

Social capital and access

Mark Warschauer

Dept. of Education and Dept. of Information & Computer Science, University of California, 2001 Berkeley Place, Irvine, CA 92697-5500, USA; E-mail: markw@uci.edu

Published online: ■ ■ 2003 – © Springer-Verlag 2003

Abstract. Physical access to computers does not guarantee access to the information society. To help ensure that the first type of access translates into the second, it is necessary to pay attention to how computer and Internet use can enhance social capital. Drawing on examples from technology projects in India and other countries, this paper examines the concept of social capital and its relationship to information and communication technology, focusing on the role of both micro-level and macro-level social capital.

Keywords: Access – Social capital – Community informatics – Community development – Social development

1 Social capital and access

In 2000, the Government of New Delhi, in collaboration with an information technology corporation, established a project, known as the *Hole-in-the-Wall* experiment, to provide computer access to the city's street children.¹ An outdoor five-station computer kiosk was set up in one of the poorest slums of New Delhi. Though the computers themselves were inside a booth, the monitors protruded through holes in the walls, as did specially designed joysticks and buttons that substituted for the computer mice. Keyboards were not provided. The computers were connected to the Internet through dial-up access. A volunteer inside the booth helped keep the computers and Internet connections running.

No teachers or instructors were provided, in line with a concept called *minimally invasive education*. The idea was to allow the children unfettered 24-hour access, and

¹ Information on this project comes from a paper by Sugata Mitra [32], personal communication with Chetan Sharma (July 2001), and my own visit to the site and interviews with users and community residents in July 2001.

to learn at their own pace and speed, rather than tie them to the directives of adult organizers or instructors.

According to reports, children who flocked to the site taught themselves basic computer operations. They worked out the following: how to click and drag objects; select different menus; cut, copy, and paste; launch and use programs such as Microsoft Word and Paint; get on the Internet; and change the background “wallpaper.” The program was hailed by researchers (e.g., [32]) and government officials alike (personal communication, S. Regunathan,² July 2001) as a ground-breaking project that offered a model for how to bring India's and the world's urban poor into the computer age.

However, visits to the computer kiosk indicated a somewhat different reality. The Internet access was of little use since it seldom functioned. No special educational programs had been made available, and no special content was provided in Hindi, the only language the children knew. Children did learn to manipulate the joystick and buttons, but almost all their time was spent drawing with paint programs or playing computer games.

There was no organized involvement of any community organizations in helping to run the kiosk, since such involvement was neither solicited nor welcomed. Indeed, the very architecture of the kiosk – based on a wall rather than a room – made supervision, instruction, and collaboration difficult.

Parents in the neighborhood had ambivalent feelings about the kiosk. Some saw it as a welcome initiative, but most expressed concern that the lack of organized instruction took away from its value. Some parents even complained that the kiosk was harmful to their children. As one parent stated, “My son used to be doing very well in school, he used to concentrate on his homework, but now he spends all his free time playing computer games at

² Principal Secretary for Information Technology, Government of New Delhi



the kiosk and his schoolwork is suffering.” In short, parents and the community came to realize that “minimally invasive education” was, in practice, minimally effective education.

How do we make sense of the problems with the Hole-in-the-Wall experiment? To do so, we must consider two conflicting definitions of the term *access*. On the one hand, the term is used in the narrow sense of physical access to online communication – that is, having access to a computer with an Internet connection. On the other hand, the term is used in the wider sense of being able to use ICTs to insure access to broader social participation and inclusion. The Hole-in-the-Wall project, like too many technology initiatives, promoted access in the narrow sense (to computers), but did very little if any to promote access in the broad sense (to the information society).

What then is the relationship between access to ICTs and access to the information society? This article suggests that one key element linking the two is *social capital*. If access to ICT is provided in a way that enhances social capital, then this will likely promote access to the “information society”, or, in other words, fuller opportunities for social, political, cultural, and or economic participation. If social capital is not enhanced, access to computers may provide nothing more than limited-value entertainment. Of course, social capital is not the only factor helping to explain ICTs’ relationship to human and social development; but, it often is a leveraging factor that can help multiply other types of capital that may be increased through use of ICTs (see discussion below).

This article will explore in depth the concept of social capital and its relationship to Internet use. First, the roots of the term will be explained, and then its relationship to Internet use in both micro- and macro-contexts will be examined, drawing on examples from India, Brazil, the United States, and elsewhere. These examples are not presented as in-depth case studies, but rather as brief illustrations of some of the key concepts discussed in the paper.

2 Social capital

The concept of social capital arose in the 1980s, as a number of social scientists considered the role of interpersonal relations in human and social development (e.g., [7, 13]). To many, it was clear that the long-existing concepts of *human capital* (i.e., individual skills, knowledge, and attitudes) and *physical capital* (i.e., financial assets) did not fully describe the developmental resources available to people and societies. Parallel to human and physical capital is a category of social relations and trust that has come to be called social capital. Woolcock, for example, points to his discussions with rural villagers in India in defining the concept (pp. 152–153 in [52]):

When asked to explain why such miserable conditions prevail in their village and what they think

needs to be done to improve things, the villagers’ answers are revealing. The main problems, they say, are that most people simply cannot be trusted, that local landlords exploit every opportunity to impose crushing rates of interest on loans, and pay wages so low that any personal advancement is rendered virtually impossible. There are schools and health clinics in the village, they lament, but teachers and doctors regularly fail to show up for work. Funds allocated to well-intentioned government programs are siphoned off by local elites. Police torture innocent villagers suspected of smuggling. Husbands regularly beat or abandon their wives. Utter destitution is only a minor calamity away. You venture that surely everyone would all be better off if they worked together to begin addressing some of these basic concerns. “Perhaps,” they respond, “but any such efforts seem always to come to naught. Development workers are no different: just last month, someone who claimed to be from a reputable organization helped us start savings and credit groups, only to vanish, absconding with all our hard-earned money. Why should we trust you? Why should we trust anyone?”

In the eyes of social scientists, what this village lacks is social capital. Social capital can be defined as the capacity of individuals to accrue benefits by dint of their personal relationships and memberships in particular social networks and structures. For example, if a friend provides information about a possible job, that represents social capital. If a parent offers high educational expectations, opportunities, and support to a child, that also represents social capital. If a government bureaucrat can be trusted to do what he or she says, that too is a form of social capital. Social capital accrues both to individuals and to communities, which benefit from the collective social capital in their midst. Even a poorly-connected person benefits from living in a well-connected community; for example, if members of a community are known for keeping an eye on each others’ homes, that will discourage crime in the neighborhood and benefit even those residents who have few neighborhood ties.

Social capital is not just an input into human development, but a “shift factor” affecting other inputs (p. 54 in [43]), since it tends to enhance the benefits of investment in human and physical capital [37]. For example, investments in training can be multiplied by the input of social capital as the strengthening of social ties enables people to better learn from others [12, 51].

An important source of social capital is the personal relations that people have in their family and community. These relations can provide information, influence, social credentials, and reinforcement [30]. Information can include everything from a recommended health-care provider, to a tip for a job opening, to advice on preparation of soil. Influence is exerted on others, for example,



when an associate persuades somebody to hire you. Social credentials refer to the higher regard that someone might have for you because of your social connections (e.g., your family, friends, neighborhood). Reinforcement refers to the emotional and personal support you get from people you know (e.g., encouragement in the face of illness). Norms refer to the general expectations of the groups around you; for example, a child benefits greatly if he or she attends a school where everybody is expected to attend college.

These benefits can be shared through both *bonding social capital* and *bridging social capital* [9, 38]. Bonding social capital refers to the strong ties that are shared among dense, inward-looking social networks, such as among family members, close friends, church groups, or ethnic fraternal organizations. These strong ties provide the kind of emotional support and sustenance that allows us to get by. Bonding social capital plays a dual role: it brings the strength of social solidarity, but sometimes at the cost of antagonism with, or distance from, other groups (consider, for example, the strong bonding social capital in a youth gang, which might serve to alienate or isolate gang members from access to other social sources of information and support).

