which confounds industry and government in the developed world is nowhere to be found. Like the Social Security number or driver's license number in the United States, in much of the developing world, their first telephone number may be the only one people ever have.

In the developing world, while consumer computing has hardly developed, it is increasingly based on common-use access to technology and infrastructure. The lower-cost, peripheral telecom appliances of the industrial world will be re-invented in the developing world. New hand-held devices will emerge and new forms of local and global connectivity are already emerging, and at lower cost due to "green-field" infrastructure opportunities and freer market and regulatory circumstances.

In the Republic of South Africa, the Universal Service Agency (USA) was established by the Mandela government in 1996 with the conclusion of the Information Society and Development (ISAD '96) Conference in Johannesburg in which Vice President Al Gore and former Secretary of Commerce, Ron Brown, represented the United States. The USA is now an established institution in South Africa. Its mandate is to develop common

standards, business models and marketing mechanisms to generate more than 6,000 telecenters in that country.

The official policy of the Government of South Africa is now that each of its more than 50 million citizens should be no further than a ½ hour walk to a telecenter, or CLC. More recently, at the Building the Information Community in Africa (BICA'99) conference in Pretoria in February 1999, the Deputy Director of the Ministry of Communications stated that the government is now considering policy that will provide every citizen with an email address at birth. With one innovation in policy formulation, a compelling mechanism for a new "push" technology will be created.

LACK OF TRAINED HUMAN RESOURCE BASE

Since the Information Age has been introduced more slowly in the developing world, the human resource base needed to sustain the technologies upon which this age depends is underdeveloped in many parts of the world. This is somewhat of a "catch-22" – the human resource base cannot be adequately developed without access to the technologies, and access cannot be granted or extended beyond relatively developed urban areas without an adequate human resource base to support the technologies.

The dynamism of the Information Economy, however, is outstripping the capacity of many of the established post-secondary institutions in the developed world to train and certify people with the skills to navigate its opportunities. In response to this, the product-specific certification systems of industry giants such as Microsoft, Oracle and Sun represent mechanisms to shorten the distance between learning and application.

In Uganda, the country with arguably the lowest teledensity in the world, an NGO called Uganda Connect takes young people with no prior certification off the streets. Using a "train the trainer" approach, it trains young people from Kampala to type, word-process, do spreadsheets and to use email and the Internet. The only obligation on the part of these young people is that they sign a contract whereby they agree to train another young person to develop the same skills at no cost. The bitter-sweet testament of the project founder, an American from Arkansas, Daniel Stern, is that he loses people from the program too quickly as they are offered jobs in business, government and educational institutions.

In East Africa's first telecenter (CLC) in Nakaseke, Uganda, a young graduate of the Uganda Connect training program is now the technical leader introducing ICE technologies into a community which has not had telephone access for more than 10 years. Just several hundred meters away, a new Primary Teachers' College, financed with the assistance of USAID, will be the likely, albeit unexpected, beneficiary of what this young man **knows** how to do. Like the graduates of the Microsoft, Oracle and Java industry-certified training programs, those who participate in the Uganda Connect program need have no prior knowledge, experience or certification. Like their counterparts in the developed world, they need only aptitude, commitment and a work ethic. In Uganda too, the distance between learning and application has been shortened.

COST

Costs of many of the technologies germane to this age have decreased dramatically in recent years, with concurrent gains in power and ease of use. As is generally understood within the ICE technology sector, costs are reduced by 50% and the performance of these technologies doubles every 18 to 24 months. Relative to average household incomes in the developed world, these technologies have become affordable. However, the costs of many of the basic technologies, such as personal computers, computer software, telephone and Internet access, and interactive multimedia CD-ROMs, are still well beyond the means of average households in the developing world, particularly when customs and duty charges on imported goods are added.

For these reasons, the developed world model of personal acquisition and ownership of technologies that facilitate access to and participation in the Information Age will not be replicated in the foreseeable future in the developing world. In Dakar, Senegal, there are more than 3,000 "telecenters". In this context, the government owned telecommunications provider, Sonatel, leases telephone and fax equipment to entrepreneurs who place it in a small shop and provide access for a fee to call services.

In Yogyakarta, Indonesia, in the middle of a ceramics producers' small business "cluster" of 159 firms, there is a small shop called the "telecommunications depot". Every one of the businesses in this cluster has the same telephone and fax number and the revenue from the use of the service is sufficient to employ a full-time attendant who assists with outgoing services and takes messages for incoming communications. Increasingly in the capital cities of the developing world, telephony and gradual access to informatics is

being introduced in affordable ways for those who understand the need and have the resources.

Rural areas are a special cost challenge but they also represent new opportunities, as well. BushNet, is a small Internet service provider in Kampala, Uganda. It provides email and Internet searching services to far-flung plantations, religious congregations and other clients using an HF radio-based store-and-forward technology. Deep in the countryside in northern Tanzania, the Sengerema Regional Development Association has collaborated with the Tanzania Commission on Science and Technology to propose the development of a telecenter in this outpost rural market town. Their idea is to reduce the entry-cost of access to ICE technologies by introducing “charge by email” pricing. The price point they have selected for an email? Roughly 60% of the price of a postage stamp! Should they succeed in what they have proposed, the Roman Catholic Church construction brigade will build the telecenter on land donated by a local businessman. After three (3) years, with proposed start-up investment from ITU, IDRC and UNESCO, their business plan brings them to sustainable financing.

III. THE COMMUNITY LEARNING CENTER MODEL

The telecenter movement is preoccupied with spreading and sharing new tools and capacities for living, working, and learning. It is a fundamentally distributive, as opposed to an acquisitive, institution and process. It relies upon common-use access to new information and communications technologies within an organizational culture where informal learning, cross-coaching, and skill fusion are the rule, not the exception. The driving force behind community learning centers is to spread the benefit of empowering new technologies. (Richard Fuchs, 1997)

Like many phenomena born of the Information Age, the Community Learning Center is a concept known by a variety of names. Identified as a community resource, learning or technology center, telecenter, telecottage or cybercafé, the goals and functions of this evolving concept differ more in degree than in kind. The model, as described here, applies to a broad range of facilities. Its defining features, however, include the following:

- central access by community members to telephony and computer services;
- a funding/pricing strategy tied to the goals of local economic development, diffusion of skills to a broad cross-section in the community and long-term sustainability through a variety of mechanisms.
- a commitment to supporting formal and informal educational opportunities within the community; cross-sectoral learning services to support diverse social development entities; and
- a commitment to enhancing the political enfranchisement of the community.²

PRIMARY CLC “MARKETS” AND AUDIENCES

What distinguishes the CLC/telecenter “model” from other approaches to the introduction of ICE technologies in social and economic development is the approach it takes to horizontal, rather than vertical, markets in the developing world. In fact, the CLC model’s most compelling impact, when it succeeds, is that it is a “**market maker**” or

² There has been no standard definition of a “telecenter” or CLC even by those who have been professionals in this area for some time. Perhaps the most constructive discussion of this issue can be followed in a series of email exchanges in the IDRC “Lyris Telecenter Listserv”. Originally introduced and moderated for IDRC by Richard Fuchs, a consultant to LearnLink, this listserv has been operating for a year and one half and can be accessed by contacting ftulus@internet.idrc.ca.

accelerator in places where ICE technologies, when they are available at all, can be accessed by only a privileged few.

