COMMUNITY BUILDING AND INFORMATION AND COMMUNICATIONS TECHNOLOGIES: CURRENT KNOWLEDGE.

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Abstract

The study of the impact of information and community technologies (ICTs) on community building has matured in recent years. Though the 'digital divide' remains, ICT availability has improved considerably in Australia, Canada, and the USA. Not only do a wider range of people have access to Internet technology, its use is a normal feature in people's lives. It is now possible to investigate its effect not just on individuals, but also on their communities, in the field of study called 'community informatics.'

Evidence suggests that ICTs have a positive effect on the tendency of people to join groups, and that many relationships formed in cyberspace continue in physical space. The social capital literature tends to support the proposition that ICTs make a positive contribution to social relationships, though it is possible that social capital is a prerequisite for significant ICT contribution to community life, rather than (or in addition to) a product of this contribution.

Traditional community development literature has always emphasized the necessity of community input into local projects for them to be sustainable. The ICT literature now acknowledges that same point: ICTs projects must meet *communally identified* goals to be successful. Wired communities are most successful when innovation comes from the grassroots up. To this end, 'soft technology,' a people-based technology which includes consultation, training, mutual support, and network building, is an essential partner to the hard technology itself.

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Introduction

> *An Internet year is like a dog year, changing approximately seven times faster than normal human time.* (Barry Wellman 2001)

In dog years, the Internet has been functioning for a very long time. However, systematic research on what people actually do on the Internet has lagged behind the Internet's development. After a long period of 'pundit supposition, travellers' tales, and laboratory studies of computer-mediated communication' (Wellman 2001, 2032), careful studies of the impact of the Internet are now taking place. This paper examines some of the consequences of being connected.

While much research on the impact of the Internet focuses on globalization, this paper concentrates on studies of its effect on a different dimension: communities, both geographic and virtual. The most fundamental question is whether the impact is positive or negative, to which cyberspace utopians say yes, and the dystopians an unequivocal no. This disagreement parallels a similar one on the effect of the information and communication technologies (ICTs) on social capital: does it have a beneficial or deleterious impact on our social relationships? The answer to this question leads to an exploration of factors which support the adoption of ICTs for community building purposes.

The published literature examined for this paper concentrates on recent academic journals, supported by conference proceedings and discussions with academics knowledgeable in the areas of community and IT. Given the vastness of the topic (a single 'Google' search on the term 'community' and 'ICTs' brought up more than 97,000 responses), this survey focuses on the identification of broad themes. An effort has been made to seek out both qualitative and quantitative research, and examples from the Australian literature. The paper begins with an examination of the notion of community building.

Community building: background

Community building involves combining the physical, intellectual and financial resources of government, communities, businesses, the philanthropic sector and other contributors to promote social and economic development in local communities. Globally many communities have adopted community building strategies to address social exclusion and disparities in the last decade. International best practice suggests that a policy response needs to recognize:

· the necessity for fostering social equity,

· the desirability of community building as a cornerstone of state development,

· the cultivation of a sensitivity to, and willingness to respond to, environmental capacity; and

· the promotion of democratic governance at all levels (Howe and Cleary 2001, 5).

To achieve what Wiseman calls 'community resilience,' (2003: 3) requires an emphasis on sustainable strategies rather than one-off projects, and the acknowledgment of the ongoing interdependency of social, economic and environmental factors.

Writing for the Victorian Local Government Association (VLGA), Raysmith's views complement those described above. He identifies four major principles on which community building is based: sustainability, participation/empowerment, inclusion/ access, and tolerance/diversity. He cautions, however, that community building only works if there is strong local commitment and ownership, a comprehensive approach, and bottom-up process. To this end, he cites international reports emphasizing the need for a resident-driven approach to community building and the need for projects to be seen to reflect the priorities of local people rather than being externally imposed. He further proposes a 'mantra' for government officials to remind them of the realities of community development: 'Community building is not

short-term, nor does it directly solve problems or lead to predictable outcomes' (Raysmith 2001, 2-3).