In contrast, bridging social capital refers to the ties that are formed with those from other social circles. Since it provides important links to new sources of information and support, bridging social capital is considered especially important for economic and social development. The value of bridging social capital is explained by Granovetter's theory of *the strength of weak ties* [17]. Those in our own immediate circle – our strong ties – tend to have similar friends and similar sources of information to us. Therefore, when we bond with them, we may not gain much in terms of new sources of information or support. However, distant acquaintances and contacts will have access to different people, different information, and different social networks. Therefore, a broad network of weak ties is actually more important than a small network of strong ties in many ways. For example, distant, weak social ties may be more useful than strong, close ties in finding a job or gaining political allies. As Xavier de Souza Briggs puts it, strong ties are good for “getting by,” while weak ties are crucial for “getting ahead” (quoted on p. 21 in [37]).

Other sources of social capital are the norms, rules, and expectations that exist in a neighborhood, community, or society. If men are expected to treat women well, individual men, women, and children will all benefit. If drivers are expected to stay in their own road lane and signal before turning, each driver will benefit because of the increased safety – or at the very least, predictability – of one's own and others' driving. If government officials must follow rules that restrict opportunities for corruption, the entire society will benefit. Of course *relational* social capital (based on bonding and bridging) affects *norm* social capital (based on norms and expectations), and vice versa. The types of bonds and bridges

that exist between individuals, the types of groups and organizations that people belong to, and the way that these groups express the needs and desires of a community all affect, and are affected by, the norms and expectations of a society.

3 ICT and social capital

What then is the relationship between ICT and social capital? On the one hand, social capital is an important factor in gaining access to computers and the Internet. Entering the world of computing is quite complex. It involves making decisions about whether to buy a computer, what kind of computer to buy, how to set it up, what kind of software to get, how to install it, how to obtain and set up Internet access, and then how to use the computer, the software, and the Internet. Most people rely on their social networks to offer support and assistance in this. That might involve observing computer use at a friend's house, hearing how a neighbor uses the Internet, asking a colleague to help solve a software problem, or simply buying a computer for your child because it is a general expectation in your community that children should have access to computers (see discussion in [1]).

For people whose social network does not include computer users, the challenges of purchasing, setting up, and learning to use a computer can be overwhelming. Two recent studies conducted in California provide evidence of the value of social capital in gaining entry to the world of computing. The first study, based on a survey of 1000 people, found that social contact with other computer users was a key factor correlated with computer access [40]. As the study reports,

Although most respondents stated that they know people who used computers, the digitally detached (those who do not have home personal computers, Internet access, or access to the Internet outside of the home) did not. And when compared with the impact of ethnicity, income, and education level, this sentiment – that they did not know others who used computers – is far more significant (p. 12).

The second study, based on interviews at community technology centers, found that the social support offered at those centers was critical toward many people's decisions to purchase computers [45]. In many other cases, though people already had purchased computers, they were not yet using them, but began to use them after engaging in computer use in a supportive social environment offered by their local community technology center.

Neither of these studies proves definitely that a particular type of social support promotes computer access; they do, however, show that social networks and computer usage are inextricably linked. Community initiatives can take advantage of this linkage to facilitate home computing. For example, one neighborhood project in Massachusetts – in spite of offering a package including



free home computers, free Internet access, and free training – was only able to sign up 8 of 47 families in the neighborhood housing project. However, after residents from the housing project who had already participated in the first round of the project went door-to-door and spoke of the personal benefits that they had received, the registration rate jumped from 17 to 57% (personal communication, Randall Pinkett, June 2001). Similarly, a “learn-and-earn” project in Riverside (that allowed people to purchase computers at a discounted price if they had first completed a computer course at a training center) found that the personal contacts established at the training center were critical toward people’s use of their new home computers. It was not only the training and skills the center provided, but also the network of support; the new computer owners would return frequently to the center to consult with staff members about hardware, software, and other issues related to computer and Internet use (personal communication, Ricardo Gutierrez, June 2001).

Another important question is whether using ICTs extends people’s social capital. The natural assumption is that the answer is yes, since the Internet provides expanded opportunities for communication and association with broad numbers of people. This is especially important for developing weak social ties, for which the Internet is a natural medium. As Collier explains, one of the simplest ways to promote social capital is to lower the cost of social interaction, and the Internet certainly achieves that [14]. One leading sociologist has gone so far as to proclaim that the rise of the Internet has brought about “a revolutionary growth of social capital” (p. 237 in [30]).

Empirical studies do suggest that use of the Internet can promote social capital. One of the most in-depth studies was conducted by Keith Hampton, who carried out his dissertation research in a suburban housing community in Toronto, known as Netville [20]. All those purchasing homes in Netville were offered free broadband Internet access, but, in the end, this access was provided to only 60% of the residents. The resulting dichotomy between those with and those without Internet access – two groups that were highly similar in most other ways – provided a fertile laboratory for analyzing the impact of Internet use on social capital. The study found that those with Internet access maintained and developed more extensive social networks of contact and support both within Netville and outside [24]. Outside the community, the wired residents tended to maintain or increase their contacts and support from people who lived less than 50 km away, between 50 and 500 km away, or more than 500 km away; whereas the unwired residents faced decreased contact or support at all three distances (presumably because they had just moved to a new neighborhood and thus removed from old contacts, and were also busy settling in to their new homes). Interestingly, the greatest differences in support rendered to wired and non-wired residents was from people at an intermediate

distance (50–500 km), suggesting that the Internet is especially helpful at building social capital with those people who are “just out of reach” (i.e., more so than with those that one never sees, or sees often).

As for contacts *within* the Netville neighborhood, those were also bolstered by online communication [21, 22]. This was due not only to Internet connectivity, but also to the establishment and use of a community e-mail list known as Net-1. Because of communication on this list and the social ties that arose from exchanges online and later offline, wired residents had substantially more contact of every sort within the community than did non-wired residents, whether measured by number of people recognized by name, number of people spoken with on a regular basis, number of people called on the phone, or number of people visited at home. Interestingly, the wired residents even had more contact with the non-wired residents than the latter group had among themselves, apparently because the wired residents took responsibility for sharing and passing on information from the Net-1 list to their non-wired neighbors.

However, there are countervailing factors involved in any consideration of social capital and ICT use, including several reasons why the Internet might *not* promote social capital (see discussion in [38]). First, face-to-face interaction provides a richer form of communication and support than does online interaction [8]. To the extent that online communication *supplants* rather than *supplements* face-to-face interaction, it could thus weaken social capital. Think, for example, of a school class that carries out an international exchange with students in another country while missing opportunities to interact more directly with different social or ethnic groups in its very own city. At least one study claims to show that the more time people spend online a week, the more they lose contact with their immediate social environment [34].³

This potentially negative effect on social capital could be exacerbated by the amount of hostility that occurs online. The reduced communicative content in online exchanges (i.e., no visual or audio clues) frees people up from their inhibitions, which allows easy contact with large numbers of people, but also can bring out the worst in people. This results in a phenomenon called *flaming*, in which people express hostility in ways they might never do face-to-face. (For an interesting discussion of this from a structure functionalist approach see [36].)

The Internet can also lead to a narrowing rather than a broadening of social contact. A teenager is just as likely

³ Whether or not use of the Internet causes social isolation is a point that has been hotly debated by sociologists. Another large-scale study found that heavy users of the Internet suffered depression, presumably because Internet use took time and energy away from face-to-face interaction with friends and kin [28]. However, a follow-up study led by the same researcher, using more up-to-date data, reversed the original view [27]. For further discussion of this issue, see the November 2001 (vol. 45, no. 3) issue of the *American Behavioral Scientist*, a special issue of 10 papers devoted to the theme of the Internet in everyday life.



to spend hours online chatting with a small circle of friends as he or she is to form new contacts and bridges with diverse social networks. Those who use the Internet to seek information may also have their sources narrowed, rather than broadened (see discussion in [46]). The Internet continues a trend of narrowcasting that began with the proliferation of radio stations and television channels. On the Internet, you can design “my CNN” or “my Yahoo,” thus making it less likely that you would discover the new sources of information that you might come across in reading the newspaper or browsing a library shelf.

Finally, there is no assurance that people will use the Internet for either social interaction or information. The most popular and fastest growing uses of the Internet include private, anti-social forms of entertainment, such as viewing pornographic material and gambling. To the extent that the Internet facilitates activities such as these, it will weaken rather than strengthen social capital.

While some cyber-pessimists have sounded the alarm about these potential drawbacks of the Internet, most sociologists take a more balanced view. The associative power of the Internet can be exploited to supplement social capital, but not if the Internet is seen as a panacea in itself. Rather, strategies must be devised to combine the strengths of the Internet with other forms of interaction. This is especially important when working with impoverished or marginalized groups that need to leverage *all* their sources of capital in order to thrive.