Since the very first CLC/telecenter in Velmdalen, Sweden in 1985 to the adoption and modification of this model in development communications in many parts of the world today, the most compelling legacy of these CLCs is that they accelerate participation in the Information Economy among a broad cross section of the community. In the pre-market circumstance, which characterizes almost all rural areas and large segments of urban populations in the developing world, the entry-point for participation in the use of ICE technologies is still many years away, if market forces alone are expected to generate the demand. Lester Thurow, Professor Emeritus of Economics at the Massachusetts Institute of Technology made reference to this when he wrote, the following:

“Capitalist infrastructure can only be built behind or slightly ahead of the market.... The Internet could not have been privately financed, the usage wasn’t there, would take twenty years to develop... But, in the end, a social investment in infrastructure provided the means for developing an exciting set of new private industries.”

Lester Thurow, Economic Community and Social Investment, in The Community of the Future, 1998, p. 22

The CLC model represents a social investment to create a “diffusion effect” for the adoption of ICE technologies in a horizontal cross-section of “pre-markets” or audiences in the community or region. Its purpose is not, in and of itself, to create an “enterprise” of the services that it offers, although this can be an outcome. Its purpose is to generate demand and diffuse skills sufficient for small business, local government, the education and NGO sectors to become self-directed and self-sustaining in the Information Economy.

Geoffrey Moore of the Chasm Group, arguably the world’s most successful technology marketing consultant, spoke to the JAVAOne conference in San Francisco in the summer of 1998. His remarks about how technology firms should approach marketing to segments of the market place were quoted in a web-report of the event. Speaking about how technology firms should consider their approach to “back-of-the-market” segments, Moore is quoted as having said *“Forget the late adopters and laggards.”*³

³ Geoffrey Moore, Speaking at JAVAOne, San Francisco, June 1998 as reported in http://java.sun.com/javaone/javaone98/keynotes/moore/transcript_moore.html

What Moore is asserting doubtless makes good business sense. The time-to-adoption decisions among late adopters and laggards is a long and expensive one. Providing access, raising awareness and undertaking campaigns for diffusion can be time-consuming and expensive propositions. Given that fact, are most of Africa and much of Asia to be without the social and economic benefits of the Information Economy because their technology adoption circumstance is at the back of the innovation curve?

The “social investment” prescription favored by Thurow seeks to trigger market demand, entrepreneurial familiarity and institutional adoption of ICE technologies. This is exactly the effect of the successful CLC model in “back-of-the-market” communities. The principal “pre-markets” or audiences that the CLC seeks to animate, enable and support include:

SMALL BUSINESS AND THE ICE TECHNOLOGY HIERARCHY OF NEEDS

Richard Fuchs, a consultant to this project, has described that small businesses go through, what he refers to, as a “hierarchy of needs” in what attracts the entrepreneur to use ICE technologies. While many projects assume that it is the Internet that should be the lead service provision in introducing ICE technologies, small businesses generally need to go through several steps before they can even consider the use of network technologies.

While not all business either need to or in fact migrate through all four (4) of these hierarchical steps, Fuchs and others have observed the progression with hundreds of small business people. The “hierarchy of needs” for the diffusion of ICE technologies in the small business sector include:

- *Access to facilities* - In many “back of the market” communities, most small business will never have used a computer. The very first step is to peak their curiosity as to why they might want to try using the technology and facilities. This could be producing a sign in Power Point for the weekly specials at the local store, drafting the first spreadsheet of sales for the month, typing and printing a letter or sending a fax.
- *Using Information* - Many businesses, and not just those in the developing world, seldom actually engage in “information-seeking behavior” associated with their enterprise. They rely on informal sources such as relatives, bankers and sales

agents to help them form judgements as to what they might do or how they might change their enterprise. Before moving on to use network technologies, businesses first need to come to learn the advantages of using information in their everyday business decision-making.

- *Network Services* - Once the business has come to understand some things about how to use the facilities and has become reacquainted with the use of information, the person is now ready to be introduced into the use of network tools such as email, the Internet and the World Wide Web.
- *ICE technology Business Startups* - Having gone through the first three (3) steps of progression associated with this hierarchy, some businesses will come to start ICE technology enterprises themselves. This is an important sign of success for the CLC. Once this does occur, the CLC needs to ensure that it is enabling and supporting the new enterprise rather than competing with it.

Community Learning Centers are a natural stimulus for the creation of information-based businesses.⁴ Among the likeliest to develop are: import of information products; local word and data processing; database creation and management; travel service; financial management and investment; and news/press services.

The majority of technology-based businesses have a longer trajectory for reaching financial stability and profitability, as the demand for their services may have to be created within a community previously unfamiliar with them. Whereas traditional businesses realize the efficiencies offered by the new ICE technologies immediately, information-based companies must invest greater resources initially with the hope that they can engender a market.

MUNICIPAL OFFICES

Community Learning Centers support democracy-building efforts by strengthening the means by which municipalities distribute information and provide services.

Municipalities utilize the centers to: distribute information and forms for routine functions

⁴ Canada's remote Southern Labrador telecenter was responsible for the creation of a multimedia company, Labrador Software Ltd. The Clarenville telecenter takes credit for the development of 15 different information and network-based companies. (Fuchs, Op.Cit.)

such as licensing and registration; distribute information about electoral candidates and provide a forum for community discussion; increase the efficiency of inter-agency communication; distribute information electronically to a community's diaspora; and receive and send information from small communities to regional and national offices.