A long-term view, however, runs counter to the usual expectations of central government, since government wants to allocate funds to solve specific problems, and evaluate success on an output and outcome basis, nor does it fit with the dynamics of community building, since this process cannot be driven from the top down. Related pitfalls for community development initiatives include: inadequate resourcing for community projects, a focus on material improvements rather than social processes within communities, an emphasis on individual leadership rather than community membership, and distortion by the short-term needs of policy makers more interested in a quick fix for problems than longer-term capacity building (Joseph Rowntree Foundation Review 1995). Successful community building is a slow and complex process.

The discussion above primarily reflects a geographically bound concept of community. However, 'community' in an ICT context has taken on a broadened range of meanings.

'Community': a concept in evolution

Traditional concepts of community focus on internal relationships within a defined locality to the exclusion of reference to ties and links outside the geographical domain (O'Neil 2001). Nowadays, the term 'community' covers a spectrum from groups located in small specific geographic locations to widely distributed individuals with a common interest. Yet how does this affect our concept of place and relationship to our community? A great deal needs to be reconsidered. In the words of Kenneth Pigg,

> *the adaptation of electronic telecommunications in community networking represents the most direct challenge yet to the role of 'place' in our understanding and development of community* (2001, 507).

To accommodate the notion of a virtual community, Beale distinguishes between a geocommunity, which is the physical community, and a community of interest, which incorporates ethnicity, religion, and areas of academic study, and can encompass a community life based on ideas and communication among individuals who may possibly never meet face-to-face (2000, 57). This expanded idea of community raises the possibility of belonging to multiple communities simultaneously, rather than being limited to the community in which one physically lives. A person can be a good neighbour, a keen member of the local Rotary Club, an activist in state politics, a participant in an amateur stock market trading group, and a member of the international paper modelling community, all without leaving one's computer desk. In brief,

> *the physical community and computer network both allow for the expression of similar identities and the satisfaction of similar social needs, and online networks provide an opportunity to enhance the spread and speed of community engagement* (Denison et al. 2002, 5).

From a sociological perspective, Wellman and Hampton describe a paradigm shift taking place in our society, in which people and institutions are no longer connected primarily by geography, but are instead living in networked societies. Nowadays people usually have more friends outside their neighbourhood than within it, and may have kin spread throughout a country, or the world. The advent of the Internet is accelerating a change that has already been set in motion, and is becoming an infrastructure of social networks (1999).

ICT use: increasing in breadth and depth

Much discussion of the impact of ICTs on 'community' is predicated on the assumption that this technology is available to all. This is increasingly the case, though access remains difficult for many subgroups of the population.

Digital divide to digital inclusion

The term 'digital divide' is used to describe the social implications of unequal access to information and communications technologies and to the acquisition of the skills necessary for full inclusion (NOIE 2002).

While overall Internet use in Australia continues to rise, with household Internet access at 52 per cent, disparities in online access and use still exist. People on low incomes, aged over 55, without tertiary education, and of Indigenous heritage are less likely to have connection to and use the Internet. This divide is correlated with social and economic disadvantage (NOIE 2002).

One response to this disparity is the Commonwealth-sponsored Networking the Nation (NTN) initiative, designed to assist the economic and social development of rural Australia through funding programs to develop ICT infrastructure and services, to promote access to and use of ICTs, and to reduce disparities in access between urban and non-urban sectors of the population (DCITA 2003a).

The existing centres may provide any of the following: communication services, computer services and applications, resource services (including technical support and photocopying), education and training services in ICT, government services, and social and community development services. They play a significant role in meeting the social and economic needs of communities, and contribute to the development of community capacity building. As well as providing service access, they can also provide an important social focus for youth, people on low incomes, Indigenous communities and the aged (DCITA 2003b). The program as a whole is currently under evaluation.