How then can this be accomplished? Efforts to make use of ICT to promote social capital take place at three overlapping levels.⁴ One is at the micro-level, referring to the relations with friends, relatives, neighbors, and colleagues that provide companionship, emotional support, goods and services, information, a sense of belonging, and opportunities for community development. A second is the macro-level, which corresponds to the effectiveness of government institutions and transparent and trustworthy relationships that exist between governments and citizens. A third level, falling between these two, is the meso-level, corresponding to the voluntary associations and political organizations that allow people opportunities to form alliances, create joint accomplishments, and collectively defend their interests. I have discussed the third, or meso-level, elsewhere [49]. For the purposes of this article, I will focus on the first two levels, examining their relationship to ICT projects.

4 Micro-level social capital: virtual community vs. community informatics

There are two approaches to using the Internet to promote micro-level social capital. The first is what could be

termed a *virtual-community* approach. The second can be termed *community informatics*.

The term *virtual community* was popularized by Howard Rheingold in 1993 with the original publication of *The virtual community: homesteading on the electronic frontier* [42]. Rheingold had been active in computer conferencing since the mid-1980s, and in the book he wrote eloquently of people’s experiences in a pioneer computer conference called the WELL (Whole Earth ’Lectronic Link). The WELL’s members, mostly upper-middle class suburbanites in the San Francisco Bay Area, participated in a wide-range of electronic forums ranging from Arts and Letters (e.g., the Beatles, Jazz), Recreation (e.g., Gardening, Chess), Entertainment (e.g., Star Trek, Bay Area Tonight), Education and Planning (e.g., Biosphere II, Transportation), Computers (e.g., Software Support, Desktop Publishing), and Body-Mind-Health (e.g., Recovery, Gay Issues). Rheingold provides a compelling narrative of how a group of strangers from different backgrounds and places came together electronically to share information, debate and discuss ideas, and provide emotional support in time of need.

However, Rheingold later came under broad criticism for his over-enthusiastic reliance on anecdotal evidence, his neglect of countervailing patterns, and his apparent support for the notion that online communities were distinct from, and perhaps better than, traditional ones. To be fair, Rheingold never claimed to be carrying out academic research, and his views on the existence of an autonomous *cyberspace* and virtual communities were never as extreme as those of others, such as cyber-guru John Perry Barlow of the Electronic Frontier Foundation, who argues that cyberspace constitutes an entirely different world [5]. Nevertheless, Rheingold’s popular book did represent a foil for those critical of the notion of virtual community. Eventually, Rheingold himself came to moderate his views, partly due to his participation in bitter social conflicts that emerged in and around the WELL. In the revised edition of his book (2000), Rheingold questions the very notion of virtual communities as distinct from traditional communities.

His critique of virtual communities rests on two key points. First, any technology emerges from, and responds to, existing social relations and social contexts. Technologies may create new possibilities, but they do not in and of themselves represent separate worlds. Second, and related to the first point, the division between *virtual* and *traditional* communities is bogus. As social-network theory and research makes clear (e.g., [50]), so-called traditional communities are rarely based on neighborhood or village alone. In all but the most isolated parts of the world, people’s social networks include relatives, friends, and other associates who live elsewhere, and contact with them is maintained through personal visits, mail, telephone, or other media. Thus the notion of neighborhood-based traditional communities is outmoded to begin with.

⁴ Sociologists have a range of views as to the different levels of social capital. My own three-level (micro-, macro-, meso-) approach draws on a number of perspectives, including those of [29, 47, 50, 52].



Extensive research in a variety of domains indicates that use of information and communication technology tends to complement other means of networking, rather than replacing them [23, 48, 50]. One of the best discussions of this issue is Philip Agre's primer for graduate students, *Networking on the Network* [2]. Agre explains how students can make use of the Internet to steadily increase their contacts and positioning within academia, but only through building on other kinds of institutional relations already existing in academia, such as personal contacts between students and professors at universities and conferences.

Because of the intersection between online communication and other means of social networking, approaches to promoting social inclusion that rely solely on virtual communities are ill-advised. Successful approaches usually combine online and face-to-face networking. An example of this approach is a group of Egyptian educators who have successfully come together, outside the Ministry of Education channels, to learn about educational technology and its integration in their classrooms and lives (see discussion in [49]). The group thrives through an e-mail discussion list, but this list was only formed after several face-to-face meetings in Cairo to share ideas and discuss plans. The group still holds occasional face-to-face meetings to conduct training sessions, hear guest speakers, or simply socialize. Annual technology fairs are planned for national conferences. Through a combination of face-to-face training, committees, projects and e-mail discussion, the group has developed into a strong educational support network – far stronger than it could have through Internet contact alone.

5 Community informatics

A more appropriate framework for thinking about technology for social inclusion is provided by *community informatics* (see [19, 31]). Community informatics seeks to apply ICT to help achieve the social, economic, political, or cultural goals of communities. Community informatics begins from the perspective that ICT can provide a set of resources and tools that individuals and communities can use, initially to provide access to information management and processing, and eventually to help individuals and communities pursue goals in local economic development, cultural affairs, civic activism, and community-based initiatives [19]. Community informatics strives to take into account the design of the social system and culture within which the technology resides, as well as the design of the broader technological system within which a particular tool or medium interacts.

Promoting social capital is a key strategy of community informatics, but it is not seen as taking place principally through online communication. Rather, social capital is created and leveraged by building the strongest possible coalitions and networks in support of the communi-

ty's goals, using technology projects as a focal point and organizing tool. Online communication is of course part of this, but so are more traditional forms of communication, organization, mobilization, and coalition building.

The author's research in a variety of settings has indicated that five strategies are critical to promoting social capital in community technology projects. These include leveraging existing community resources, mapping and connecting existing community connections, integrating with broader social and economic campaigns, organizing new social alliances, and social mobilization via a wide range of media and tools.

5.1 Leveraging community resources

Probably the most effective method for leveraging community resources is to work through existing community organizations or leaders to launch and manage community technology initiatives (cf. [3]). In this way, existing bonding social capital in the community can be exploited to further develop people's bonding and bridging social capital. Community organizations know the local situation and can work to provide a structure that meets local needs. One of the main failings of the aforementioned Hole-in-the-Wall computer kiosks in Delhi was that no local community organization was involved in running them. The director of the project, a government official, declared that he preferred to work "directly with the people" rather than via intermediaries such as community organizations.⁵ However, in the specific case, going "directly to the people" meant placing a project in a community without any organized way for the community to partake in the management or leadership of the project. In contrast, the best community projects I have witnessed in India, Brazil, and elsewhere make ample use of community resources. In India, for example, where many local villages are led by local tribal leaders, their participation is critical in the effective implementation and management of community technology projects. In the cities of Brazil, in contrast, key community roles are played by neighborhood associations, slum-dweller groups, and other non-governmental associations.

Many times a single community group can be brought in directly to manage a project. In other cases, leaders of several community organizations can come together to form a new community council for the project. So while the Hole-in-the-Wall project suffered from an unclear purpose and questionable sustainability due to its lack of community leadership, another street children's project in India – a computer-based training program – was run very effectively by an NGO called Prayas, which has a long history working with street children in many other capacities (e.g., through housing programs, health clinics, counseling services). Since this group already has

⁵ Interview with S. Regunathan, Principal Secretary for Information Technology, Government of New Delhi, July 2001.



worked with street children, knows their needs, and has their trust, it was able to fashion a computer training program that had a better organization (through structured classes) and purpose (vocational training) rather than merely placing computers in a slum.

Another strategy for leveraging community resources is through the promotion of ICT capabilities of extant groups. An example of this is seen by the Community Digital Initiative, a community technology center in Riverside, California – a city with a large number of low-income Latinos.⁶ Though the center also runs individual training programs, much of its impact comes from work with organizations. The project chose as its location a large building in the center of town that hosts many other community organizations, including violence-prevention groups, a dispute-mediation group, a volunteer center, court-referral programs, housing programs, transportation-access programs, crisis-intervention programs, community health projects, and legal-aid organizations. These groups, as well as similar organizations elsewhere in Riverside, form an important part of the clientele of the center. Managers, administrators, and members of these groups participate in workshops to learn how to use computers and the Internet to function more effectively. This might include everything from developing a computerized mailing list, keeping track of organizational finances, developing brochures and newsletters, making an organizational web site, or setting up an internal or external e-mail list. The center also provides its equipment and resources for the community organizations to carry out these tasks. In this way, the efforts of the Community Digital Initiative are multiplied, as existing community groups are empowered to carry out their work more effectively.

5.2 Mapping and connecting community resources

Mapping community resources is a critical component of launching a successful community technology initiative. This also serves to identify and maximize access to existing social capital. Participatory appraisal techniques (see [10, 33]) can be used to identify relations and resources within a community and how those might be amplified through a technology initiative. For example, one of the participatory techniques used in rural telecenter planning in India has been *community mapping*. Different members of the community are invited to draw maps of the community from their own perspectives. By seeing how different members map the community, organizers can learn about what locations, people, and assets of the community are most valued, and which location,

for example, might be the best for placing a community telecenter. Other participatory techniques include identifying who is in contact with whom. For example, another rural Indian telecommunications project learned through PRA techniques that women in the village tended to communicate principally with other women, rather than with men. The project then incorporated the rule that half the staff of its village knowledge centers should be women, to ensure that everyone in the village would be able to have a voice and be heard (personal communication, K.G. Rajamohan, July 2001).

The community can later be drawn into developing more detailed databases of local resources and assets. For example, a community project called Sampa.org in Sao Paulo has mobilized a group of people to develop a geo-reference system of the Capo Redondo *favela* (slum) – one of the poorest and most crime-ridden neighborhoods in Brazil – including a physical map of the streets and a database of community resources such as health centers, neighborhood associations, and worker cooperatives [49]. Whereas this kind of information is easier to find in wealthier communities, many of the *favelas* of Brazil are like informational black holes. In this case, a commercial transportation company, which monitors deliveries in the area but has no existing map, funded the project. From the community organizers' point of view, the project serves multiple ends. Not only will the database itself be of great use to community members when made available through the local telecenters in the Sampa.org project, but the mapping team is gaining important vocational skills (e.g., development of geo-reference systems) that they can then market to others.

5.3 Tie-in to broader social and economic campaigns

Technology projects do not exist as ends in themselves. They are most effective when they are tied to broader social and economic campaigns, as shown by the following three examples.

5.3.1 Bresee cyberhood

The Bresee Foundation has been carrying out community organizing in Central Los Angeles since the mid-1980s.⁷ The involved neighborhood is one of the poorest and most crime-infested in Los Angeles, with a high rate of homicide, gang-related shootings, auto-theft, domestic violence, and drugs, and a low rate of employment, income, and health care. More than 40% of the people in the neighborhood live below the poverty line and some 54% lack health insurance. The neighborhood was also the site of the infamous Rampart police scandal, in which members of the Los Angeles Police Department were convicted

⁶ Information on the Community Digital Initiative comes from interviews with project Director Richard Chabran in April and June 2001, a visit to the center in June 2001, and from web sites of the project (<http://cdi.ucr.edu>) and its umbrella group, Computers in Our Future (<http://www.ciof.org>).

⁷ Information on the Bresee Community Center and Cyberhood comes from a visit to the center and interviews with Bresee staff in April 2001 and from the Bresee Foundation's web site (<http://www.bresee.org>).



of planting evidence, faking confrontations, and repeatedly lying to send men to prison.

Bresee's community-development strategy is largely built around forging social capital in the neighborhood. This is accomplished via a community center that provides a safe, trusting environment through a wide array of programs. The center includes a health clinic, a homework assistance program, a recreation program, youth discussion groups, and employment training. Recently, Bresee has opened a computer center, known as Cyberhood, within the broader community project. Cyberhood offers a wide range of services, including open drop-in computer and Internet access for adults, a range of computer courses, a multimedia internship program for teenagers, and technology-and-employment programs.

The integration of Cyberhood within the broader social development mission of Bresee offers many benefits. On the one hand, Cyberhood builds on the safe and trusting atmosphere of its "parent" center. Among the Cyberhood participants I interviewed was a local homeless youth who came to the Bresee center regularly because it offered a safe environment for him to spend time in. On the other hand, the computer projects can benefit from the broader organizing campaigns and relationships of Bresee. Bresee's relations with local schools, universities, and businesses, for example, help to recruit the right children into its technology programs and to provide them with sufficient volunteer support. In addition, there is much crossover between the different services. Some of the people who attend the health clinic at the center later come to Cyberhood to find information on the Internet related to their health needs.

One strategy for community building is through fostering local leaders. Some 25% of the employees at Bresee were formerly clients of the center. Local youth leaders are constantly developed through training and internship. For example, in the computer center, much of the hands-on assistance is done by teenagers who have completed a course there and who have demonstrated talent; they are subsequently hired to help others.

The Cyberhood programs also serve the economic goals of Bresee, through integration of technology and employment training. Courses focus on business graphic-design skills, such as the development of business cards, brochures, and newsletters. Other software programs are used to help the youth develop an overall sense of direction in their lives. For example, a software program called Choices helps people reflect on and research the kinds of careers they are interested in and the types of preparation those careers require [11].⁸

In summary, Cyberhood is not an end in itself. As the director of Bresee explained:

⁸ Information on Choices are available at <http://www.careerware.com/products/us/choices.htm>. There is also an Internet version called eChoices, with information at <http://www.echoices.com>.

We don't just teach people computers, it's not just about developing skills – it's about connections with people and building relations. This community lacks the kind of mediating institutions like good schools, churches, and parents involved in the schooling. Our technology programs work together with all our other programs to help people develop these kinds of relations that are often missing. In this way we can be a gathering place and hub for the community.⁹

5.3.2 MS Swaminathan Research Foundation

A rural counterpart to the work of Bresee is that of the MS Swaminathan Research Foundation (MSSRF) in southern India.¹⁰ MSSRF has been carrying out economic and environmental programs in communities in Pondicherry and Tamil Nadu since 1991. MSSRF works with the neediest groups in order to simultaneously combat both rural poverty and environmental degradation. Its strategy in rural India is to help landless laborers and small farmers develop the skills, resources, and organization they need in order to obtain much greater value from their labor. As a centerpiece to this, they have developed two model bio-villages, where agricultural laborers can come to observe environmentally sustainable farming processes first-hand and learn new skills, techniques, and knowledge. Projects at the bio-villages center on aquaculture, mushroom and flower cultivation, fodder cultivation, horticulture, conservation of rainwater, composting, rope-making from coconuts, pest control, and dairy farming.

MSSRF later developed their Village Knowledge Centers, a network of computer kiosks in rural villages, to serve this broader socio-economic development project. Content from the bio-village projects is made available throughout an intranet that connects the centers. Even if the farmers themselves can't read it, the center staff can share information about bio-farming with them. With funding from the Commonwealth of Learning, a local farmers' group is further developing this content into databases to assist rural development campaigns throughout India. In addition, MSSRF is helping women's collectives learn computer skills needed for micro-finance management, so that they can better work to obtain and manage their bank credit in carrying out sustainable agriculture projects.

One of the more exciting offshoots of this program is Oddanchatrammarket.com, an e-commerce web site and campaign started by a local farmers' association. In order to enhance demand – farms in the area lay fallow 40%

⁹ Interview with Jeff Carr, Director of Bresee Community Center, April 2001.

¹⁰ Information on MS Swaminathan Research Foundation projects comes from a visit to their headquarters and rural projects in July 2001 and interviews with members of their staff. Further information is available from their web site at <http://www.mssrf.org>.



of the year because of lack of a market for the goods – the local small farmers’ association went to the suppliers and offered to announce their goods on a web site. The intention is to increase national demand for local products, thus providing greater income for the suppliers, farmers, and agricultural laborers alike. The suppliers will pay a nominal fee for the service, thus providing additional funds for the farmers’ association.

5.3.3 ISIS for the blind and visually impaired

The Information, Service, Integration, and Schooling (ISIS) project for the blind and visually impaired is located in Graz, Austria.¹¹ ISIS, whose president and staff are themselves all blind or visually-impaired, seeks to open job possibilities beyond classical blind employment (e.g., basket weaving) to more wide-ranging opportunities in the information economy. Toward that end, they have set up a computer training center offering courses for the blind ranging from introductory modules (resulting in a European Computer Driving License)¹² to specialized topics (e.g., Linux operating system) with a close orientation to labor market needs. The training center also hosts what is believed to be the first public Internet café for blind people, where people are offered the opportunity to browse the Internet using specially designed hardware and software, as well as to interact with other café visitors. In addition, a telephone, “blindline,” provides free information to the blind and their relatives, educational establishments, and social-service agencies about assistive technology issues and training opportunities.

5.4 Organizing new social alliances

While the virtual-community approach focuses on developing online ties, the community-informatics approach seeks to actively engage an array of groups in social projects. In this way, the community gains access to social contacts and support from diverse resources that may not have been accessible before. For example, at the institution level, Alkalimat and Williams describe how gradually increasing the involvement of local churches, a university, and municipal organizations provides strength and sustenance to a community technology center [3]. Similarly, in Egypt, the 21st Century Clubs are a national set of computer centers that have been developed through an alliance of NGOs (which run the centers), private businesses (which donate the computers), software companies (which provide office and edutainment packages), and the governmental Ministry of Information Technology (which coordinates the project).

¹¹ Information on ISIS is from the Commission of the European Communities (2001) and the organization’s web site (<http://www2.gribus.at>).

¹² The European Computer Driver License is a European-wide qualification that enables people to demonstrate their competence in computer skills; see <http://www.ecdl.co.uk>.

The Riverside Cybrary in California offers an example of an initiative that helps develop social capital, in part through strengthening community–university relations. The Cybrary was initiated by the Riverside Public Library. It is located in a storefront in a low-income Latino community and provides a friendly, accessible atmosphere for neighborhood youth. Children and teenagers drop in to use the computers in the library – all of which are connected to the Internet – and are offered individual instruction and support from local volunteers. Most of the volunteers come from special service learning projects run by local universities. The volunteers not only provide invaluable computer support but also act as role models for the teenagers, many of whom have never met anybody who has attended college. Since many of the volunteers themselves are Latinos, they can relate well to the children and answer their questions not only about computers but also about college and possible career paths. This provides an example of how the in-person relations built through a community technology center can provide important new weak ties (e.g., [17]) to participants.

5.5 Social mobilization through a variety of media

Another important strategy for community technology development is to use all available media to amplify the power of the Internet. This is especially important in developing countries where individual use of the Internet is not widespread. Examples of this principle are seen from three projects in South Asia.

The Kothmale Community Radio Internet project in Sri Lanka makes use of FM broadcasting to bring online information to thousands of people without Internet access.¹³ Kothmale is located in an under-developed area of Sri Lanka, several hours from the capital. The radio station was set up in 1989 to serve the needs of the rural and small town population, numbering close to 350 000 people in a 25-mile radius. An Internet component to the project was launched in 1998 with a grant from UNESCO. The Kothmale radio announcers gather information from the Internet, which they incorporate into news, weather, journalism and music programs. The announcers also take questions from listeners delivered by postal mail, research the questions on the Internet, and provide answers on air in local languages. The questions are responded to within radio programs focusing on topics such as human rights, the status of women, rural health, farming, and international events. Questions posed are often very specific to the needs of the community, such as the care of a local tropical disease or the best way to raise and market geese. The announcers also visit the rural villages themselves both to get local content for their broadcast as well as to gather more questions from the community. Finally,

¹³ Information on the Kothmale project is from the project web site at <http://www.kothmale.net/> and from [18, pp. 127–132].



to provide greater Internet access, the radio station has opened up its own facilities for community Internet use and has also built two more community technology centers in the area.

The aforementioned MS Swaminathan project makes very creative use of multimedia in one of the Village Knowledge Centers located in a fishing village. The project staff download weather and sea condition information on a daily basis from the U.S.-based Cable News Network and U.S. Naval Station web sites. They then translate the information into the local Tamil language and broadcast it over a loudspeaker from the community technology center. The village fisherman can easily hear the broadcast from the beach 100 m away, and they use the information to improve both their safety and productivity. Information is also posted on blackboards and bulletin boards outside the center for those who might walk by.

Finally, the Gyandoot rural technology project in Dhar (see discussion below) makes use of a wide variety of media and campaigns to build involvement in their project while focusing attention on local health and economic concerns. One annual campaign they hold is a healthiest child competition, in which parents throughout the rural area are invited to bring their children to the local village Internet kiosk. A combination of radio, newspaper announcements, posters, and even local theater is used to promote the campaign. Volunteer medical personnel come to the Internet centers to weigh the children, check their vaccination records, and otherwise perform examinations. The campaigns serve to introduce the rural population to the Internet kiosks while also calling their attention to important health needs, such as vaccinating their children. A similar campaign was later organized for the most productive cow, based on milk yields and promoting knowledge of dairy-farming techniques.

These successful uses of diverse media reinforce the view of many scholars that online communication *supplements*, rather than *supplants*, other types of communication and social networking (e.g., [2, 23]).

In summary, all the examples discussed in this section use technology as an additional tool to promote social capital and community development, and none of them focus on technology as an end in itself. Information from the Internet is used to enhance this process, but it is often downloaded and shared via a variety of media rather than expecting individual use by community members. Existing sources of community capital – social, human, and financial – are leveraged through the additional use of new information and communications media.

Computer-mediated communication can be an element of community informatics, but it is not the only or even the principal form of communication. Rather, as Resnick suggests, it is more likely that an Internet-based communications system can be used effectively for community development only after its users have developed,

through other means, trust in each other, a shared identity, or some other form of social capital [41].

6 Macro-level social capital: governance and democracy

If micro-level social capital comes from the bottom up, macro-level social capital comes from the top down. It concerns how the social structures of large institutions, especially governments, provide and facilitate resources and support to individuals and society. In this section, I will examine issues of governance and their relationship to technology and social inclusion.

As Woolcock explains, an important component of macro-level social capital is synergy, in other words congruent and positive relations between the state and society [52]. Woolcock cites India as a prime example of a country that, although politically democratic, and with a well-educated and highly prestigious civil service, still suffers from a severe lack of synergy. In India and other “weak” states,

The government may be committed in principle to upholding common law and may refrain from actively plundering the common weal, but in practice misappropriates scarce resources, is largely indifferent to the plight of vulnerable groups (women, the elderly, poor, and disabled), produces shoddy goods, responds slowly if at all to citizen demands, and is notoriously inept in supporting businesses seeking to be competitive in world markets (pp. 177–178).

This lack of synergy worsens divides in India and other low-income countries in two ways. First of all, it holds down national development and keeps these countries poor vis-à-vis the West. Second, it maintains and increases inequality within the country, since it is the most marginalized and vulnerable members of society who suffer the greatest from lack of governmental support.

Developing synergy is a challenging task, especially in countries with high degrees of inequality. A vicious circle often develops, in which the marginalization of the poor (through lack of literacy, social isolation, lack of access to media) puts them at a distance from government officials, government information, and government programs. This lack of access to government resources increases their poverty and marginalization, which in turn further weakens their access to governmental assistance.

Well-designed use of ICT can help break this pattern and replace it with a virtuous circle of increased access to governmental information and resources, less marginalization, and further increased access. For this to take place, e-governance programs have to be carefully designed with the needs of the poor and marginalized in mind; otherwise, such programs will likely only benefit those who are already well connected. E-governance initiatives can help the poor in at least two ways. First, they



can make government *transparent*. Second, they can help facilitate *citizen feedback*. Initiatives in each of these areas will be discussed below, using examples from India.

7 Transparency

In a typical developing country, gaining access to even the most common types of government information or documents can be a nightmare. Obtaining a simple government record can involve one or more overnight bus trips to the state or national capital; waiting in long lines in hot, overcrowded and poorly-organized government buildings; shuffling back and forth between a host of departments; and, too often, paying a hefty bribe to eventually get the document needed. And whereas the well-to-do often assign their personal servants to carry out such tasks, the poor have no choice but to carry out such tasks themselves, losing a good chunk of their meager income on transportation, lost wages, and bribes. In many cases, the obstacles are so overwhelming that the poor don't bother even to try seeking their rightful information or documentation, and over time the lack of information and documents worsens people's economic and social marginalization.

Developing transparent information and documentation systems is no easy task, especially given the low wages of government employees in most developing countries. Those who would be most responsible for implementing more transparent systems have little incentive to do so, since that would lessen the possibilities of bribes and thus decrease their own income. It thus becomes almost impossible to achieve transparency through moral appeals to individual employees or units to improve the quality of their work. Rather, systemic solutions must be developed at a broader and more comprehensive level. The use of ICT to systematize the maintenance and distribution of government information and documentation provides one possible mechanism for achieving transparency, especially when combined with efforts to make sure that the marginalized have equal access to this computerized information.

The lack of systematic and transparent recording and public documentation of government data is a major issue affecting international development. Probably the most important example of this is in land records. Hernando de Soto, an internationally renowned economist and President of the Institute for Liberty and Democracy in Peru, has published an exhaustive and compelling study of the importance of land records for international development [16]. De Soto explains that, unlike in the West, where transparent documentation of land ownership allows people to use their property as sources of capital, lack of such documentation in much of the developing world has a devastating effect:

In every country we researched, we found that some 80% of land parcels were not protected by

up-to-date records or held by legally accountable owners. Nobody can identify who owns what, addresses cannot be easily verified, people cannot be made to pay their debts, resources cannot conveniently be turned into money, ownership cannot be divided into shares, descriptions of assets are not standardized and cannot be easily compared, and the rules that govern property vary from neighborhood to neighborhood or even from street to street (quoted on p. 2 in [6])

According to his research, the total value of the real estate held but not "legally" owned by the poor of the developing and former communist nations is equal to some 9.3 trillion dollars. In most countries, the value of this extralegal real estate is many times greater than total savings and time deposits in commercial banks, the value of companies registered in local stock exchanges, all foreign direct investment, and all privatized public enterprises all put together. If even a small portion of this amount of capital were unleashed, it could present an enormous reservoir for economic development and poverty alleviation.

India provides an excellent example of both the importance of land records and the difficulty in obtaining them.¹⁴ Government land records in India contain an exhaustive amount of information, including not only a delineation of the property borders but also a list of crops grown, a description of crop output, a list of the cultivators and tenants, and a report on any outstanding agricultural loans from government agencies. Copies of land records are required for a wide variety of transactions, including long-term land mortgages, short-term crop loans, and applications for a wide variety of government poverty alleviation programs (e.g., to demonstrate that the person is a small farmer), and are even used in criminal proceedings (e.g., to give assurance that the accused is a land owner and thus has geographical roots and economic means). Since these records are frequently updated, simply having one permanent copy is not sufficient. Rather, people need to go to government offices to get an up-to-date copy of the land record on most of the occasions that they need to show it.

There are hundreds of millions of these land records in India. Until recently, they had all been kept on paper, much of which is yellowed, badly faded, or torn. These

¹⁴ Reported information about land record systems in India, and about the Computerized Land Record System of Karnataka, comes from the following sources: personal interview with Rajeev Chawla, Additional Secretary of the Revenue Department of the Government of Karnataka, July 2001; Karnataka government documents on the system provided by Mr. Chawla in July 2001; a visit to a land record office in Bangalore, India, and interviews with the staff and clients in July 2001; interviews with small farmers and development workers in Pondicherry, Tamil Nadu, and Madhya Pradesh in July 2001; and a personal interview with Bhawti Soleki, Assistant Vice-President for Social Development of the Infrastructure Development Finance Company in New Delhi, India, in July 2001.



records are maintained by tens of thousands of local village accountants, who are responsible for recording updated information and also for distributing copies of the land records upon request from citizens. Both aspects of this process – the recording of information and the distribution of copies – are subject to a great deal of corruption. In a paper-based system, it is easy for the accountants to claim that the record has been misplaced, and to thus make the farmer come back again and again to receive a copy. On other occasions, information on the land-record is illegible, thus forcing another bribe for the accountant's clarification or correction. Similarly, when a sale is made, the accountant can delay recording the transaction until the new owner is forced to pay a bribe. Finally, the village accountants, who have many functions in the 3 or 4 villages they are responsible for and are often out of the office, can simply ask for a bribe merely to show up to meet someone. My own interviews with small farmers throughout India indicated that bribes for land records are the norm rather than the exception, and that these payments can add up to as much as a small farmer's monthly income.

In response to this situation, the state government of Karnataka, India has implemented an ambitious computerizations system of land record maintenance and distribution. The project has been designed not only to move from paper to computer, but more importantly to move from an informal, unregulated system to a transparent and efficient one. As a first step, the local governments throughout Karnataka have digitized the information on all 20 million land records in the state. At the time of digitization, landowners were given an opportunity to examine the computerized record to assure that it was correct. After computerization, land record updates are now performed by the village accountants on computer, and only after they have gained access to the system through fingerprint recognition. This guarantees that changes and updates are not lost and also that there is non-repudiation; the village accountant cannot deny that he or she made a change once that change is associated with his or her own fingerprint. The computerized system allows government auditors to easily verify if all land sales have been properly recorded within the mandated 30-day period. When people need copies of land records, they are now generated and printed out by machine. The distribution process has been taken out of the hands of the village accountants (who number some 9000 throughout the state) and shifted to a single person and machine in each sub-district office that serve no other function than full-time printing and distribution of land records. Obtaining a land record in Karnataka is now as simple as standing in a short line and paying a fee of \$0.30 USD. Those people who do not need a copy of their land records, but just want to see them, can use a self-service kiosk to view their record for a fee of \$0.04 USD. There has been some discussion of moving the latter function to the Internet, but that has not been done yet.

Due to the low cost of labor in India – including in the information technology industry – the total cost of implementing this system was only about \$5 million USD, or some \$0.25 USD for each of Karnataka's 20 million land records. This amount will be recouped over time through the \$0.30 USD fee for distribution of land record copies. (An additional savings comes through the redeployment of the village accountants, whose time was freed up to devote to other aspects of their work.) Of course the economic benefit to the state, through better availability of land records, will be much greater. As Jeffrey Smith asks, quoting de Soto,

In a "world where ownership of assets is difficult to trace and validate and is governed by no legally recognizable set of rules; where the assets' potentially useful economic attributes have not been described or organized; where they cannot be used to obtain surplus value through multiple transactions because their unfixed nature and uncertainty leave too much room for misunderstanding, faulty recollection, and reversal of agreement," how can people prosper? (para. 3 in [44])

In Karnataka, due to the well-designed use of ICT to promote more transparent land record documentation and access, more people will now be able to prosper.

One important question to ask at this point is why Karnataka has been able to implement such an advanced system, when no other Indian states, and few other developing countries, have done so? This is due partly to the technological infrastructure in Karnataka; Bangalore, the state capital of Karnataka, is the most important ICT hub in India and one of the major ICT centers in the world. Beyond that, though, the new state government, which took office shortly before this new system was implemented, had a strong vision of using ICT for human and social development. The government was committed to using Karnataka's substantial ICT resources to try to improve services, especially as they affected economically marginalized groups (such as small, rural landowners). To accomplish this, the government was willing to challenge some entrenched interests, such as the power of local government officials (e.g., village accountants). This is thus a good example of how technological capacity must be combined with vision, leadership, and a commitment to social development in order to achieve an impact.

8 Citizen feedback

State-society synergy cannot be fully developed just by top-down provision of information and documentation. Some kind of mechanisms for bottom-up communication must also be provided. Citizen feedback to government provides a check on bureaucratic abuse and corruption, alerts the government to citizens' needs and concerns, and gives citizens a sense of having a voice in society.



There are many means for giving citizens voice in government, such as providing free elections, a free press, and opportunities for organized public protest. However, all of these means have their limitations. Elections take place only at intervals, and are often heavily influenced by large campaign donations or bribes, or by issues of patronage. A free press is similarly shaped by financing considerations, with media outlets reflecting the views of their owners or advertisers as much as those of the public at large. Opportunities for citizen association and protest are vital, but they are often difficult to take advantage of by the poor whose time and energy is dedicated to wage-earning and survival.

Many people have looked to the Internet as a means to provide people with an instrument for transmitting more rapid and flexible feedback to their governments. The possible advantages of this must be weighed against the possible disadvantage of giving greater voice to those who are already relatively privileged. That is one of the problems, for example, with e-voting, which could skew voter turnout to those who have computers and home Internet access, and who, in most countries, are disproportionately among the economically well-off.¹⁵

E-governance can help give voice to the marginalized if projects are designed specifically to reach the poor. An excellent example of this comes from another effort in India, the Gyandoot (Purveyor of Knowledge) project in the Dhar region.¹⁶ This represents a fascinating example of e-governance in one of the poorer regions of the world.

Dhar is a mostly-rural district in Madhya Pradesh, the second poorest state in India. About 1.7 million people live in the district, spread out over some 100 villages. The vast majority of the population in Dhar are small farmers and agricultural laborers, and 57% are illiterate. According to organizers of Gyandoot, some 60% of the district residents are below the poverty line, which is defined in India as lacking sufficient nourishment. Some 54% of the

population are members of tribal groups, including large numbers of low-caste members.

The Gyandoot project was initiated by the district administrative leadership to overcome poverty and social marginalization. Unlike most ICT initiatives in rural India (and other countries), it was initiated neither by foreign donors or international agencies, nor by private business, but rather by local government officials in an impoverished region. The goals of the Gyandoot project are to provide better government information and services toward enhancing economic and social development. The project has targeted the poor and marginalized and has been largely successful in reaching its audience; some 87% of Gyandoot users have incomes of less than \$400 per year, and more than half are members of tribes or lower castes [39].

Gyandoot has two main components. One component is a collection of Internet kiosks throughout the district. Some 36 kiosks have been set up to date, and each one is managed by a local entrepreneur, who works either independently or on behalf of the local village council. The Gyandoot project supplied a computer and phone line to each of the kiosks. The managers charge a small fee for their services (usually about \$0.10 USD per transaction) to offset the ongoing costs of the operation and to earn their own income. Most users who come to the kiosk do not use the computers themselves, but rather purchase services or information via the kiosk owners. The principal exception to this is the large number of children who are sent by their parents for individualized computer instruction from the kiosk managers.

There is little information available on the Internet of interest to the Dhar villagers, and even less available in the Hindi language. Thus the second component of the Gyandoot project is a district-wide intranet of Hindi-language information that has been especially developed for the needs of the rural poor. The intranet is developed and maintained by a small team in the Dhar district government offices, and includes a wide range of information: copies of land records (though not yet in a complete and updated fashion as in Karnataka), government forms, applications for governmental permits, information about governmental programs (especially the many Indian programs that are designed to serve tribal members and people below the poverty line), and market rates for local crops. One section of the intranet is devoted to e-education, and includes sample questions for state exams, educational quizzes, mathematical puzzles, and career guidance information.

Probably the most interesting aspect of the Gyandoot intranet, though, is that it also allows for a two-way process of communication. Citizens can not only receive information but also post it. Interactive services include an online market place (where people sell cows and bicycles), an online matrimonial service, and an online complaint service. Interviews with kiosk managers and users in sev-

¹⁵ The first experience with online voting in the United States was in the 2000 Arizona Democratic Primary election. An analysis of the voting patterns showed that the non-white, the unemployed, and the elderly were all significantly less likely to participate in Internet voting than the public at large, and that this limited their proportion of the vote compared to prior elections [4]. The authors of the study conclude that "if Internet voting were widely used in American politics, it would change the character of political representation, with some specific groups behind the digital divide (minorities, the unemployed, and the elderly) losing further political power" (p. 1148). Stephen Pershing, an attorney in the U.S. Department of Justice Civil Rights Division, has similarly concluded that "Internet voting without protections for equal access may violate section 2 of the Voting Rights Act" (p. 120 in [35]), which prohibits denial or abridgment of voting rights due to race.

¹⁶ Information about Dhar and the Gyandoot project comes from the following sources: interviews with Naveen Prakesh, Gyandoot Project Manager, in July 2001 (and subsequent e-mail correspondence in August–September 2001); an interview with Rajesh Rajora, then Dhar District Magistrate, in July 2001; a recent book by Rajora [39]; visits to five Gyandoot project information kiosks and interviews with managers and users in July 2001; and electronic and paper documents provided by the Gyandoot project in July 2001.



eral Dhar villages revealed that the online complaint service is an especially valued component of the Gyandoot project, and one that has had an important impact on villagers' lives.

The online complaint service comprises a web page with a pull-down menu from which users can choose from a range of 21 predetermined selections, including the following:

- Non-payment of salary, stipend, wages
- School is closed or teacher is absent from school
- Absence of a veterinary doctor
- Complaint against the secretary of village council
- Non-payment to the farmers at the auction centers
- Complaint against agriculture laborer accident insurance
- Complaint regarding hand pump or transformer not working
- Complaints regarding beneficiary schemes for the members of tribes and lower castes

It is not required to read or write to use the system, as the kiosk managers can check off the complaints for the end user.

The district administration has made a guarantee to respond to complaints in each of these 21 categories in 7 days or less. This system is enforced through public posting of outstanding complaints on the intranet through the government district offices. That way, it is immediately obvious to both government employees and their supervisors which complaints have and have not been answered. Beyond the 21 predetermined selections, people can issue personal complaints on any issue they wish, but the government does not offer the "7-day guarantee" on these broader complaints.

Interviews with villagers indicated that the complaint system was highly popular and effective. The two most common issues that they mentioned involved hand pumps and schools. Both of these issues speak to the lack of government response that is common in rural India, and the power of more transparent, interactive communication to help improve such responsiveness.

Villagers in India get their water from wells by means of hand pumps that are typically spread out at 1–2 km distance from each other. If the nearest hand pump isn't working, villagers must make a tiring walk to the next hand pump and then carry the water all the way back to their homes. Prior to the development of the Gyandoot system, hand pumps in Dhar frequently fell into disrepair for months as government officials had little incentive to maintain them. Now, for \$0.20 USD, villagers can issue a public complaint about a broken hand pump and be virtually assured that it will be repaired within a week. This may still represent a substantial amount compared to local income, but in many cases it is found to be a worthwhile expense since a government response is guaranteed.

A second and, in the long run, more important issue for social development involves public schooling. Vil-

lagers and government officials alike in India complain that many village schools are poorly run. They may consist of a single teacher who never shows up at all or of a few teachers who show up rarely with the approval of an also-absent principal. The lack of accountability in the Dhar schools contributed to a vicious cycle: the less teachers showed up to work, the more families became discouraged and kept their children from school; the fewer children came to school, the more teachers felt justified in not showing up to work. Resigned to poor schools, and lacking recourse to complain, villagers were often forced to accept the situation. With schools, as with hand pumps, villagers now feel they are in a position to defend their rights. Complaints about absent teachers or non-functioning schools were frequent in the early stages of Gyandoot, and were replied to promptly by government officials. These complaints have now apparently slowed down as teachers and principals become more aware that their behavior is under public scrutiny.

This last point illustrates the benefit of this interactive system even for those who might never make use of it. According to informal reports, not only has schooling improved in the district, but so also have hand pump maintenance, provision of public benefits, and other government services. Basically, government officials are now aware that their performance will be subject to public complaint and criticism. Knowing that they will be held accountable for their work provides incentive for them to perform better. Well-designed use of ICT for society-government communication – as in the case of the Dhar district in India – provides a means of improving the social capital not only of those directly using the online service but also of the broader community.

9 Conclusion

Access to computers and the Internet does not in itself guarantee access to the information society. How, then, can such broader access be facilitated?

A key mediating variable is that of *social capital*. Community technology programs that seek to promote social inclusion and lessen the poor's marginalization need to be structured so as to leverage and expand social capital. This process can take place both bottom up, through promotion of community development, and top down, by making government more transparent and responsive.

Community technology projects often focus too narrowly on provision of equipment, rather than on using technology to promote social inclusion. A careful consideration of the role of social capital can make it more likely that such projects help achieve the broader goal of providing access to the information society. Social capital is of course not the only variable affecting broader access to the socioeconomic benefits of the information society. Promotion of social capital must be part of a broader strategy of social and economic reform to heighten human



and social capacity and remove institutional barriers to development. However, as illustrated in some of the cases discussed above, the promotion of social capital through ICT projects can have an important impact on improving people's lives.

The conceptual framework of social capital is not the only lens of social analysis that can be applied to understanding technology integration in communities. Indeed, it builds from many other types of social frameworks, such as those presented within theories of social informatics [25, 26] or social embeddedness (e.g., Diebert, 1997^{CE^a}). However, while these previous theories focus on issues of technological integration in systems, social-capital theory also addresses issues of human and social development, and thus adds an important element to our understanding of how new media can best serve developmental goals.

Finally, this paper has focused on putting forth a conceptual framework, illustrated by selective examples. More in-depth case studies of these and other ICT projects are needed to further flesh out the relationship of ICT to social-capital development in diverse contexts.

Acknowledgements. This paper draws on the author's broader discussion of the topic in *Technology and Social Inclusion: Rethinking the Digital Divide* [49].

References

1. Agre PE (1997) Building community networks. In: Agre PE, Schuler D (eds) *Reinventing technology, rediscovering community: critical explorations of computing as a social practice*, vol 1997. Ablex, Greenwich, Conn.
2. Agre PE (2001) Networking on the network. <http://dliis.gseis.ucla.edu/people/pagre/network.html>. Cited 19 October 2001
3. Alkalimat A, Williams K (2001) Social capital and cyberpower in the African American community: a case study of a community technology centre in the dual city. In: Keeble L, Loader B (eds) *Community informatics: shaping computer-mediated social networks*. Routledge, London
4. Alvarez RM, Nagler J (2001) The likely consequences of Internet voting for political representation. *Loyola Los Ang Law Rev* 34(3):1115–1153
5. Barlow JP (1996) Declaration of independence of cyberspace. <http://www.eff.org/~barlow/Declaration-Final.html>. Cited 1 July 1999
6. Binns D (2001) Review: the mystery of capital: why capitalism triumphs in the West and fails everywhere else. *Leading companies e-zine*, January. <http://www.fed.org/onlinemag/jan01/reviews.htm>. Cited 2 October 2001
7. Bourdieu P (1986) The forms of capital. In: Richardson JG (ed) *Handbook of theory and research for the sociology of education*. Greenwood Press, New York
8. Brown JS, Duguid P (2000) *The social life of information*. Harvard Business School Press, Boston
9. Burt RS (1992) *Structural holes: the social structure of competition*. Harvard University Press, Cambridge, Mass.
10. Chambers R (1992) Rural appraisal: rapid, relaxed and participatory, discussion paper no. 311. Institute of Development Studies, Brighton
11. Choices (2001) *Choices*. Bridge.com Inc, Ogdensburg, New York
12. Cohen D, Prusak L (2001) *In good company: how social capital makes organizations work*. Harvard Business School Press, Boston
13. Coleman JS (1988) Social capital in the creation of human capital. *Am J Sociol* 94:95–120
14. Collier P (1998) Social capital and poverty (social capital initiative working paper 4). World Bank, Washington, D.C.
15. Commission of the European Communities (2001) e-Inclusion practices [background document]. http://europa.eu.int/comm/employment_social/soc-dial/info_soc/esdis/eincl_1practices.pdf. Cited 10 December 2001
16. de Soto H (2000) *The mystery of capital: why capitalism triumphs in the West but fails everywhere else*. Basic Books, New York
17. Granovetter M (1973) Strength of weak ties. *Am J Sociol* 8:1360–1380
18. Gumucio Dagron A (2001) *Making waves: stories of participatory communication for social change*. Rockefeller Foundation, New York
19. Gurstein M (2000) *Community informatics: enabling communities with information and communications technologies*. Idea Group, Hershey, Pa.
20. Hampton KH (2001) *Living the wired life in the wired suburb: Netville, globalization and civil society*. Dissertation, University of Toronto
21. Hampton KN (2000) Examining community in the digital neighborhood: early results from Canada's wired suburb. In: Ishida T, Izbister K (eds) *Digital cities: technologies, experiences, and future perspectives*. Lecture notes in computer science, vol 1765. Springer, Berlin Heidelberg New York
22. Hampton KN (2001) Broadband neighborhoods: connected communities. In: Jacko J, Sears A (eds) *CHI2001 extended abstracts*. The Association for Computer Machinery, New York
23. Hampton KN, Wellman B (1999) Netville on-line and off-line: observing and surveying a wired suburb. *Am Behav Sci* 43(3):475–492
24. Hampton KN, Wellman B (2001) Long distance community in the network society: contact and support beyond Netville. *Am Behav Sci* 45(3):476–495
25. Kling R (1999) What is social informatics and why does it matter? *D-Lib Mag* 5(1)
26. Kling R (2000) Learning about information technologies and social change: the contribution of social informatics. *Inf Soc* 16(3):1–36
27. Kraut R, Kiesler S, Boneva B, Cummings J, Hegelson V, Crawford A (2002) Internet paradox revisited. *J Soc Issues* 58(1):49–74
28. Kraut R, Patterson M, Lundmark V, Kiesler S, Mukophadhyay T, Scherlis W (1998) Internet paradox: a social technology that reduces social involvement and psychological well-being. *Am Psychol* 53(9):1017–1031
29. Krishna A (2000) Creating and harnessing social capital. In: Dasgupta P, Seragaldin I (eds) *Social capital: a multifaceted perspective*. World Bank, Washington, D.C.
30. Lin N (2001) *Social capital: a theory of social structure and action*. Cambridge University Press, Cambridge, Mass.
31. Loader B, Hague B, Keeble L, Eagle D (eds) (2001) *Community informatics: shaping computer-mediated social networks*. Routledge, London
32. Mitra S (1999) Children and the Internet: minimally evasive education for mass computer literacy. *CSI Commun* June:12–16
33. Mukherjee N (1993) *Participatory rural appraisal: methodology and applications*. Concept Publishing, New Delhi
34. Nie NH, Erbring L (2000) Internet and society: a preliminary report. Stanford Institute for the Quantitative Study of Society, Stanford. http://www.stanford.edu/group/siqss/Press_Release/Preliminary_Report.pdf. Cited 20 December 2001
35. Pershing SB (2001) The voting rights act in the Internet age: an equal access theory for interesting times. *Loyola Los Ang Law Rev* 34(3):1171–1211
36. Pieper M (2001) Sociological issues of HCI design. In: Stephanidis C (ed) *User interfaces for all: concepts, methods, and tools*. Lawrence Erlbaum Associates, Mahwah, N.J.
37. Putnam R (1993) The prosperous community: Social capital and public life. *Am Prospect* 13:35–42
38. Putnam R (2000) *Bowling alone: the collapse and revival of American community*. Simon and Schuster, New York

^{CE^a} Diebert is not mentioned in the bibliography. Add reference to bibliography and cite here with the \LaTeX `\cite` command.



MS ID: UAIS0040

2 April 2003 15:12 CET

39. Rajora R (2002) Bridging the digital divide: Gyandoot, the model for community networks. Tata McGraw Hill, New Delhi
40. Regional Technology Alliance (2001) Mapping a future for digital connections: a study of the digital divide in San Diego County. http://www.sdrta.org/sdrta/aboutsdrta/RTA_Report_0201.pdf Cited 7 September 2001
41. Resnick P (2002) Beyond bowling together: sociotechnical capital. In: Carroll J (ed) Human computer interaction in the new millennium. Addison Wesley, New York
42. Rheingold H (2000) The virtual community: homesteading on the electronic frontier. MIT Press, Cambridge, Mass.
43. Serageldin I, Grootaert C (2000) Defining social capital: an integrated view. In: Dasgupta P, Serageldin I (eds) Social capital: a multifaceted perspective. World Bank, Washington, D.C.
44. Smith J (2001) Books reviewed: The mystery of capital. *The Geonomist* 9(3). <http://www.progress.org/geonomy/geonom93.htm> Cited 2 October 2001
45. Stanley L (in press)  Beyond access: psychosocial barriers to computer literacy. *The Information Society*
46. Sunstein C (2001) *Republic.com*. Princeton University Press, Princeton, N.J.
47. Turner JH (2000) The formation of social capital. In: Dasgupta P, Serageldin I (eds) *Social capital: a multifaceted perspective*. Washington, D.C.
48. Warschauer M (1999) *Electronic literacies: language, culture, and power in online education*. Lawrence Erlbaum Associates, Mahwah, N.J.
49. Warschauer M (2003) *Technology and social inclusion: rethinking the digital divide*. MIT Press, Cambridge, Mass.
50. Wellman B, Haase AQ, Witte J, Hampton K (2001) Does the Internet increase, decrease, or supplement social capital?: Social networks, participation, and community commitment. *Am Behav Sci* 45(3):437–456
51. Wenger E (1998) *Communities of practice: learning, meaning, and identity*. Cambridge University Press, Cambridge
52. Woolcock M (1998) Social capital and economic development: toward a theoretical synthesis and policy framework. *Theor Soc* 27:151–208