In the industrialized world, there are numerous examples of municipalities that have established robust community networks, accessible both within and outside the community. In the United States, some of the most successful have been in rural and disadvantaged areas, including Big Sky Telegraph (rural Montana), the Ozark Regional Information Online Net (southwest Missouri), Prairienet (east-central Illinois), the Panhandle (northern Idaho) and the La Plaza Telecommunity (Taos, New Mexico.)

EDUCATIONAL ORGANIZATIONS

A Community Learning Center that functions as a central learning resource will evaluate its effectiveness not merely on economic terms, but on the basis of its success in promoting increased learning within the community. To that end, CLCs offer services to support both formal and informal learning for individuals of all ages.

In this capacity they serve as a site at which individuals can participate in distance learning opportunities from global sources; bring into the community the vast educational resources - primary, secondary and tertiary - available through the Internet; bring external experts into the community through a range of technologies, from telephone and fax to email and videoconferencing; connect educators and administrators to central administrative offices in a more efficient manner; facilitate participation in regional, national and international projects; make community members aware of project funding opportunities; provide professional development opportunities to educators; provide on-site training in technology to educators, administrators and students; facilitate inter-library loan arrangements; provide robust database search capabilities; and provide a library of on-site educational materials, both electronic and traditional.

In Nakaseke, Uganda, the CLC/Telecenter there has provided support to the local primary and secondary teachers' educational "cluster". Now teachers can go to the telecenter and obtain resources like color printouts of maps for use in classroom geography instruction. In Sengerema, Tanzania the Nurses' Training College would like to be able to access the CD-ROM, "*The Human Anatomy*", to assist with its training program. Until recently, as well, they had no idea how to load the operating system for

the desktop computer that had been donated to the College. They expect the proposed CLC/Telecenter will assist with this and other useful services that help the College's transition to introducing more educational technology into the curriculum.

The National Institute on Postsecondary Education, Libraries, and Lifelong Learning has identified the following questions, by which a CLC should set its standards (Humes, 1996).

- What does a lifelong learning community-based education community look like?
- Who is involved?
- Does the lifelong learning community of today differ from the community of the future?
- Which are we planning for?
- How does the societal climate for learning differ among communities?
- How do communities view their learning opportunities beyond those provided by traditional schooling (K-12 institutions and postsecondary colleges and universities)?
- What are the enhances and barriers to the development of lifelong learning communities?
- What community coordination and cooperation is needed to stimulate and enhance lifelong learning?
- What training and education is needed for community leaders to understand the economic, social, political and personal benefits of investing in lifelong learning opportunities?
- What will it mean (financially, economically, and socially) for the community to increase the number of adults engaging in lifelong learning?
- What does a virtual (electronic) community look like and what is the role of the Community Learning Center in its creation and existence?

The fundamental benefit of a Community Learning Center does not rest in specific educational offerings, but in the ability of the center to change the way in which community members see the world and their place in it. The impact of access to

medical databases on CD-ROM, for example, was described by Helga Patrikios, Deputy University Librarian at the University of Zimbabwe:

Unquestionably CD-ROM databases...have brought about a rapid change in the information seeking behavior of our users; unprecedented rapid and easy access to current and archival journal literature; and an increased awareness and documented increased use of the journal literature. We believe, however, that the most significant and valuable outcome of this service has been the growing awareness in its users of a range, literally a world of otherwise unknown information sources. It has been by far the greatest force for progress in information access that our users have experienced (Patrikios, 1996).

To some extent, the role of a Community Learning Center can be viewed as an extension of the traditional role played by a public library in the developed world. In the United States, government policy has established libraries as key players in the effort to make available computers and Internet access to those who can not afford to pay for personal access on a consumer basis. In rural areas and the developing world, CLCs can fill this role as a communal resource, serving as meeting place, information exchange center and professional development site.

Unfortunately, little research has been conducted concerning the delivery of education through libraries and other community-based organizations and therefore there is inadequate understanding of its full potential impact. (Humes 1996)

NON-PROFITS, NGOS

Community Learning Centers provide capacity-building services to non-profit and non-governmental organizations, which generally operate with minimal resources. The average NGO lacks the wherewithal to secure independent Internet connectivity. They may also lack the budget for other fax, reproduction and computer equipment.

Community Learning Centers allow them to: participate in international initiatives; link with other local, regional and national organizations; create and distribute more effective outreach materials; access professional development opportunities; and create operational efficiencies.

Given their close relationship to the community, their small size and corresponding need to network and communicate and the information intensity of their work, many NGOs' are prime targets for the successful adoption and subsequent diffusion of ICE technologies. On the down side, NGOs are often least capable of maintaining the

ongoing capital reinvestment and operating costs associated with the type of service that can enhance their capabilities considerably.

INTERNATIONAL AND NATIONAL ORGANIZATIONS

Currently the number of communications-based initiatives being launched by international organizations is increasing exponentially. Multilateral funding organizations such as The World Bank, UNESCO, the Inter-American Development Bank, the United Nations Development Programme and the European Community have made long-term commitments to major programs that either target directly, or rely indirectly, on information and communication technologies. National bilateral funding agencies, such as USAID, have likewise established telecommunications as an organizational priority. Among the long-term initiatives which have been established to promote information access within the developing world are Canada's International Development Research Centre's Acacia program and Pan Asian Networking (PAN) initiative; USAID's LearnLink Project and Leland Initiative; the World Bank's InfoDev Project and the United Nations' Sustainable Development Networking Programme (SDNP).

In the past decade, many governments and national and international organizations have sought to alter the balance of resources and power that previously existed between state/provincial/local levels of program implementation and national/international levels. Community Learning Centers support this process of *devolution* by making states, provinces, and localities less dependent upon central, national, and international agencies for information dissemination and operational coordination. The information and communication technologies made available through the centers empower communities to seek, generate, and share information and resources on a far more independent basis.

Through the use of learning centers, national, and international agencies can communicate directly with local project personnel. They can send and receive reports more, organize meeting and visitation logistics, make remotely located experts available, and link related projects for collaborative support. While it can take some time for local personnel to accustom themselves to their greater accessibility, it is ultimately in the best interest of the project.

INDIVIDUALS

Individual use of learning centers spans the full range of services, from teleworking to lifelong learning to simply connecting with distant family members. The extent to which

a Community Learning Center focuses on providing services to individuals, as opposed to organizations, is a function of its charter, its stated goals, its hardware and software inventory, its price structure and staff resources. As with most facilities, some individuals become “regulars” and may begin to function as auxiliary staff. Given the limited resources available to most centers, this is a valuable source of support. In some cases, volunteers or interns from local universities or the private sector may also lend support.

Regular tracking of how the technology is being used, how much and by whom, can provide input into training, system maintenance and long-term planning (U.S. Dept of Education, 1997). CLCs should track: the number of users; the number of transactions; the nature of each transaction; the duration of user sessions; patterns of use by day, week, month, and year. To the extent possible, computer-tracking software should be used to facilitate record keeping. All users should be asked to sign in and out, with time notation. The design of both formative and summative evaluations at the outset will clarify the type of data that the center needs to collect.

In Uganda, NGOs account for more than 40 percent of the utilization of the Kampala-based MUKLA electronic network (Musisi, 1996). NGOs are often among the founding partners creating a telecenter, either as an individual, local initiative, or as part of a broader, global project. Included in this packet of materials a CLC network in Ghana is described in which three separate non-governmental organizations are building centers with USAID funding and LearnLink technical assistance.

KEY CAPABILITIES OF A COMMUNITY LEARNING CENTER

Community Learning Centres are organized to provide facilities, information, communications access as well as informal coaching and training. We have already referred to the “hierarchy of needs” through which many first time users of ICE technologies navigate. Accordingly, CLCs include the following services:

COMPUTER-BASED SERVICES

A Community Learning Center’s inventory of computers may range from a very modest number, 2 to 3, to a much more robust amount, 20 to 25. A typical Nordic telecottage has between two and five computers, and Canada’s NCDC Technology Center began with only two computers for public use (Campbell, Part 6). The computers may be connected by a network, so that users can share materials stored on a central server, or

they may function individually, with programs limited to what can be stored on an individual hard disk drive or CD-ROM, if the computer is so equipped.

The types of applications that may be provided range from word processing and desktop publishing to interactive educational programs. Community Learning Centers that serve as distance learning sites may maintain student records in a secure database.

Individuals using the CLC for business purposes may keep proprietary records on their own diskettes, which remain in their control.

When a Community Learning Center is established in connection with an existing institution, it is important to select hardware and software that is compatible with the existing infrastructure. Likewise, it is better to resist the urge to buy untried, “bleeding-edge” equipment. Instead, planners should invest in equipment that has proven its worth in a particular climate and under conditions similar to those under which it will have to function.

NON-ELECTRONIC RESOURCES

While much of the excitement engendered by CLCs is based on their ability to offer communities access to new information and communications technologies, a robust Center will provide a range of traditional, non-electronic resources as well. A well-stocked library of books, periodicals, reports, and videotapes will be highly valued by community members and may be the “hook” that draws them in, to later explore higher-tech applications.

Traditional materials are critical components of distance learning programs and offer a range of opportunities for informal, lifelong learning. Videotapes continue to provide excellent simulation training and print materials may be circulated on a library loan basis. Community Learning Centers with copy machines can reproduce both traditional print offerings, as well as items printed from the Internet for patrons to take home, where floppy disks and CD-ROMs would be of little use.

The digital camera and color printer create an entirely new capacity for teachers, local historians and community organizations to prepare new media using graphics, pictures and images. Newsletter, curricula, books, signs and reports can now be prepared in the local language. The wisdom of elders that was formally only available through the oral culture can now be represented in the digital world.

Community Learning Centers also serve as a venue for lectures and seminars, providing both space and equipment support if needed. To that end, they serve as a “lightning rod,” drawing speakers who might otherwise not be drawn to address the community.

TELEPHONY SERVICES

The concept of a central office where citizens can make telephone calls on a pay-per-use basis is more familiar to those in the developing world than to those in societies accustomed to near-universal home-based telephone access. CLCs expand traditional telephony services to include fax services and dial-up access to the Internet.

Of course, the reliability of Center services is dependent upon the dependability of the region’s communications providers. Some of those involved in CLC development, both in the developed and developing world, have noted that centers place pressure on telephone companies to provide service for which there is not yet sufficient consumer demand. This is an unavoidable problem during the early years of a country’s emergence into the Information Age.

Along with the manifest function of providing communications services in support of social and economic development, CLCs help to “make the market” for traditional and new communications products and services. But their latent function is not limited to this. They also serve in a “tortoise and hare” R&D relationship with traditional and established telecommunications providers. Because new forms of telephony and communications are so fundamental to their success, they help traditional telcos to see and learn about new ways of finding solutions to long-term telecommunications problems. Additionally, they help to build community support for innovations in telecommunications which both directly and indirectly helps the telecommunications providers respond to the new demands that have been created.

ONLINE SERVICES

The hierarchy of online services provided by learning centers include access to email, listservs, World Wide Web browsing; synchronous and asynchronous conferencing; and audio and video streaming. Which of these services a learning center can offer and with what speed and reliability depends greatly on the technological infrastructure and equipment to which it has access. Simple email is at the low end of the technological spectrum, while synchronous videoconferencing through video streaming would occupy

the high end. To provide high-end services, learning centers must have access to both powerful computers and broad communications bandwidth.

The extent to which community members will use online services even when available rests on the center's pricing structure and the success with which it has made the community aware of the potential benefits to them. It depends as well on the center's ability to provide relevant training and staff support of individuals attempting to use the unfamiliar equipment and software.

A recent analysis of the impact of electronic networking on the research community in Ethiopia credited access to email with facilitating participation in international seminars, joint conduct of research and authorship of papers, as well as the introduction of standard computer operating systems. It also facilitated a switch from a time-consuming and inefficient hierarchical reporting structure to a flatter, more democratic means of communicating, both nationally and internationally. The study further illustrated the cost effectiveness of email relative to the sending of faxes, the previous alternative (Lishan, 1996).

MEDIUM	AVERAGE KB/MIN.	COST/KB	COST RATIO TO A FAX
Fax	40	0.18	1:1
Email using 14.4 modem	237	0.0093	1:19
Email using 28.8 modem	355	0.0062	1:29

A 1996 study of networking in Malawi similarly found that "the cost of sending...text messages internationally by email is...about 20 times cheaper than faxing similar messages..." (Nyirenda, 1996). It is sometimes difficult to remember that the revolution in telecommunications attendant with the Internet Protocol (IP) is only five (5) years old in North America and has yet to be diffused throughout most of the developing world, especially in rural areas.

Accordingly, the cost-performance-content relationships that are now becoming evident in more mature Internet markets in the developed world have yet to establish either a price point in developing nations.

FUNCTIONAL REQUIREMENTS

Clearly the functional requirements of a Community Learning Center are driven by the level of services to be provided and the range of possibilities offered by the overall environment. The "requirements" discussed below represent the options available to the

majority of communities. In the developing world and in rural communities throughout the developed world, organizers do not have the financial and staffing resources or the technological infrastructure to provide the high end of the spectrum.

There are three (3) models for the introduction of CLCs that have been attempted and proposed. They include:

- The “*stand-alone*” model - This model is based almost entirely on the operating revenues generated by the CLC with non-or-partially recoverable start-up investments from the community, national and international organizations. The Sengerema Telecenter in Tanzania was planned on this basis. While volunteer labor and land is to be donated to this CLC, the purpose is to create a new, stand-alone service right across the lane from the local Tanzania Telecom and Communications Ltd. service location.
- The “*adoption*” model - The adoption model has a CLC service being hosted within an existing institution whereby many of the costs for space, administration and general operations are integrated into the expanded services of the host organization. While the service is adopted for the entire community, it becomes located in an established institution such as a college, local government, secondary school or church organization. Located in an existing library building that is owned by the local regional government, the telecenter in Nakaseke, Uganda is following this model.
- The “*companion*” model - Rather than being focused squarely on access to the entire community, this approach aims to enhance the existing special interest services of an established institution which, over time, can grow to meet more general community needs. For example, an investment can be made to enhance ICE technologies within a college, hospital or community organization which eventually migrate into broader public access as a “companion” service. The Indonesian PERs (or People’s Economic Posts) are following this model.

Each of the foregoing models have both strengths and weaknesses, and in the context of the LearnLink initiative, they should be field tested and assessed to come to understand which approach performs most successfully in offering services, becoming sustainable and reaching all segments of the community.

PEOPLE FIRST

While the role of ICE technologies in development assistance is achieving more and more emphasis, it is important to remember that it is *people* with *skills* that make ICE technologies work. Far too many initiatives within development communications neglect this important point. Almost without exception, successful ICE technology initiatives follow a **Core User**, or Train the Trainer, approach to human resource development. This approach begins with intensive training among early adopters within community institutions that use the CLC. Over time, the CLC comes to serve as a support mechanism for these Core Users as they market and “socialize” the ICE technologies within community institutions.

A second fundamental principal is that CLCs need to be understood to be demonstration projects and not just service provision locations in and of themselves. Unless plans are made for those within the more powerful metropolitan institutions in a society to learn from and to eventually benefit from the investment in CLCs, they will almost always find reasons to dismiss or ignore the benefits generated by the innovation. Accordingly, **Capacitation** plans and programs need to be developed to ensure that those within the society to generalize and adopt the benefits of CLC innovations have the opportunity both to learn and to understand the capabilities generated by ICE technologies.

ACCESS-AWARENESS-DIFFUSION

The Internet has a lot of cheerleaders and people who understandably learn and want to share the enabling effect which they discover by using this powerful new tool. But ICE technologies in development incorporate much more than just the Internet and it is very important to differentiate among how the technologies are to be made available and who they are intended to assist. There are three (3) models for this type of assistance, as follows:

- *Access* - Access refers to the relatively simple task of making Internet, computing and telecommunications tools available where previously they did not exist. Once the technical issues have been resolved those that already know and understand the advantages of using the Internet will take advantage of ACCESS to it. With ACCESS a relatively small segment of the community is assisted while the costs attendant with entry and start-up are the lowest among the three (3) options.

- *Awareness* - The AWARENESS model involves building programs of orientation, familiarization and demonstration on top of the new access which has been accomplished. This takes more time, financial resources and planning but reaches out beyond the technical elite to those early-adopters who, when given the opportunity, take the time to learn and integrate ICE technologies into their professional and personal lives.
- *Diffusion* - The DIFFUSION of ICE technologies and the skills attendant with them into the early and late majority adopters in developing societies is a time consuming, resource intensive, “body contact” activity. This is, however, how real markets get created for self-sustaining ICE technology products and services.

In a sector where language can often be imprecise, where no taxonomy exists for impacts and objectives and where there is considerable growth and development, it is extremely important to differentiate among which of the three (3) foregoing types of interventions are intended in association with the introduction of a CLC.

CONNECTIVITY OPTIONS

The technological options for levels of Community Learning Center connectivity include:

- land-based fiber optics, which provide rapid, broadband access to the Internet, but are expensive and do not currently exist in the majority of the developed world;
- dial-up service over standard telephone lines, which offer slower, much more limited capability, but which has the benefit of using existing telephone lines where they exist;
- ISDN (integrated services digital network), ADSL (asymmetric digital subscriber line) and HDSL (high-bit-rate digital subscriber line), all of which offer more robust voice, video and data capacity over standard copper lines;
- a range of satellite technologies, including traditional C and Ku bands, VSAT (very small aperture terminals), DBS (direct broadcast satellite) and LEOs (low-earth orbiting satellites);
- asymmetrical services involving high-speed downlink and out-going transmission using existing terrestrial systems has been used extensively in rural Canada to

support SchoolNet programs. This is a cost-efficient, low maintenance, transitional technology that is worthy of consideration; and

- wireless technologies, including cellular mobile communications, broadband radio, and microwave.

There is no “best solution” across the board. Each nation, city, region, and locality exists within its own envelope of pre-existing conditions. Those conditions will inform the development of the best solution for a specific community.

HARDWARE AND SOFTWARE NEEDS

Planners are often faced with a dilemma as they make hardware and software investment choices. On the one hand, they want to support burgeoning national industries in hardware and software. On the other, they want to minimize potential problems by investing in time-proven, name-brand products, which often means using imports from the United States and Europe.

At present, a reasonable compromise seems to be to support local hardware importers, systems integrators, tech support services, and trainers, while investing in equipment from well-established corporations. Likewise, the most robust productivity software, including office suites that feature word processing, database management, and spreadsheet manipulation, comes from industrialized countries. However, educational programs that require sensitivity to local culture and language are best developed within a nation’s borders.

The issue of compatibility, once significant, no longer poses a huge problem. The field has “shaken out,” so that a number of proprietary, non-compatible systems are no longer being marketed. The remaining manufacturers have adopted a range of international standards that, while not eliminating entirely the need to address compatibility issues, has greatly reduced it.

Application software programs relevant to Community Learning Center needs fall into several categories: personal and business productivity, instructional management, and educational. Personal and business productivity tools include word processing and database programs, as well as email packages, budget management, scheduling, file maintenance, and desktop publishing. Instructional management programs help educators prepare for instruction and keep records. The range of educational applications include:

- drill and practice programs, often used for math and foreign languages;
- reading comprehension programs;
- simulation programs, often used for science and geography instruction;
- reference materials, often hyperlinked for ease in cross-referencing;
- collaborative learning programs, designed to develop group decision making skills;
and
- workplace skills, focusing on both content acquisition and the development of professional attitudes.

Those responsible for selecting software and program applications are often at a loss for criteria by which to make the selection. The criteria recommended by AED's National Demonstration Lab include intuitiveness of the user interface — the controls and screen presentation seen by the user; and the degree of control offered — the ability to pause, review material, quickly move to and from narrowly defined segments of information and otherwise not be “held hostage” by the program.

In addition, compatibility with other software and a range of hardware platforms is necessary, as are history and speed of company upgrades and maintenance of the product line. Educational programs should be designed in a manner that includes linear versus non-linear organization, existence of assessment and remediation strands, the role of an intelligent “tutor;” hyperlinking of resources and themes; credibility; and objectivity of source material.

Other factors to consider include production value — clarity of audio and video; professionalism of appearance, including screen design, color and fonts; incorporation of multiple languages in a single application or availability of the same product in multiple languages; cultural relevance; and cost.

STAFFING

There is very little question that the most important decision which will be made in the operating life of a CLC is the selection of the skills, experiences and qualities in the person hired or recruited to manage the service. Especially at the onset, the characteristics of this person are mission-critical predictors for the success or failure of a CLC service.

Whether a Community Learning Center requires one staff member or five, full-time or part-time, it is driven by its services and developing demand. More important than the number is the *type* of staff member best-suited to ensure the Center's success.

Technical sophistication is less important than the ability to work with the community. Staff can be trained to operate hardware and software; the necessary "people skills" that will successfully integrate the Center can not be taught. Those with CLC experience have stressed this point in the strongest possible terms. Successful centers have worked because of the personal ability of one or two individuals to rally the community around the new endeavor, with its seemingly exotic and sometimes out-of-place appearance and functions. Staff have to maintain their enthusiasm and conviction despite initial slow acceptance and utilization. They must be able to infuse the community with enthusiasm and to engender ongoing support.

The majority of centers to date have not had the luxury of diversified staffing. Most have been limited to a single director, who may be able to draft volunteers and students to provide additional help. Ideally, however, a telecenter should have:

- a director, who provides strategic planning, marshals community support, seeks funding, interacts with funders and other stakeholders, and supervises daily operations;
- a technician, who maintains and services the hardware, loads and manages software, conducts training classes and provide daily technical support to users; and
- an administrative assistant, responsible for scheduling telecenter use, maintaining center records, supervising the library, and providing operational support to the director.

SELECTED TELECENTER EXPERIENCE

USAID LEARNLINK COMMUNITY LEARNING CENTERS IN PARAGUAY AND GHANA

The Community Learning Center is one of the intervention models identified by USAID's LearnLink Project, administered by the Academy for Educational Development. The first of six pilot centers to be established in Asunción, Paraguay opened in January 1998. Asunción is in the process of automating many of its municipal services, and the Centers are designed to provide convenient and efficient access to these services. In addition, a range of learning tools, including interactive educational programs on CD-ROM and tools

for vocational instruction have been provided. The CLCs provide Internet access and free email services, and offer free orientation sessions to computers and the systems and services available. LearnLink is assisting the municipality in monitoring the utilization of the centers and in evaluating their impact on the community over the 18-month pilot period.

The Paraguay Center followed the model described in identifying and employing a local champion, who was energetic and persistent in his early efforts to publicize the center and to involve influential members of the community in introductory events. The emphasis of the Center is on strengthening formal and informal learning, and so early activities have focused on engaging those concerned with education in Asunción.

The LearnLink Project has joined in cooperation with USAID's Ghana Mission, the USAID Leland Initiative, the Research Triangle Institute and a local NGO to establish pilot Community Learning Centers in Ghana. The coalition effort has been working with communities to assess, prioritize, and address their needs.

The Ghana Community Learning Centers operate on a cost-recovery basis and employ local staff. The Centers are helping strengthen basic education, train teachers, provide health care information, strengthen municipal administration and encourage business development. LearnLink staff design the facilities, train staff, and provide initial guidance with respect to hardware and software choices (Naydu, 1998).

ITU/UNESCO/IDRC MULTIPURPOSE COMMUNITY TELECENTER PROJECT IN AFRICA⁵

The International Telecommunications Union (ITU), UNESCO, and the International Development Research Centre (IDRC) have joined together to develop five African Multipurpose Community Telecenters on a pilot basis. In doing so, they seek to further develop the telecenter concept, explore and refine models, disseminate information about the process, and create a partnership model of collaboration among international, national, and local organizations.

The first of the centers was launched in early 1998 in Nakaseke, Uganda. The telecenter is owned by Local Council 3 of the Lowero District, but receives support from the Uganda Post and Telecommunications Corporation.

⁵ The description of this project is based on information from Fuchs, Richard. Op.Cit. and from an interview with Fuchs conducted 6/26/98.

Organizers have targeted educators, health workers, and public administrators in Nakaseke, with the belief that innovators in each sector will draw in their colleagues. For example, they believe that a significant user will be the Primary Teachers' College. The college delivers continuing education to primary school teachers in 5 regional districts, primarily through the efforts of 31 regional coordinators. By offering the coordinators access to email and other Internet-based services, telecenter supporters feel that the quality of the educational training will be greatly improved.

One of the challenges cited by telecenter planners was that while some of the teachers, doctors, nurses, and librarians understood the value of "new and improved" information, many in the rural community felt that their information needs were being adequately met in the traditional ways — from family, friends, and visitors. A major effort was being launched at the outset to teach people about information itself and the ways in which it might enhance their lives. Richard Fuchs, one of the project's organizers, put it this way:

People need to come to learn that it is worth their while to take the time and trouble to find information to help them solve their problems. Before we decide what information will be good for the farmer, the midwife or the entrepreneur, we need to spend some time helping them understand the value of information and the tools that can be used to access it. (Fuchs, 1998)

PROJECT SCOPE

Project SCOPE (Specialized teleCenters Of Professional Education) describes itself as "a non-profit developer of community-based telecenters for urban and rural venues, with a focus on underserved populations, particularly women, children, and the disabled." (Project SCOPE Web site) The Project SCOPE Web site offers the following description of its goals:

In partnership with local communities using an innovative, grassroots approach including the 'televillage concept,' Project SCOPE establishes telecenters which ensure universal access for all to education, training, community redevelopment, public health, and economic development programs via appropriate technology. Additionally, Project SCOPE telecenters will create 'cultural connections' to provide a voice for each culture individually but designed for sharing and inter-action with all cultures. (Project SCOPE Web site)

Key elements of the SCOPE telecenter strategic plan are:

- the establishment of an equipment purchasing program, permitting communities to benefit from the economies of scale achieved by negotiating multi-center purchase packages with vendors;
- evaluation of local educational needs and creation of community-specific curricula, including externally- and internally-generated courses;
- offering of a reduced pricing schedule for teleconference access by nonprofit organizations and associations;
- implementation of a varying range of communications tools based on a community's existing infrastructure;
- provision of ongoing training for center staff and users;
- collaboration with community-based organizations to secure funding for the centers;
- connection of all SCOPE centers to each other and to globally-accessible resources through online SCOPENet; and
- dissemination of research and evaluation results based on telecenter experience.

These are but a few of the many telecenter development initiatives underway. In addition, countries such as Canada, Sweden, Australia, and the United Kingdom have robust networks of centers that have functioned for more than a decade. In Sweden and the United Kingdom, the emphasis has been on providing facilities to enable telecommuting, or *telework*, while often incorporating a community action social agenda. In Newfoundland and Labrador, Canada and Australia, the emphasis has been on reaching remote, rural communities to enable them to access services otherwise unavailable and to build local capacity.

In Newfoundland and Labrador, Canada a second generation of entirely wireless telecenters is now in the final phases of research and development. Using "plug and play" satellite up-and-down link telecommunications organized around an affordable "bandwidth-on-demand" basis, medical, education, small business and government information services are all being integrated into a common facility which divides the cost of the more robust telecom capability among the entire community.

IV. PLANNING AND IMPLEMENTATION

ASSESSING THE ENVIRONMENT

A critical element in the establishment of a Community Learning Center is the initial community assessment, done in part to determine whether or not a Community Learning Center is an appropriate intervention within the environment. Assessing potential community support may be difficult because a community can not support what it doesn't understand and ICE technologies are not easy to explain. To gauge potential community support, planners may choose to view the area's previous record of support for new initiatives aimed at addressing economic, educational, social, and democracy building needs. They may also consider the community's history of working with multilateral, bilateral, and national funding agencies, its base of potential trainees and the regional telecommunications infrastructure. National and local attitudes toward telecommunications regulation and emerging private sector competition are also key assessment elements.

STRATEGIES FOR SUCCESS

While Community Learning Center experiences to date have differed greatly, based on purpose, location, size, funding, community support, and a number of other variables, there is generally common agreement on certain lessons learned among them.

1. Secure support from senior policy makers. Communities accept technological interventions much more rapidly and fully when it is clear that there is support from the top.
2. To the extent possible, get the community involved *before* the establishment of the center. Identify key community leaders and involve them in planning-stage decision making.
3. Find and employ a "champion." Those centers with the greatest success and staying power have benefited from the untiring efforts of a single individual who was committed to the cause. The "champion" was generally someone with excellent social outreach skills, and respected in the community.

4. Conduct pro-active outreach to the community. Do not wait for them to come to you. Instead, target organizations in the community and bring them in for demonstrations, free tutorials, receptions, and other introductory events.
5. Get a “nose under the tent.” Offer physical space for meetings even if no electronic services are involved.
6. Conduct ongoing training classes (beyond the introductory sessions) to help community members become comfortable and increasingly skilled with CLC hardware and software.
7. Provide ongoing training to CLC personnel so that they remain current with evolving technology, are able to support its development and can serve as a valuable resource to the community.
8. Connect with other centers to provide mutual support, share lessons learned, create buying collectives, and otherwise create strength in numbers.
9. Publicize early successes within the community. This must sometimes be handled carefully, to avoid engendering resentment among traditional power bases. Share the credit for success, even when that involves creative reporting.
10. Invest in resources that can build on each other. Create a plan for increasing capabilities and add only that hardware, software, and applications which support the plan. Avoid short-term, trendy equipment; equipment with no track record for service; and applications with incompatible or inappropriate languages and cultural references. Adopt “state of the market” technologies that are robust, have an established service record and which many people have already learned to use.
11. Look beyond the pilot funding phase. Plan early for financial sustainability. Draft a proposed fee-for-services plan and solicit feedback from community members. Enlist their support in proposed fundraising initiatives. Understand that the entry-level pricing will necessarily be different from the prices charged when the centre is self-sustaining.
12. Use the Center’s online presence to bring the community into the international eye. Most communities appreciate the enhanced visibility. It can bring economic development opportunities and foreign investment.

GOVERNANCE

A range of ownership and governance options exist. To date, no one model has proven more effective across the board. Community Learning Centers may be owned by community cooperatives, local NGOs, or state agencies or by individuals, either singly or in partnership. They may have governing and/or advisory boards, or may simply report to their funders.

Developing country and rural learning centers that have been established as pilot projects by national and international agencies may be funded for delimited periods, with the expectation that ownership will be transferred to a local group or organization after the initial pilot phase. Transference of ownership and control often comes with a cessation or cut-back in funding, so that the center faces both governance and economic challenges simultaneously.

Typically, however, if the CLC is to be a “model” for emulation and reproduction, the Centre will have a Management Committee consisting of representatives of national and international agencies which are involved in contributing the investment to initiate the service. There will also be a Local Steering Committee which includes organizational leaders from those agencies which stand to be direct beneficiaries of the service and have identified “Core Users” to participate in the early training provided by the CLC.

POLICY ISSUES

Among the issues that CLC founders must address are: telecommunications regulation, national attitudes toward access to information, protection of user-specific data, and intellectual property rights (copyright) protection. Lack of attention to any of these issues in the short term may result in long-term problems. The governing documents created for a center should include clear guidelines and policies in each area.

Some of these issues are susceptible to technology-based solutions. As encryption technology continues to evolve, for example, data integrity, security, and personal information about users will be less susceptible to tampering and theft. Likewise, when it becomes commonplace for all users and individual pieces of information to carry encoded digital “thumb prints,” it will be easier to track violations of copyright and the commission of other online crimes. Unfortunately, the use of such digital tracking measures increases the potential abuse of personal privacy by both the government and the private sector. In some cases, societies will have to decide at the legislative and regulatory levels whether the cure is worse than the disease.

In many countries, access to ICE technology remains inhibited by government control of the telecommunications sector. Many observers have noted that, to become full participants in the Information Age, such countries will have to reform their systems, ceding a greater role to a competitive private sector. Moving beyond pilot implementation of ICE technology projects toward a robust national system will require an enormous infusion of capital, the type of investment that has traditionally come from private corporations allowed to operate within a stable regulatory environment.

It is almost certain that those who are championing the CLC in their jurisdiction will come to understand how national telecommunications regulation, infrastructure and services require change. As ICE technology innovators, they are on the precipice of an immense change that will eventually occur within their society. As we have already indicated, their actions can help to inform, sensitize and mobilize national resources and institutions to accelerate their entry into the Information Economy. They can also be knocked off the precipice, as many telecenter pioneers have been, only to see their early heretical ideas eventually come to be embraced as orthodoxy by later-adopting institutions in the society.

Given the inevitable tensions that are attendant with this type of innovation, it is mission-critical that international and national organizations involved in CLC sponsorship engage in “capacitation” initiatives which help the dominant and influential national regulatory, governing and licensing agencies to understand and themselves experience the benefits of the early adoption of ICE technologies.

POTENTIAL PROBLEMS, PITFALLS, AND POTHOLES

As with any new, technology-rich intervention, Community Learning Centers may be plagued by theft, vandalism, accidents, and natural disasters. To some extent, planning and vigilance can reduce the potential risk. The ultimate key lies in the extent to which Center “champions” succeed in garnering community-wide support for the new venture. When successful, CLC staff have found that communities will not tolerate threats to the new resource.

Less tangible threats may come from organizational sources, often outside the community. Consultant Richard Fuchs describes one such problem and his recommended solution.

Metropolitan institutions don't appreciate it when the 'outback' has better tools, skills and resources than they do. In the words of one of our Kampala

collaborators, “We shouldn’t do that. Then the people of Nakaseke will know more about it than we do.” This natural disposition of metropolitan institutions has to be acknowledged and respected. It shouldn’t, however, be successful in dominating how resources get deployed as they will tend to consume most of the benefits directly. Metropolitan institutions do, however, need to be accommodated.

Our solution was to introduce what we called ‘capacitation programs’ that would link the Nakaseke telecenter to these Kampala based metropolitan agencies. This way they could benefit from training and access to the new technology. Additionally, we proposed linking some of the more well endowed international agencies in Kampala with both their later adopting national counterparts and the rural telecenter. (Fuchs, 1997)

A related problem is the tendency for certain users or sectors to dominate Community Learning Center services, controlling and narrowing the center’s overall utility to the community. It is difficult sometimes for CLCs struggling for economic sustainability to resist catering to the demands of users, or even a particular sector, that provides consistent business. However, Community Learning Centers that have as their mandate the strengthening of educational resources or municipal centers designed to provide enhanced services and information must stay focused on their primary agendas.

While they can and should remain flexible in supporting a wide range of services, they should not yield to the temptation to allow narrow, business interests to prevail over the greater good to be offered to the community. Neither should they compete with private sector initiatives that arise because of the awareness and diffusion impacts of the CLC in the community. This is an extremely important issue which has been lost in much of the discussion respecting CLC and telecenters throughout the world.

SUSTAINING THE COMMUNITY LEARNING CENTER

The issue of sustainability is among the most challenging dimensions of CLC investment, start-up and “grow-out”. There are essentially three (3) models of sustainability.

The Medium Term Market Maker - First, is the CLC or telecenter which is seen as only a short-medium term mechanism to trigger accelerated innovation in the Information Economy within “back of the market” communities. In this case the CLC is seeking to spread enhanced ICE technology awareness and skills throughout community organizations and business such that they can develop and maintain an self-sustaining capacity to innovate and adopt ICE technologies. In this model, the CLC is a social and

economic development project that is focused on helping to “make” the market for local ICE technology services because of the diffusion-effect of the CLC in the community.

The Service Extension - Second, is the CLC model that comes to be an integral part of the one of the initial sponsoring organizations. This could be a school, local government, cooperative, hospital, chamber of commerce or economic development agency. After the initial investment, the CLC comes to be financed through the “A” base budget of one of the initial sponsors and is sustained in this manner.

The CLC “Business” - The third sustainability model is where the CLC is intended to become a financially, self-sustaining business entity, whether on a profit or “not-for-profit” basis. In this case, the initial pricing strategies need to reflect an attractive “entry cost” while the reliance on the services needs to find several anchor markets within the community.

Whichever model is adopted, and they can change over time, the “start-up” CLC or telecenter will need to incorporate the following into its initial operations plan:

- a strategic plan;
- identified potential funding sources;
- diversified funding sources;
- a schedule of service fees deemed reasonable by community standards;
- an understanding of the political and economic climate;
- a working model of organizational collaboration; and
- quality assurance techniques.

V. LOOKING AHEAD

As we approach the 21st century, it's clear that the Community Learning Center model is one in which most international funding organizations have confidence. It is a flexible model, with operational issues, from size to governance to services, adaptable to specific community needs and resources. It addresses both the problems of technological access and *equitable* access in tandem. It is a growth, rather than a static, model.

As with many Information Age interventions, international experiences with the Community Learning Center model have not been sufficiently evaluated and lessons learned have not been adequately disseminated. It is critical that sound evaluation criteria be built into a CLC model at the outset. Valuable data will be lost if planners do not establish the qualitative and quantitative information that must be collected from the planning phase on. The current ubiquitousness of the Internet makes the sharing of that information easier than ever before in human history.

To achieve certain measures of success, communities will be dependent upon elements they can not readily control. In the education sphere, for instance, the utility of computer-assisted applications will be driven by the extent to which they are developed in native languages, to be compatible with local values, curricula, and lifelong learning needs.

Success in one domain may come at the expense of another. If, for instance, one set of users comes to dominate a Community Learning Center's resources, other portions of the community, with other priorities, will continue to be denied access. Planning for such "success" must be done at the outset, to give center staff clear guidelines for allocating resources.

In the end, the outlook is positive for the Community Learning Center model. That outlook includes:

- declining technology costs;
- the promulgation of international standards;
- the establishment of long-term technology initiatives by every major international funding organization;

- increased technological awareness and sophistication within the urban centers of developing countries; and
- the growth of a technology-literate cadre of development professionals.

The Community Learning Center model focuses on access, and ultimately it is the community members who determine what to use the access for. As with other technology-based interventions, the tool is neutral. The actual economic, educational, and social impact of the Community Learning Center model will depend upon those involved in its planning, implementation, and use.

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