In 2002, an estimated 7.5 million Canadian households had at least one member who used the Internet regularly, either from home, work, school, a public library or another location, accounting for 62 per cent of the nearly 12.2 million households at this time. Between 1997 and 2001, the proportion of households using the Internet regularly almost doubled, from only 29 per cent in 1997 to 60 per cent in 2001 (Statistics Canada 2003).

A similar explosion in Internet use is shown in the USA. Use of the Internet increased eight-fold within a period of five years: only eight per cent of adults were using the Internet in 1995 (sample of 2,500 adults), compared to 65 per cent in 2000 (1,305 adults) (Katz, Rice, and Aspden 2001). Nonetheless, significant concern remains that persons at lower socioeconomic levels will be similarly disadvantaged in the area of ICTs, with rural poor and rural and central city minorities among the least connected, 'trailing far behind' national averages in both computer ownership and Internet access (Sullivan et al. 2002).

Overall, the digital divide is shrinking in these three countries, though it has not disappeared. New questions are emerging: should government and research focus shift from technical access to social access? Is optimal use being made of ICT in a community context?

Gurstein describes how the Canadian government's priority for ICTs moved from technical to social access, as a result of the success of the Canadian government's Community Access Program launched in the mid-1990s. The goal of this program was to assure that rural and remote areas had low-cost access to the Internet. As commercial firms moved to fulfil this need, the government's focus turned from providing technical access in non-urban areas to providing access to disadvantaged groups such as the unemployed, those lacking computer and literacy skills, and to the physically disabled (Gurstein 2000).

Since then Gurstein has argued that access is no longer a primary preoccupation, and that more attention should be paid to how ICTs are being used in a community context. Gurstein proposes an exploration of 'effective use' of ICTs, which includes:

> *examining how and under what conditions ICT access can be made useable and useful . . . 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 goals'* (Gurstein 2003, 5).

While considerable resources are spent on creating ICT infrastructure, he notes few initiatives have been directed towards expanding local capacity for developing, managing and maintaining ICT capabilities. In the same way we have moved from the single issue of access to more holistic notions of effectiveness, ICT itself has moved from being a novel means of locating and conveying information to being incorporated into our daily routines.

Integration into our lives

Early research into ICTs and their social impact tended to assume that Internet use was somehow separate from people's lives, an entertaining technological advance which interfered with real-life activity. Discussion of the impact of ICTs was often based on a series of dichotomies: electronic versus face-to-face interaction, online versus offline, virtual versus real (Haythornthwaite 2001). However, rapid increase in the number of businesses and governments using the Internet, higher levels of exposure and commitment to Internet-based activity for personal use, and the interface of the Internet with a host of mobile devices all demand a refocus of attention onto the integration of the Internet into everyday activities.

As a result, explaining people's Internet behaviours entails understanding that the Internet is not a separate entity in their lives, but rather a complement to their ongoing activities of life. Recent research acknowledges this integration, and begins to identify and address the social consequences of adding Internet activity to our daily lives (Haythornthwaite 2001[1]).

An analysis of two projects undertaken as part of New Zealand's Computers in Homes, A Digital Divide Project, illustrates the importance of identifying factors which encourage the uptake and integration of Internet services in people's daily lives. Academic Barbara Craig identified that the quality of Internet use by low-income families is determined by ease of access and local support and training. For example, place of access is critical: Maori and Pacific parents in the Computers in Homes scheme attribute their success to the availability of on-line access at home. This freed them from childcare constraints and the fear of embarrassment resulting from lack of literacy, which could occur in a public access centre, though the high costs of home access remained an issue. Education and literacy training were found to enable adults to acquire the skills and confidence to learn one-on-one with the computer and enrol in online literacy programs (Craig 2003).

Projects such as this one have the potential to simultaneously support both individuals and an entire community. ICT research has begun to focus more on the impact of ICTs on communities and community aspirations in addition to the more traditional focus on individuals and organizations.

Community Informatics

'Community informatics' (CI) is a phrase coined by Michael Gurstein to describe the emerging field which seeks to analyse the use and role of ICTs in community development efforts (Gurstein 1999). CI has since been defined in a number of ways:

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[1] The entire issue of American Behavioral Scientist, (2001 45(3)) is devoted to aspects of the Internet in everyday life, and is an excellent resource.

- a technology, strategy or discipline which links economic and social development efforts at the community level with emerging opportunities in such areas as electronic commerce, community and civic networks and telecentres, electronic democracy and on-line participation, self-help and virtual health communities, advocacy, cultural enhancement, and others (Gurstein 2000, 1).
- the adoption and study of how new information and communications technologies can facilitate the social, economic, political and cultural development of communities (Loader 2002).
- the use of ICT for local community benefit (Taylor 2003, 4).

The development of this field will provide new insights into the impact of ICTs on communities and quality of life, and enable us to identify the ways in which ICTs contribute to social outreach and social engagement. The social capital literature already begins to address this question.

ICTs and community engagement

Social capital— the sine qua non

Community building is inextricably bound up with the key ideas about social capital, which is defined as follows by the World Bank:

> *Social capital refers to the institutions, relationships, and norms that shape the quality and quantity of a society's social interactions. Increasing evidence shows that social cohesion is critical for societies to prosper economically and for development to be sustainable. Social capital is not just the sum of the institutions which underpin a society— it is the glue that holds them together* (World Bank 2002).

Robert Putnam, in his groundbreaking work, contrasts social capital with other forms of capital:

> *Whereas physical capital refers to physical objects and human capital refers to properties of individuals, social capital refers to connections*

among individuals— social networks and the norms of reciprocity and trustworthiness that arise from them (Putnam 1995).

A literature on social capital is now burgeoning, with articles appearing in such disciplines as sociology, political science and economics. In Australia, Eva Cox's Boyer Lectures (Cox 1995) popularized the term 'social capital' in Australia, and it has since been taken up by academics working in a range of disciplines including public health, education, sociology and public policy (Winter 2001).

Putnam's thesis, captured in the metaphor 'bowling alone,' is that social capital in the USA is on the decline, as a result of macro-level social conditions, such as the tendency for individuals no longer to devote time to participating in voluntary associations such as bowling leagues. The result is less opportunity for people to build social networks and social trust, which constitute the primary ingredients of social capital. Putnam argues that communities with high levels of social capital exhibit a higher quality of life, so a decline in social capital has serious implications (Putnam 1995).

The impact of ICTs on both individuals and community has been a subject of continuing debate, with speculation centring on whether ICT use undermines or enhances existing social capital. Is there a role for interactive media in building social capital?

ICTs: strengthening or diluting human relations?

Early supporters of the Internet had great hopes for its impact. It would have the capacity to extend and transform community, given its ability to span distances and time zones at low cost, to sustain relationships based on shared interests regardless of geographic proximity, and to provide powerful links between people and dispersed knowledge (Wellman 2001). Sceptics feared that computer-mediated ties would prove to be inauthentic or less meaningful than those established face-to-face, and that the Internet was pulling people away from deeply meaningful household and neighbourhood conversations (Wellman and Hampton 1999).

Although early accounts focussed on the formation of online virtual communities, it has become clear that most relationships formed in cyberspace do continue in physical space, leading to new forms of community characterized by a mixture of online and offline interactions. Moreover, online interactions fill communication gaps between face-to-face meetings. The Internet thus enhances the tendency for many ties to be non-local, connected by cars, planes, phones, and now computer networks (Wellman et al. 2001).

Socially active individuals use online networks as they do their other personal networks, according to a recent survey:

> *Internet users in all of the surveyed countries [Chile, China, Germany, Hungary, Italy, Japan, Korea, Macao, Singapore, Sweden, UK, and USA] spend more time than non-users in social activities. Internet users … spend more time or as much time as non-users socializing with friends* (UCLA 2004).

The Internet may compete for time with other activities; there are discrepant findings as to whether time spent online does or does not pull people away from other interactions inside and outside the household. The Internet can draw people's attention away from their immediate physical environment because, when they are online, they pay less attention to their physical and

social surroundings (Wellman et al. 2001). Some evidence suggests that television watching at home is diminishing as Internet use increases (UCLA 2004), but it is not conclusive.

Despite some ambiguity, the bulk of the evidence presented above points towards a positive role for the Internet in facilitating social interaction. A number of recent studies have explored potential relationships between ICT use and the tendency to join groups (both on- and offline) and engage in other forms of community interaction. Their main findings are worth summarising here.

- The Pew Internet & American Life Project sponsored a study based on a random sample of Americans, aged 18 and over, conducted through telephone interviews. It provides basic information on impact of ICTs in the USA. Methodologically, it has the advantage of compensating for a response rate of less than half (46 per cent) by weighting the sample data for known biases. The most notable result is:

  Use of the Internet often prompts Americans to join groups. Of the 84 per cent of Internet users who say they have used the Internet to contact or get information from a group, 56 per cent joined an online group after they began to communicate with it over the Internet (Horrigan 2001).

- Data from the National Geographic Society Survey 2000, gathered from the Society's Web site, were the basis for another study. Though the respondents, 39,211 North Americans, were self-selected, the researchers excluded those whose first experience on the Internet was the completion of the survey. The study finds that:
  - o The Internet supplements relations with one's circle of friends and relatives. However, face-to-face and telephone contact provide unique ways of communicating for which the Internet cannot substitute.
  - o The more people are involved in organizations offline, the more they are involved in computer-related activities.

- o There is no association between Internet use and community commitment, with the exception of online community, where researchers find a negative correlation between high levels of Internet use and commitment to online community. This finding is attributed to the fact that high volume users of the Internet are likely more likely to have unpleasant encounters on the Internet than lower volume users, simply because they spend more time online. These distasteful online interactions have the effect of lowering the users' commitment to online community (Wellman et al. 2001).

- Missouri Express. Funded in 1996, this project was designed to provide basic community information technology infrastructure in communities throughout the state of Missouri in order to develop community information networks and support community building and development. An analysis of the project was undertaken by Kenneth Pigg. One question he addressed was the degree to which cyberspace could substitute for 'public space.'

  - o While pointing out that computer-mediated communications using e-mail and the Internet need to correspond to the information infrastructure normally used for community building purposes, Pigg asserts that cyberspace could easily substitute for or supplement 'public space.'
  - o To the degree that technical facilities are organized by human action for general community purposes, stronger communities may result.
  - o However, Pigg presents this caveat: 'These networks must be imbued with content and must be represented in meaningful social interaction in order to fulfil their social capital functions' (Pigg 2001, 524).

- 'Netville' (Toronto). 'Netville,' a recently-built 'wired suburb' near Toronto was equipped with advanced Internet technologies as part of its design. Sociologists collecting information about the nature of social ties of the inhabitants over a two-year period found that:

- o Residents used e-mail as an 'introduction service' in its own right and to set up face-to-face get-togethers.

- o Almost all community members encouraged neighbourly interaction, intertwining online and offline relationships.

- o A local e-mail list enabled families to organize barbeques, teenagers to offer babysitting services, parents to direct other families to recommended shops and service.

- o In Netville people have used the Internet to build neighbouring relationships with families down the street or around the corner, whereas in other neighbourhoods, these relationships are much more highly conditioned by close physical proximity, such as living next door to someone (Wellman and Hampton 1999).

· Blacksburg (Virginia) Electronic Village. The purpose of this community computer network project, begun in 1993, was to enable residents to gain access to the Internet. It provided structures such as listservs, grants for businesses to build online content, and server spaces for local voluntary organizations to create a Web presence.

- o Kavanaugh and Patterson carried out a telephone survey of randomly selected subjects in Blacksburg, using a 'before and after' study design. Their goal was to identify any changes in participants' level of community involvement/attachment between 1996 and 1999, during which Internet use substantially increased. While the level of social capital went up during this period, the relationship between ICT use and social capital was associational, not conclusively causal, and the increase in social capital did not lead to any significant change in community participation (Kavanaugh and Patterson, 2001).

- o Using a stratified random sample, a survey questionnaire was administered to 100 Electronic Village households to collect information on topics such as group membership and participation, Internet use, and community involvement. Results focussed on those people who used ICTs to help create connections between otherwise disconnected groups, demonstrating 'bridging' social capital. While theses ties tend

to be weak, they help integrate diverse groups into a larger social setting, such as a geographic community. ('Bonding' social capital stems from individuals with strong ties within groups and helps further strengthen these ties.) The findings suggest that 'bridging individuals' use the Internet as a tool for maintaining social relations, information exchange, and increasing face-to-face interaction, all of which supports the growth of social capital (Kavanaugh et al. 2003).

· National Survey Fieldwork in the USA. Four telephone surveys based on random samples were fielded between 1995 and 2000 in order to track social and community aspects of Internet use. No loss was discerned in terms of the indicators of political or community involvement. The findings support a more positive interpretation of the Internet's impact, at least in terms of interpersonal communication, where Internet use is associated with greater levels of telephone use and social interaction. It also led to many face-to-face friendships that were judged by respondents as a positive experience (Katz, Rice, and Aspden 2001)

A common thread through these results is a positive impact of ICTs on the tendency to join groups and increase interpersonal connectivity. Two researchers add riders to the general theme: Pigg stresses the necessity for information networks to reflect community concerns, and the conclusions of the study of Kavanaugh and colleagues (2003) refer to the subgroup of 'bridging individuals' as significant, rather than all types of network participants.

This last study helps bring to light a new question. 'Bridging individuals' are people who have connections with groups other than their own. One might expect this type of individual to make positive use of the Internet for community purposes, or to contribute to their community even without the Internet. To what degree is a pre-existing high level of community participation necessary to bring about increased community participation? Is

the amount of pre-existing social capital in a community predictive of the uses and impact of ICTs?

Chicken and egg: Is social capital necessary to beget social capital?
In his examination of the community networks established in Missouri Express project, Pigg concludes that the networks need to be in place for a longer period of time in order for their impact to be determined:

> *There is little evidence that . . . the nature and extent of information access and communication are yet capable of producing social capital or building community* (Pigg 2001, 524).

Putnam speculates on the relationship between physical or personal social capital and 'virtual social capital.' He wonders whether the latter is a contradiction in terms, or whether it is still too early to know. He concludes,

> *Experience in Blacksburg suggests that … social capital may turn out to be a prerequisite for, rather than a consequence of, effective computer-mediated communication'* (Putnam 2000, 177).

Wellman wonders if the positive impact of Internet on community ties shown in 'Netville' may be a special case because the residents were recent arrivals and enthusiastic about participating in an Internet experiment (Wellman and Hampton 1999).

The question of the role of social capital in facilitating community adoption of ICTs is addressed in a comparative study in the state of Minnesota. The study involved two similar rural communities, Grand Rapids and Detroit Lakes. Grand Rapids employed a community approach to the introduction of electronic access, whereby a partnership was formed among the local public school district, community college, public library, economic development corporation, and county health and human services agency, and funded by grants and the federal government. Detroit Lakes was chosen as a comparison city, based on a cluster analysis of demographic and social

variables in both places. In Detroit Lakes, computer use was determined by the purchasing power of households in the private market, acting as individual households. Among Grand Rapids residents, computer use was explained with reference to political capital (which in this study was defined as a variant of social capital). A relationship was identified between degree of political engagement and access to electronic media, with little effect from economic resources. In Detroit Lakes, the reverse was true: economic resources predicted computer use, and political engagement (of which there was very little) has no impact. Pre-existing political capital, as defined in this study, was a strong predictor of computer use (Sullivan et al. 2002). These findings suggest that pre-existing social capital may be a necessary prerequisite if ICTs are to have a role in creating additional social capital.

On the whole, our survey of current studies suggests that online communication shows no sign of displacing real face-to-face interaction and community, and the Internet seems to be expanding and enhancing communities of all descriptions. Nonetheless, there still appear to be questions about the direction of causality between existence and development of social capital and strong community uptake of ICTs.

Community building—beyond technology

This paper has shown that ICTs can play a positive role in community building. A useful corollary is to consider what factors enable ICTs to be most effectively integrated into a community setting.

Lyn Simpson, an academic from Queensland, has identified that a number of elements are necessary to establish the foundation for effective, sustainable community networking implementation: a prepared technical environment, and a target community ready to engage with technology. The degree to which social capital exists in a community is a critical factor in the establishment of successful ICT initiative.

In her view, the ability and readiness of a community to engage with technology depends on the existing social infrastructure and 'soft technology', as described below:

- · social infrastructure— the structural arrangements (occasions and resources) that enable individuals and groups to interact with one another, including community organizations and institutions, networks, volunteerism, and community services and resources.
- · soft technology— the formal and informal activities and interactions that develop skills and knowledge required to maximize the use of hard technology including awareness raising, education and training, and activities that build leadership, decision making and conflict resolution skills and the capacity for reflection and envisioning new future.

The 'soft technology' plays a key role in the degree of community adoption of ICT, though, as shown earlier in this paper, the challenges of soft technology are frequently overlooked in favour of the simpler solution of providing access to computer hardware. A second set of challenges is integrating ICT project goals and processes with the local social infrastructure in order to ensure that community members retain control and a sense of ownership of the project (Simpson 2002).

Randy Stoecker, from the University of Toledo, states the problem succinctly:

Today too many of us ask, 'What can we do with this technology? 'It is the wrong question. The right question is, 'What technology do we need to accomplish our goals?' The technology shouldn't drive the project.

He argues that our real work is rebuilding the social fabric of society, and urges us to acknowledge the responsibility of being drivers of technology rather than its servant (Stoecker 2002).

An earlier study compares two attempts to establish community-based ICTs. In the first case, the impetus for development of a network across seven cities in the state of Ohio came from university academics. The second case involved the adoption of a community-based network in the city of Toledo, where the development proceeded from the ideas and input of the local population. The grassroots initiative succeeded, where the top-down approach used by the academics failed (Stoecker and Stuber 1999).

The work of Nancy Milio, an academic at the University of North Carolina (Chapel Hill), also begins with the premise that 'soft technology,' involving people and organizational relations, is as essential as hard technology to the development of strong community ICT programs. Milio's exploration of communities and ICTs takes place through a series of cases studies, which enables her to identify key factors which increase the likelihood that ICTs will be successfully implemented for community purposes:

These case studies cover innovative uses of information technology to support marginalized groups within a community, to supply educational opportunities, and to contribute to the development of participatory democracy and responsive government. Each case study focuses on a site which successfully developed an innovation in community information technology, defined as the organized application of information technology to

promote conditions supportive of community well-being and health. A summary of some of Milio's recommendations follows:

- Specific targeting.   Target specific populations and offer ICT information tailored to the needs of each group.
- IT Support services. Offer personalized in-home set-up and training sessions and on-call support for troubleshooting, in addition to online and printed help.
- Hardware. Note that matching low-cost components of the hardware—computers, printers, modems, telephone wiring—may be a problem, especially in linking facilities in low income areas.
- Software. Be aware that the available software may not be suitable for the kinds of people-responsive services that community IT is intended to provide. Educational and other types of shareware may be helpful.
- Joint Ventures. Seek a partnership with an organization that has the necessary resources if a community group lacks assets.
- Sponsoring ('Parent') Organizations.   Note the sponsoring organization's continued need to satisfy its original constituencies, and also the importance of 'satisfactory meshing' between the parent organization and designated leader(s) of the sponsored project (Milio 1996).

The major theme of these researchers, the need to listen primarily to the community members that the technology is intended to serve, is echoed elsewhere. Cited are acknowledgement of the critical importance of ensuring that technology serves human needs (Preece 2002), the importance of 'humanware' (Smith 2003), and the necessity of a 'bottom up' or grassroots approach, even when policies may come from the 'top down' (Loader 2002).

A project recently undertaken in Melbourne illustrates the difficulties which may arise when decision makers come to conclusions in the absence of community input. In 1998 a residential construction company proposed to create a residential development in Williamstown, a bay side Melbourne suburb, composed of new homes containing an advanced communications

and information system as a standard household feature. An early grant proposal describes the two main functions of this system (Arnold 2000):

· 'home construction: archiving and informational interoperability,' e.g. plans and instructions for all appliances to be electronically available, and

· 'community construction: ubiquitous digital communications,' composed of broad-bandwidth communications links between each of the houses (an intranet), and 'Virtual Private Network' links to the Internet.

This plan was based on the premise that these communications applications would be used to initiate and nurture a wide range of community building and maintenance activities. The development was completed and launched in March 2002.

The findings of the University of Melbourne evaluation team indicate that after one year of operation, the level of use of the intranet by residents is unexpectedly low. Contributing factors identified by the team (in a paper entitled 'Yes an intranet is all very well, but do we still get free beer and barbecue?') include: insufficient numbers of residents in the community, inappropriate technology for the purpose, and a misinterpretation of community relations (Arnold, Gibbs, and Wright 2003).

Conclusions

Evidence summarized in this review suggests that ICTs have a positive impact on the tendency of people to join groups and that most relationships formed in cyberspace continue in physical space. The social capital literature supports the proposition that ICTs make a positive contribution to social relationships, though whether this results in a cumulative increase in social capital is still to be determined fully. This discussion warns of the possibility that social capital may be a *prerequisite* for a significant ICT contribution to community life, rather than a *product* of this contribution. The transition relationship is difficult to unravel.

Elements that support the successful implementation of a community ICT network include the participation of people with high social capital, the presence of existing community bonding activities (such as volunteering), appropriate training and managerial support, and friendly access space. Of critical importance is consultation with community members to the extent that they demonstrate a sense of ownership of the project as a whole.

The clear refrain from the community development literature is that community building is a process which requires the engagement and commitment of community members. The pace is slow, and as Raysmith noted, community building is not short-term process, despite the fact that the public funding paradigm favours relatively quick results and easily measured outputs. Furthermore, continuity is vital -- the longer established a community network, the greater are the chances of survival. This applies equally to developing a community ICT network, as ICT experts in this survey have made clear.

Many, if not most, of the academics cited herein emphasize the need for human-based 'soft technology' to accompany the purchasable hard technology. Putnam observed that communities with high social capital tend to have a higher quality of life. We could now amend that proposition to read: communities with high social capital tend to be more fertile ground for the establishment of vibrant ICT networks. Networks can stimulate the creation of other networks, both on- and off-line.

Taking a broader perspective, the articles surveyed in this literature review suggest that academics in the field of ICTs have discovered what community development specialists have known all along: community sustainability needs to be grounded in grassroots engagement to meet the needs and aspirations of community members. Failing that, ICTs remain just hardware.

References

Arnold, M. 2000. Wired Homes: Communication and Information Technologies in a Residential Setting. Melbourne: Department of History and Philosophy of Science, Melbourne University. URL: <http://www.hps.unimelb.edu.au/research/wired_homes.html>. Consulted September 23, 2003.

Arnold, M., M.R. Gibbs & P. Wright. 2003. 'Intranets and Local Community: "Yes, an intranet is all very well, but do we still get free beer and barbecue?"' Communities and Technologies: Proceedings of the First International Conference on Communities and Technologies; C&T 2003, ed. M. Huysman, E. Wenger & V. Wulf. Dordrecht. Kluwer Academic Publishers**:** 185-204.

Beale, T. 2000. 'Requirements for a Regional Information Infrastructure for Sustainable Communities--The Case for Community Informatics.' In Community Informatics: Enabling Communities with Information and Communications Technologies, ed. M. Gurstein. Hershey, