

Effective use: A community informatics strategy beyond the Digital Divide**by Michael Gurstein****Abstract**

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A huge industry has been created responding to the perceived social malady, the "Digital Divide". This paper examines the concepts and strategies underlying the notion of the Digital Divide and concludes that it is little more than a marketing campaign for Internet service providers. The paper goes on to present an alternative approach — that of "effective use" — drawn from community informatics theory which recognizes that the Internet is not simply a source of information, but also a fundamental tool in the new digital economy.

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Introduction

In December of 2003 the United Nations will be staging the World Summit on the Information Society [1] (WSIS). This event, in many respects, can be seen as a Summit on the Global Future as framed by our increasingly information and communications technology (ICT) mediated environment. This will be the first global attempt to come to grips with a potentially malleable and technologically determinable future. It is thus

important that the discussions around the event and which provide its context should not be left to the exclusive hands of the usual suspects — the governments and the bureaucrats playing out their familiar routines of control and centralization; or the corporations seeking their ever shorter horizons of profit maximization; or the traditional NGOs, many of whom seem so unable to see that ICTs are at least as much an opportunity as a problem.

What seems to be missing so far from any of the "official" involvements in the WSIS is the sense of building a common future with a remarkable and incredibly powerful new set of tools; of going beyond the "market building" and "market failure" rhetoric of much of the "Digital Divide" (DD) discussion; and, of moving toward opportunities for effective and active use of ICTs to enable communities, active citizens, and democratic participation. What has been lost is the vision of achieving the widest possible distribution to communities and individuals (as producers of goods and services and as citizens) of the remarkable opportunities for gains in productivity, efficiency, and process and product innovation; for active participation and devolved control; for an amplification of creativity and an intensification of "voice" which ICTs are making available.

Also, in the public discussions around the WSIS there is little sense of the Internet as a network, a network of networks, a technology with the capacity to engage and enable interaction across geographies and boundaries, both physical and cultural, and to support initiatives from the "bottom up" as well as the "top down". Nor, and finally, is there the sense of the creative ebullience that the Internet has let loose, initially, through the DotCom's but which continues through the development of alternative patterns of governance and consultation, new forms of services and production opportunities and new styles of knowledge creation and effective use.

Remarkably and sadly (and this too is overlooked amidst the tired and tiresome clichés of the WSIS), it seems that it has been primarily the corporate sector and even only certain elements within the corporate sector who have truly taken advantage of the revolutionary potential presented by ICTs. Others — small or more conservative enterprises, those with lower capitalizations or access to investment funds, enterprises in developing countries, and perhaps most important, whole strata of those who are not direct financial beneficiaries of the corporate sector — not for profits, the local public sector, those outside the market and beyond the enabling technology networks — are clearly falling ever further behind.

In addition, there has been little opportunity for those actually building the new "Knowledge Societies" as practitioners, researchers, suppliers; as communities — to have a voice in the WSIS. It appears as with the various global initiatives, such as the Digital Opportunities (DotForce) [2] Task Force growing out of the G8 Okinawa summit, the U.N.'s ICT for Development Task Force [3], and the World Bank's Global Development Gateway [4] initiatives, that this is something that will be done to "us" from the top, rather than by "us" from the bottom. The form that this "talking about" or "doing to/for" has primarily taken is to focus on the "Digital Divide" as the central "social" or "developmental" issue to be addressed in the context of the WSIS as it looks to respond to the changing technological environment.

Meanwhile, many have serious reservations about the DD terminology and overall discussions in this area. They find the DD approach patronizing and "welfare-ist" and a major diversion from what are the truly important questions which might be addressed addressed at a global gathering such as the WSIS. Specifically it is being observed that these issues are not about "access" (as the DD rhetoric and analysis presents it) but rather

about how and by whom and under what circumstances, and for what purposes ICTs can and should be used to benefit individuals, communities, and societies as whole.

The Digital Divide

A search on Google finds almost 1,000,000 entries for the DD. Of these some 55,000 refer specifically to the U.S., some 14,000 to Canada and 81,000 to the DD in developing countries [5].

There are a variety of definitions of the DD of which that at the "Whatis" Web site is perhaps representative:

"The term 'digital divide' describes the fact that the world can be divided into people who do and people who don't have access to — and the capability to use — modern information technology, such as the telephone, television, or the Internet. The digital divide exists between those in cities and those in rural areas. For example, a 1999 study showed that 86 percent of Internet delivery was to the 20 largest cities. The digital divide also exists between the educated and the uneducated, between economic classes, and, globally, between the more and less industrially developed nations." [6]

The major U.S. Government report ("Falling Through The Net") on these issues reports:

"Information tools, such as the personal computer and the Internet, are increasingly critical to economic success and personal advancement. *Falling Through the Net: Defining the Digital Divide* finds that more Americans than ever have access to telephones, computers, and the Internet. At the same time, however, NTIA has found that there is still a significant "digital divide" separating American information "haves" and "have nots." Indeed, in many instances, the digital divide has widened in the last year." [7].

A German group provides the following:

"the gap between the have and have-nots based on several criteria. These criteria were:

- 1 Technical: there are countries that do not possess the technical infrastructure to support this technology — not even at the most basic level of having electricity. However, there can be further limitations, even if the country has access to computers and electricity — bandwidth can limit use of multimedia — especially motion video.
- 1 Gender: There are less girls involved in ICT technology than boys. Is this because there is not a conducive environment for women and girls?
- 1 Political: There are countries where people are not allowed to go on the Internet because governments want to control the flow of information.
- 1 Self-Decision: There exist technophobes who are scared of the

technology and will not use it even if they have access.

- | Linguistic: The Internet is available only in certain languages while the largest sources of information are English.
- | Literacy: Unless the users are literate and can read, their use of the Internet is seriously limited. However, just as there is illiteracy, there is a new term in French "Illectronisme", where people are electronically illiterate." [8]

And a recent OECD publication entitled *Understanding the Digital Divide* begins by asking "What is the digital divide?":

"As used here, the term "digital divide" refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to their opportunities to access information and communication technologies (ICTs) and to their use of the internet for a wide variety of activities. The digital divide reflects various differences among and within countries." [9]

The private sector through the prestigious and influential Silicon Valley Partnership provides the following definition:

"The Digital Divide is the under-representation of African Americans, Hispanics, and Native Americans in employment within high technology firms in Silicon Valley as well as in technical, managerial, and professional positions. Further issues that the Digital Divide addresses are:

- | Including women and people of color on the Boards of Directors, and among Chief Executive Officers;
- | Including women and people of color in middle and senior management positions;
- | Increasing the overall employment and diversity representation in high technology firms in Silicon Valley;
- | Planning to train and educate minority youth;
- | Exploring business to business opportunities for small businesses and minority and women venture firms;
- | Gaining access to capital, particularly for minority vendor firms and emerging entrepreneurs;
- | Having universal access to computers, Internet and technology in classrooms, homes, and our communities." [10]

And of course there is Michael Powell (the Chairman of the U.S. Federal Communications Commission) and his "Mercedes Divide".

"At his maiden press conference last week, FCC Chairman Mike caused even jaded journalist jaws to drop when he warned America that the "digital divide" was "a dangerous phrase" because it could be used to justify government programs that guaranteed poor people cheaper access to new technology, like computers. "Digital divide" refers to the growing technological gap between rich and poor, white and non-white. "I think there's a Mercedes divide," Chairman Mike elaborated. "I'd like to have one, but I can't afford one." Then,

to disabuse anyone who might think him just another spoiled, rich, overprotected brat, he added: "I don't mean to be completely flip about this. I think it's an important social issue. But it shouldn't be used to justify the notion of essentially the socialization of the deployment of the infrastructure." God forbid. One thing you can say about Mike is that, unlike George W., he has no trouble whatsoever with polysyllabic words." [11]

And globally

One of the major global efforts, the "DotForce", is confronted with an international DD:

"However, solving the problem of the Digital Divide internationally is not a simple one. In order to solve the international disparity in technology access and usage, the Dot Force involves developed and developing countries, in addition to representatives from the private sector. With total involvement, the resulting regime will be one in which everyone can benefit mutually not only in the short-term, but also more importantly, in the long term." [12]

The International Telecommunications Union defines the international DD as "the division between countries and people within countries who have real access to information and communications technology (ICTs) and are using it effectively, and those who don't." [13]

A further and indicative statement of the DotForce is as follows:

"Bridging the digital divide in and among countries has assumed a critical importance on our respective national agendas. Everyone should be able to enjoy access to information and communications networks. We reaffirm our commitment to the efforts underway to formulate and implement a coherent strategy to address this issue. We also welcome the increasing recognition on the part of industry and civil society of the need to bridge the divide. Mobilizing their expertise and resources is an indispensable element of our response to this challenge. We will continue to pursue an effective partnership between government and civil societies responsive to the rapid pace of technological and market developments.

A key component of our strategy must be the continued drive toward universal and affordable access. We will continue to:

- 1 Foster market conditions conducive to the provision of affordable communications services;
- 1 Explore other complementary means, including access through publicly available facilities;
- 1 Give priority to improving network access, especially in underserved urban, rural and remote areas;
- 1 Pay particular attention to the needs and constraints of the socially underprivileged, people with disabilities, and older persons and actively pursue

measures to facilitate their access and use;

- 1 Encourage further development of "user-friendly", "barrier-free" technologies, including mobile access to the Internet, as well as greater utilization of free and publicly available contents in a way which respects intellectual property rights." [14]

And

"One third of the world population has never made a telephone call. Seventy percent of the world's poor live in rural and remote areas, where access to information and communications technologies, even to a telephone, is often scarce. Most of the information exchanged over global networks such as the Internet is in English, the language of less than ten percent of the world's population. This "digital divide" is, in effect, a reflection of existing broader socio-economic inequalities and can be characterized by insufficient infrastructure, high cost of access, inappropriate or weak policy regimes, inefficiencies in the provision of telecommunication networks and services, lack of locally created content, and uneven ability to derive economic and social benefits from information-intensive activities." [15]



Access and beyond

What is generally not discussed in the many studies and commentaries on the DD is how proposed solutions to the DD "problem" or condition, i.e. "improved access", will, in fact, provide any sort of useful response particularly to the impact that the DD is having. The underlying reasons for the impacts of the DD such as on-going trends towards increasing social and economic polarization — with the well-off getting better off and those behind falling even further behind as they find themselves unable to take advantage of ICT opportunities — are largely ignored. What for example, is the link between "access" and wealth creation/economic development and does simply providing "access" do anything to provide that "missing link"? Is it reasonable (or useful) to indicate the need for "access" without suggesting a parallel need for training for use, structured links between "access" and production or distribution systems, targets of "access" which correspond to individual or community needs in usable formats?

It should be observed that primary definitions of the DD almost all have to do with one or another of the concerns with "access" and generally don't go beyond this. But there are ambiguities and questions around this use of the notion of "access" so why focus on this to the exclusion of other perhaps more important issues?

Of course, "access" (to the Network, to I/O devices, to content) is fundamental and basic to all other developments and uses of ICT technology. Without "access" little else is possible. However, the nature of that "access" is not without ambiguity, whether for example, the concern is for simple "access" as, through multiple user environments such as telecentres or whether there is a concern to provide in-home "personal" access; and, what about the quantity, quality and format of that access — Broadband, WiFi, dial-up, bandwidth —

which "access" is sufficient to "bridge the DD" and how or when do we know this?

_The tendency moreover is to understand "access" as a "technical" or "infrastructure" issue particularly by those directly involved with the issue as for example for "development" or more broadly with policy or regulation in less developed countries (e.g. through telecom regulatory agencies or development funding or policies). The result is a greater awareness and capacity to respond to perceived failures in "infrastructure" than there is in other possible issues concerning "access".

Of course, there are major commercial interests concerned with providing "access". These include infrastructure providers such as the telephone companies, and broadband and satellite network providers as well as Internet service providers. A focus on "access" and a public concern to ensure "access" is potentially very beneficial to these groups (as for example, the U.S. e-rate provision which has proven to be a significant revenue source for U.S. telephone companies). In addition, a focus on "access" public subsidies which support extending the base of "Internet access" (to "overcome the Digital Divide") have the direct effect of increasing markets for access providers.

As well, and not incidentally, any broadening of the base of simple "access" increases the potential market for e-commerce retailers. In addition, those who are major suppliers of information to the public and particularly governments are able to achieve enormous benefits by being able to reduce (often dramatically) their publication and distribution costs through making these "accessible" (and increasingly exclusively accessible) via the Internet.

However, the use and application of ICTs as the basic instrumentalities of the "Information Society" go much beyond discussions of the DD. They include examining how and under what conditions ICT access can be made usable and useful i.e. how "effective use" can be achieved by, among others, marginal or excluded populations and communities. Developing strategies and applications for using ICTs to support local economic development, social justice and political empowerment; ensuring local access to education and health services; enabling local control of information production and distribution; and, ensuring the survival and continuing vitality of indigenous cultures are among the most significant possible applications and goals.

While considerable development resources have been spent on creating ICT infrastructure and access points (e.g., local telecentres), few of these initiatives, have been directed towards expanding local capacity for developing, managing and maintaining ICT capabilities. Additionally, the kind of ICT developments which would enable an effective participation by local communities in regional, national and even global decision making processes (e-governance) are largely ignored in favour of the design and implementation of efficient and ever more centrally controlled if electronically enhanced service delivery (e-government). Again the early promise of the Internet as a means for enabling widespread distribution of the means for effective active citizenship has not been carried forward.

Thus a broadly based well-financed DD lobby including significant private sector representation and focusing on ensuring the broadest possible base of Internet access should not be surprising. However, whether such a lobby is in fact concerned with the broader issues of which "access" is an element is much more questionable. In fact, a close observation of discussions on the DD issue fails to indicate precisely for what the "access" would or could be used. As we will note below, without attention being paid to this subsequent issue of "access for what", the result is that "access" and thus the DD becomes a

surrogate for increasing e-commerce markets (as indicated for example, quite explicitly as a goal for Canada's Community Access program (CAP), one of the most comprehensive "access" programs in the world).

"The Community Access Program (CAP) was launched in 1995 to provide Canadians with universal and affordable access to the Information Highway. The program has been a vital element of the connecting Canadians agenda and continues to play a crucial role in bringing (*sic*) the digital divide, contributing to the foundation for electronic access to government services, encouraging on-line learning and literacy, fostering the development of community based infrastructure, and promoting local/Canadian e-commerce. Since 1995, 8,800 rural and urban CAP sites have been either established or are in the process of being established." [16]

"Access" in this context then, is about being able to consume and receive rather than produce and distribute. Participation in the "Information Society" as presented here is concerned with the capacity to purchase, to download and to interact passively with one or another externally created Web site. Bridging this DD clearly has as its goal to ensure that everyone is accessible to consumer goods and electronically mediated marketplaces.

Clement and Shade in their most useful paper, "The Access Rainbow: Conceptualizing Universal Access to the Information/Communications Infrastructure" [17] raise significant questions concerning this:

"Defining access to ICTs is difficult for several reasons. While access is consistently identified as a key principle in policy discussions, it is not an end in itself. Access only enables further activities that can only partially be specified beforehand. There are three main questions to address: 1) Access for what purposes?; 2.) Access for whom?; and 3) Access to what? In summary, a model of access needs to: include support for a multiplicity of usage roles involving creation and dissemination as well as retrieval of existing information; encompass both conventional and new media; recognize the interplay of social and technical dimensions in the development of infrastructure; define what services are "essential"; identify "access gaps", those social segments likely to be "left out" by market forces acting alone, and hence in need of protection via collective public initiatives." [18]

The difficulty with "access" as the primary concern for those looking to ensure socially equitable use of ICTs are the questions identified by Clement and Shade — "access for what", "access for what purposes", "access for whom" and "access to what". Without attention being paid to these issues, "access" as most commonly presented within the context of the DD discussion is simply a matter of ensuring opportunities to "consume" Internet enabled services and Internet supplied goods or information by passive consumers.

The notions of the Internet as a productive tool (or more broadly as an instrument for transformative change) [19], in fact as the central productive tool of the Information age and of economies whose basic platform are ICTs, is lost. Being a "producer" in this context is reserved only for the few. In practice, this is understood as being only for those working for corporations or governments, technologically advanced nations and those communities with specific training and skills as might be required to produce (and not simply consume) in a technology environment. In these contexts the opportunity (and the benefits which follow)

of being a producer as well as a consumer are reserved not for those who have simple "access" but for those in the privileged position of designing and developing the uses and applications to which this access is being put.

The social challenge thus becomes one of ensuring that end users can do locally significant things with technology tools to which they now have access — economically, socially, and politically. Experience has been that where there are useful things to be done with technology (and assuming that a minimum infrastructure is in place — which now with wireless — is likely to become much less of an issue), then people will find ways of getting access. If all that is available for people to do with technology is to access another (if online) shopping mall or means of electronic consumption then investments made as a response to the DD are just further subsidies to commercial interests or ways of channeling additional resources to support government downloading and downsizing.

There is a need now to distinguish between an approach to the "Information Society" and to ICTs which "stresses access/the DD" and one which stresses "effective use". This is how the WSIS differs from previous summits. ICTs when used effectively provide significant resources/tools for transforming one's condition — economic, social, political, cultural — whether through obtaining the means for effective use of information and communications capabilities and tools; reaching new markets for small and micro-enterprises; providing the means to bring together dispersed linguistic communities; giving amplification and global voice to unheard minorities (or majorities); for facilitating informed participation in remotely managed political and other decisions; and, for obtaining the interactive services (if remotely) of skilled practitioners.

The key element in all of this is not "access" either to infrastructure or end user terminals (bridging the hardware "divide"). Rather what is significant is having access and then with that access having the knowledge, skills, and supportive organizational and social structures to make effective use of that access and that e-technology to enable social and community objectives.

The on-going processes of seeing the DD only in terms of "access" further aggravates and perpetuates the notion that with an ICT platform there will be a relatively small number of producers and a very large, even universal, set of consumers. Meanwhile, of course, the technology is such as to allow for each to be both a consumer and a producer of information and even productive knowledge-intensive goods and services within an electronically enabled environment.

And even within the context of the consumption of services and goods by means of ICTs, without attention being paid to the manner in which access is provided, many if not most will not be able to take advantage of the benefits available because of design or other flaws. The challenge thus, is to ensure not simply "access" but "effective access" or "use", that is, access which can be used and made effective to accomplish the purposes that individuals might set for themselves.

"Access" is something that all can support — better markets for AOL and Microsoft if nothing else; however it should be seen that "effective use" is the real goal (and the perceived risk to those who only see ICTs in the context of e-commerce) in that it means the on-going reshaping of how individuals and communities interact with their information/organizational/commercial/governance environments.

Effective use

"Effective Use" of ICTs might be defined as:

The capacity and opportunity to successfully integrate ICTs into the accomplishment of self or collaboratively identified goals.

This concept of "effective use" has been widely employed in an educational context where it is used primarily to refer to pre-conditions for implementing educationally oriented technology [20]. However, the use of the term in that context appears to have been solely concerned with technical matters and moreover there seems to have been little or no systematic analysis of how specifically to identify for example, indicators or measures of "effective use".

An additional interesting use of the term is by Bridges.org, a leading NGO in the application of ICTs to economic and social development where they link "effective use" to the term "e-readiness"; the notion of "e-readiness" having come into widespread application as a measurable indicator linked to potential effectiveness of the implementation of ICTs systems at a national or regional level and specifically in the context of responding to the perceived crisis of the "DD":

"With the specter of the growing digital divide looming large, world leaders in government, business, and civil society organizations are harnessing the power of information and communications technology (ICT) for development. They seek to improve their countries' and communities' e-readiness — the ability for a region to benefit from information and communications technology. It is increasingly clear that for a country to put ICT to *effective use*, it must be "e-ready" in terms of infrastructure, the accessibility of ICT to the population at large, and the effect of the legal and regulatory framework on ICT use. If the digital divide is going to be narrowed, all of these issues must be addressed in a coherent, achievable strategy that is tailored to meet the local needs of particular countries."

"Developing country leaders can use e-readiness assessment to help them measure and plan for ICT integration. It can help them focus their efforts from within, and identify areas where external support or aid is required. But an assessment alone is insufficient, and decision-makers face two key challenges in making *effective use* of this tool. First, they need to understand how ICT can help their countries achieve economic and social benefits, and set achievable goals accordingly. Second, they must take concrete steps toward effective and sustainable ICT use that will help their countries realize their objectives." [21]

Others also use the term in a development context as for example, the "Mission Statement" of the Global Knowledge Partnership:

"The Global Knowledge Partnership is an evolving network of public, private

and not for profit organizations. We aim to promote broad access to — and effective use of — knowledge and information as tools of equitable sustainable development." [22]

Or the following which is from a British Government IT management group: "The TASC will identify ways of helping institutions make effective use of IT through the identification of examples of good practice in the adoption of standards and co-ordination." [23] Or a paper discussing the DD, "Closing the Digital Divide: From Promise to Progress A Special Focus on The Commonwealth":

"However, despite the enormous benefits offered by ICTs, developing countries face significant obstacles to their effective use. For example, the telecommunications infrastructure in most developing countries is insufficient. Poor computer and general literacy, lack of awareness and regulatory inadequacy present further problems." [24]

Perhaps of most interest is the use of the term in the Report of the Digital Opportunities Task Force (DOT Force),

"Precisely because the digital revolution has the power to transform production processes, commerce, government, education, citizen participation, and all other aspects of our individual and collective lives, it can create substantial new forms of economic growth and social development. Therefore, *access* to, and *effective use*, of the tools and networks of the new global economy and the innovations they make possible, are critical to poverty reduction, increased social inclusion and the creation of a better life for all." [25]



Achieving effective use

As noted above, the "Digital Divide" as a terminology and as a practice seems largely to be about ensuring "access" to the infrastructure of ICTs and to ICT delivered content. In this way, "access" for many, if not for most people, can only be a pre-condition to deriving benefits from these systems, since, as is very well known in industry and by governments, simple "access" results only in being able to receive or passively consume "content" produced elsewhere by others, as has traditionally been the case for other "media" such as print, radio, and television.

However, ICTs are different. Once available, they can readily become not simply deliverers of content (to those with "access"), but also and crucially they can become the means for the production, distribution, and sale of "content" locally or globally; and, moreover, beyond content, they provide the basic infrastructure for production, distribution, sales and service delivery in any area of activity which has a significant information, knowledge or learning component. ICTs, it should be clearly understood, are the "satanic mills" of the Age of Information, but contrary to those "satanic mills", these present the opportunity for very widely dispersed application and use.

What this latter circumstance implies is that the challenge with ICTs is not simply to provide passive "access" to the technology but rather to provide the means by which individuals in their communities can find ways of making "effective use" of these technologies for productive, wealth creating, and transactional as well as other processes. In this, "access" in all its various components is a pre-condition and an enabler of "effective use" but is not a substitute for it.

In working through to an understanding of ways to achieve "effective use" it is worth re-examining and adapting the elements of the "Access Rainbow" as delineated by Clement and Shade [26] as a way to begin a discussion of the conditions for active and effective use of ICTs. Thus an "effective use" rainbow would include:

1. *Carriage facilities* — What telecommunications service infrastructure is needed to support the application being undertaken? What are the appropriate and required volumes and capacities of bandwidth to be provided by broadband, dial-up, WiFi, satellite or other networked telecommunications services? What will it take to ensure that a supportive technology infrastructure is available in the form and quality (bandwidth, error rates, etc.) necessary to accomplish the purpose to which it will be put? In this context effective use is application specific — certain applications will require broadband while others may only require dial-up, but in either case, effective use is only possible with the appropriate carriage infrastructure.
2. *Input/output devices* — What are the devices which users need to undertake the particular activity? Are they for example computers for information processing, Personal Digital Assistants (PDA) for mobile information access, printers for text production? Effective use of a health alert service may require access to a PDA, while effective use of a support for an NGO activist organization may require access to a full-colour printer for printing brochures and leaflets.
3. *Tools and supports* — What software, physical supports, protocols, service supports are required? For example, databases for keeping track of large volumes of environmental data will be needed by environmental management groups, while physical textbooks may be a requirement for effective use by teachers of the support facilities of Internet enabled educational systems.
4. *Content services* — What specifically designed content is needed for particular application areas? What are the usability and locally contextual requirements for this content — language, design, literacy level, localization of references, links and so on. As many have pointed out, in many areas there is too much information, which is too difficult to navigate and where there are significant issues of reliability. Effective use implies content which is designed to be specifically "effective" — usable, trustworthy, and designed for particular types of end users in appropriate language formats. The issue here is to go beyond access to develop applications of interest and benefit and usability to identified end users. Effective use means that end users can make use of what it is they have access to — in the current form, much of what is currently available (i.e. accessible) is of little use or benefit and some may even be harmful.
5. *Service access/provision* — What type of social and organizational infrastructure, links to local social networks, para-professionals, training facilities are necessary for the particular use being developed? Effective use for many application areas requires

an enabling social, as well as technological, infrastructure. Thus for example, effective use of e-health services in remote areas will require not just the technical access to the physical infrastructure, the information, the I/O devices and the service design but it will also require health application infrastructures including health care providers, para-professionals, community support systems i.e. a social organizational structure of the service to link the information or service being provided into local organizational structures and related delivery and support systems [27].

6. *Social facilitation* — What local regional authorities/resources, community and environmental infrastructure, training, animation are required to locally enable the desired application or use? The effective use of an ICT enabled service will frequently require supporting facilitation since the service likely will not be effectively implemented spontaneously. There will be the need for co-ordinated planning and design, for training at all levels and for animation of the supporting structures to make the service usable. Overall of course, there will be the need for local leadership [28].
7. *Governance* — What is the required financing, regulatory or policy regime, either for governance of the application or to enable the implementation of the application within the broader national legal or regulatory systems? In many cases effective use will require an enabling financial structure, a supportive (or at least not inhibiting) legal or regulatory system and political support. Thus, for example, a major restriction on the effective use of e-health services has been the failure of many pre-paid health systems, both private and governmental, to develop financing systems which allow for reimbursement of the cost of electronic health support services provided locally to support local (or non-local) users.



Implications of an "effective use" approach

The context of this discussion should be clear — there has been an expressed concern on the part of most governments, multi-lateral agencies and even the private sector concerning the mal-distribution of opportunities arising from the introduction of ICTs. While governments and the private sector and certain countries and regions have derived very significant value and benefits from the implementation of ICTs, others have not and their economic position relative to others has deteriorated as a consequence. This mal-distribution is seen as further exacerbating already existing patterns of inequality and a failure to integrate ICTs into national economies is seen as further restricting possibilities for poverty reduction and overall economic and social development. This concern has for the most part taken the form of a focusing on the perceived "Digital Divide" between those who have access to ICTs and those who don't as for example, has been the dominant framework of discussion within the context of the World Summit (WSIS).

But is what is meant by "access to ICTs"? Understood narrowly, it means simply access to computers and the Internet. Understood more broadly as for example, in the e-readiness approach, it includes the training, technical and legal and regulatory infrastructures which ensure access to the use of technology.

However, when we are referring to the notion of "effective use" we are significantly extending or even going beyond this approach by focusing not on "access" issues (the immediate availability of the Internet or computer technology) but rather on how this availability fits into larger concerns for "use" or "uses" that will ultimately benefit individuals and communities. Thus the focus is not simply on one of the possible "tools" for development (access) but rather highlights the entire "development process" including the infrastructure, hardware, software, and social organizational elements that all must be combined for development to occur. Clearly "access" is a pre-condition of "effective use." However, "effective use" as a design and development parameter for ICTs is not necessarily included in conventional approaches or understandings of responses to the DD.

Issues concerning "effective use" are moreover, significantly contextualized, that is, what is an effective use in one context will not necessarily be so in another context. The focus on "effective use" is on individual use, or the user, or user community. The opportunity for defining and developing strategies for "effective use" should become a dialogue between those responding to the perceived inequalities of the DD and end users who understand most clearly what applications or uses would be most beneficial in particular local contexts.

As an example of effective use one could think of an e-health application where simply providing access to passive information via the Internet may if anything, be as damaging, as it is beneficial. The information being accessed may not be appropriate in a particular local context, there may be no supporting professional resources for implementing the identified strategies or remedies, and there may be no access to the necessary tools required for implementation. On the other hand an "effective use" approach would ensure that [29]:

1. the *infrastructure* available is appropriate to the particular application being introduced, or (perhaps more correctly), the application is designed so as to be made available using the particular technical infrastructure accessible in the area where the application is to be implemented;
2. the *output devices* required for the application are available and usable by the target population. Providing health alerts on PDAs in the absence of a wide distribution of PDAs of course, makes little sense as does providing lengthy descriptions of remedies and responses to medical conditions if there are no printers available to print or copy the information being made available;
3. any *peripherals* required to support the particular application is available locally as for example, if the e-health application requires a thermometer to test the body heat of a patient. If no thermometer is available locally, the application could hardly be "effective";
4. the *content* of the e-health application is described and presented in the language, form and literacy level appropriate to the local users and is further localized in terms of reflecting local environmental conditions, such as heat, humidity, and altitude. All these may influence how certain health applications are implemented locally and thus should be reflected in any information provided as for example in the language used, acceptance of local terminologies and usages (metric measures rather than imperial as necessary) and so on;
5. the *service* application is appropriate to the particular circumstances of the end user. It makes little sense to provide an e-health application which assumes the availability of a fully-stocked pharmacy when none is available locally for hundreds of kilometers or where there may be significant cultural issues with this approach to health servicing;
6. the application being presented includes provision for *capacity development* locally

sufficient to its successful implementation. For example, many e-health applications are based on the social organization and local availability of para-professional health workers. In the absence of these, the e-health application will of course, fail, thus an "effective use" approach would include a provision for the development of the local capacity for implementation; and,

7. over-arching all of the above of course, is the need to include an appropriate structure of *finance and governance* for the application. In the absence of an appropriate enabling legal/regulatory framework, in the health area for example, one which ensures funding through whatever the local funding mechanisms allow or which satisfies or adapts issues of liability to the new application delivery environment it is impossible to think about "effective use" of ICTs. This of course, is one of the major failings of the narrower DD approach where such issues are largely ignored or left to a longer term concern with "sustainability". For an application to be "effective", provision must be made for its financial stability and for an enabling regulatory and legal framework from the beginning rather than as a longer term "add on".

All of the above it should be noted is, presented solely in a passive and analytic mode. In the real world, there is the need for active participation on the part of the local community to "animate" the process of technology acquisition and implementation. A reader for this paper, in a private communication, refers to the notion of there needing to be a community "pull" as well as or in advance of the "top down" or external "push". Even before this, there is the need to create this local "pull" since in many cases communities or local users will be unaware of what types of opportunities are available through ICTs. Thus there may be the need for local animation or community development [30].

As well, in practice, effective use of ICTs as with other forms of effective behaviours, takes place within larger social contexts including the family, work groups and communities. Effective use takes into account the fact that use is a socially situated behaviour and phenomena. A community informatics approach, which firmly situates the design and implementation of ICT systems in their community and social context thus most usefully provides a conceptual and methodological foundation for designing for effective use.



Effective use and communications rights

As the discussions concerning the World Summit on the Information Society progressed through the various lead-up meetings and particularly based on the contribution of civil society actors, the discussions concerning the primary framework for addressing the challenges of ICTs and development (and the Digital Divide) became polarized between those advocating an approach based on "communications rights" and those who reject such an approach. In practice, the communications rights advocates are organized under the framework of CRIS (Communications Rights in the Information Society), a non-profit organization [31]. Much of the discussion on communication rights follows the work of Cees Hamelink [32] who in turn quotes from Jean D'Arcy of the International Institute of Communications concerning the need to insert such a right alongside other rights enshrined in the International Declaration on Human Rights.

The D'Arcy, Hamelink, CRIS approach to communications rights is updated and re-contextualized for the WSIS as follows:

"Civil society is already shaping information societies to achieve social, cultural, educational, political, and economic benefits for all. Communication rights embedded in human rights should be the framework for Information and Communication Societies. Human rights must be the framework for information societies. Without this, the WSIS vision of "an information society" is meaningless We will insist that the proposal of the WSIS includes our priorities such as development and justice for the south, human rights, gender equity, community media, education, public goods, free software and open access to scientific and technological information, privacy, democratic and transparent internet governance, cultural and linguistic diversity, excluded minorities, indigenous people, people with disabilities, labour rights, etc." [33]

Of course, all of this is extremely praiseworthy and doubtless the position of those in developing countries and elsewhere without access to "effective use" of ICTs would benefit should such "rights" be put into place. However, the question remains whether the implementation of such rights presented as they are as essentially passive prescriptions — things that are made available to end users, rights that ensure "access to" and "access for" a wide range of excluded groups — would without an accompanying strategy of "effective use" have any impact beyond providing a "rights" (rather than for example an ethical) platform on which to argue "Digital Divide" issues.

ICTs differ from the rather simple selection of "communications media" about which D'Arcy was commenting — essentially broadcast media and telephony, in that ICTs are at their core the essential means of production in an information society. Access to these production tools in the absence of the availability of the larger context of infrastructure, training, regulation, and others would render the value of such simple "access" meaningless except as an enhancement of the opportunity to participate in the Information Society as a passive consumer of information goods, however much the means to "communicate" might be enshrined and available as "rights" to end users.

The "rights" approach advocated by Civil Society at the WSIS focuses almost exclusively on "the right to communicate". The content of the communication, the use of the communication or even the other possible ways in which ICTs may be transformative of the lives of users and producers is not addressed.

The difficulty with a "communications rights" approach to ICTs is that it doesn't really address what is perhaps the most significant and determining characteristic of ICTs which is that they are at their essence the production and management tools of the information economy. In fact, civil society should have insisted that the issue of equitable distribution of access to ICTs, especially to excluded populations should be based on the role that ICTs play as the central instruments of production and distribution of information intensive goods and services in the information economy (as well as the information society) and that the effective and productive "use" of these is what increasingly distinguishes the haves from the have nots, including those populations in developed countries currently finding their economic opportunities being threatened by the progress of ICTs.



Effective use, local innovation and participatory design

One issue with the notion of "effective use" is the determination or design of the "uses" to which the ICTs should be directed [34]. As with other areas concerned with the design of applications, projects and activities within a community informatics framework, the approach that would be most supportive of local "effective use" would be "participatory design" [35] or in this case through "participatory action research" [36] where the responsibility (and the opportunity) for application design is done with the full participation of the end users and the local community.

For example, a community e-health application would be designed with the active participation of the local community including the local health care professionals and paraprofessionals. One would expect that the framework for their design activity would be something similar to what has been presented as the "effective use" framework, addressing from a local ICT application perspective each of the identified categories in turn, and making provision for these in the ultimate application design.


In this way, an application would not only be potentially useful at the local level, but also would be directly linked into local needs and create local "ownership" and local "champions" who could provide feedback on its development and evolution [37]. Introducing this approach within a participatory action research methodology would give an application the capacity to evolve and respond to local circumstances — constraints and opportunities — as they present themselves.

One of the major emerging areas of activity in the development context is to enable the capacity for local innovation to respond to local circumstances as a means for local communities to economically advance. The combination of the introduction of an "effective use" approach to local ICT implementation and a participatory action research methodology would go some way to providing a framework for bringing to the surface local innovation in a variety of spheres and optimizing the economic and social potential of these innovations through the inter-networking capabilities of ICTs [38].



Conclusion

An "effective use" approach can redirect some of the discussion — and thus perhaps some of the resources currently being expended — away from the "access "crisis" of the "Digital Divide" toward strategies which will be of more direct benefit to end users in developing countries. Instead of providing hidden subsidies to technology providers in developed countries resources could and should be directed to developing useful and usable applications for those for whom such applications might be of immediate benefit. What is needed is both access (bridging the DD) but also the means for using technology in an effective way to respond to real crises in health care, education, economic development, and resource degradation. For these issues to be successfully addressed through the use of ICTs, attention will need to be paid not simply to "access" but also to an entire range of supports

for "effective use". 

About the Author

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Notes

1. <http://www.wsis.org>. There is very considerable discussion on this event. Among the most useful is the critical discussion from the non-governmental organization community coordinated through the Communication Rights for an Information Society (CRIS) campaign. <http://www.crisinfo.org> and the several e-mail lists which are hosted by CRIS through that site. See also the archives of the Dot-Force-WSIS e-list at <http://vancouvercommunity.net/lists/arc/dotforce-wsis>.
2. <http://www.dotforce.org/>.
3. <http://www.unicctaskforce.org/>.
4. <http://www.developmentgateway.org>.
5. The term "Digital Divide" according to Steve Cisler, formerly a librarian at Apple Computer, was first used as a joke in an article in a U.S. West Coast newspaper discussing the "divide" between a husband working on his computer late into the evening and his not

overly appreciative wife; <http://www.athenaalliance.org/rpapers/cisler.html>.

6. http://whatis.techtarget.com/definition/0,,sid9_gci214062,00.html.

7. <http://www.ntia.doc.gov/ntiahome/digitaldivide/> Executive Summary.

8.

http://wwwedu.ge.ch/cptic/prospective/projets/ifip/workarea/dortmund/Digital_Divide.doc.

9. <http://www.oecd.org>.

10. <http://www.siliconvalleypartnership.org/digidiv.html>.

11. http://www.thegully.com/essays/US/politics_2001/010212powell_fcc.html.

12. International Telecommunication Union, Inf-6-E, 4 March 2002 World Telecommunication Development, Conference (Wtdc-02), Istanbul, Turkey, 18-27 March 2002 original: English Canada Bridging The Digital Divide In Rural And Remote Communities: The Canadian Experience, <http://www.itu.int/ITU-D/conferences/wtdc/2002/doc/info-docs/006V3E.pdf>.

13. Bridges.org, 2001, Referred to in The DOT Force and the Digital Divide, J. Nathan Parham and Su-yong Song, The University of Michigan, Ann Arbor, School of Information, "Global E-Commerce", <http://www.cavajava.com/final.pdf>.

14. Okinawa Charter on Global Information Society by the Office of International Information Programs, <http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan002263.pdf>.

15. Digital Opportunities for All: Meeting the Challenge, Report of the Digital Opportunity Task Force (DOT Force) http://www.dotforce.org/reports/DOT_Force_Report_V_5.0h.html#_ftn1.

16. <http://www.ic.gc.ca/cmb/welcomeic.nsf/0/a9e5644830c78bdf85256cca00712ea8?OpenDocument>.

17. Andrew Clement and Leslie Shade, 1998. "The Access Rainbow: Conceptualizing Universal Access to the Information/Communications Infrastructure," Information Policy Research Program, Faculty of Information Studies, University of Toronto. *Working Paper* No. 10. Toronto, Ontario; and, M. Gurstein (editor). *Community informatics: Enabling communities with information and communications technologies*. Hershey Pa.: Idea Group, 2000.

18. In addition, Clement and Shade provide a nuanced perspective on how we might look at issues of "access" in what they call "The Access Rainbow". which is a:

"socio-technical architecture or model that illustrates the multifaceted nature of the concept of access. Inspired by the layered models used for network protocols, the lower layers emphasize the conventional technical aspects. These have been complemented with additional upper layers emphasizing the more

social dimensions. The main constitutive element is the service/content layer in the middle, since this is where the actual utility is most direct. However, all the other layers are necessary in order to accomplish proper content/service access. The layers also correspond to important regulatory distinctions between carriage and content."

The layers of the rainbow as they present them are:

1. Carriage Facilities: the facilities that store, serve or carry information.
2. Devices: the actual physical devices that people operate.
3. Software Tools: the program that runs the devices and makes connections to services.
4. Content/Services: the actual information and communications services people find useful.
5. Service Providers: the organizations that provide network access to users.
6. Literacy/Social Facilitation: the skills people need to take full advantage of information/communications facility and the training and facilitation to acquire these skills.
7. Governance: How decisions are made concerning the development and operation of the infrastructure.

19. This addition was suggested to me in a private communication by Matt Wenger, one of Canada's leading community technology practitioners.

20. Establishing the Effective Use of Information and Communication Technologies in Education for All in Cambodia,

http://www.unesco.org/bangkok/education/ict/unesco_projects/JFIT/cambodia.htm;
"Factors Influencing the Effective Use of Technology for Teaching and Learning: Lessons Learned from the SEIR©TEC Intensive Site Schools," South East and Islands Regional Technology in Education Consortium, <http://www.zuni.k12.nm.us/las/PDF/lessons6.pdf>;
and Critical Factors in the Effective Use of Technology, Laura J. Dowling and Darci J. Harland, Walden University, 6 January 2001;
www.dowlingcentral.com/gradschool/Edu6420/project1.html. For the use of the term in a somewhat different context, see "Effective Use of Courtroom Technology: A Judge's Guide to Pretrial and Trial" http://www.fpdct.org/reference/courtroom_tech_guide.pdf.

21. "Effective Use of ICT to Create a New Environment for Learning and Teaching," U.N. International Conference Centre, 29 July-1 August 2002, Bridges.org, <http://www.bridges.org/ereadiness>.

22. http://www.globalknowledge.org/gkps_portal/index.cfm?menuid=8.

23. JISC Strategy 2001-05 Supporting Paper — Joint Information Services Committee XI (97), http://www.jisc.ac.uk/index.cfm?name=strategy0105_supporting.

24. Sarah Cleeland Knight and Catherine L. Mann. Georgetown University and the Institute for International Economics, http://www.ssrc.org/programs/itic/publications/ITST_materials/mannnote1.pdf.

25. 11 May 2001, http://www.dotforce.org/reports/DOT_Force_Report_V_5.0h.html.

26. See, for example, M. Gurstein, In: M. Gurstein (editor). *Community informatics: Enabling communities with information and communications technologies*. Hershey Pa.: Idea Group, 2000; and "Rural development and food security: A "community informatics" based conceptual framework for FAO," <http://www.fao.org/sd/CDdirect/CDre0055c.htm>.
27. Cf. M. Gurstein, "Introduction," In: M. Gurstein (editor). *Community informatics: Enabling communities with information and communications technologies*. Hershey Pa.: Idea Group, 2000; and M. Gurstein and Bruce Dienes, "A 'Community Informatics' Approach to Health Care for Rural Africa," presented to The Africa Telemedicine Project: Conference '99 "The Role of Low-Cost Technology for Improved Access to Public Health Care Programs Throughout Africa," Nairobi, Kenya, 19–21 February 1999.
28. Matt Wenger, *op. cit.*, makes a very important point about the need to develop a local "pull" for technology through local leadership and processes of local community development.
29. This example is loosely based on the paper by Gurstein and Dienes (1999).
30. Wenger *op. cit.* See also Peter Day, "CNA — Community Network Analysis and ICT: Bridging and Building Community Ties," unpublished, where he describes a research project to document precisely these issues.
31. <http://www.crisinfo.org/live/index.php>.
32. <http://mail.sarai.net/pipermail/solaris/2002-July/000151.html>.
33. Taken from Civil Society Press release, 26 September 2003, WSIS — PrepCom III.
34. Two international colleagues whom I asked to comment on this paper both pointed to the issue of the constraints which and "effective use" approach might place on local or individual innovation using ICTs. Their argument was that the simple provision of "access" was in itself a major source of empowerment at the individual or local level since it gave the opportunity for self-directed exploration and innovation. This is certainly an important issue in this context and clearly reflects the concerns of those (one colleague was experienced in pre-perestroika Russia) who have experience in highly directive environments.
35. For an introduction with references to participatory design, see <http://www.cpsr.org/program/workplace/PD.html>.
36. For a general introduction to participatory action research see: <http://www.parnet.org/>. For a specifically community informatics application see the on-going work by Peter Day and Wal Taylor as in <http://www.is.njit.edu/vci/iwci1/day-comm-network-analysis.doc>.
37. Wenger, *op.cit.*
38. Tony Salvador of Intel Research (in a private communication) has been attempting to apply the effective use framework to the analysis of case study material he and his colleagues have been collecting on local telecentre projects. He has observed quite correctly I believe, and consistent with the observations elsewhere in this section, that in order to use the framework for "analysis" of existing developments rather than "planning" future

developments there is the need to identify the "animating source" of the activities that is what has caused them to develop where and how they have developed — he uses the term "auto-catalysis" for this purpose.

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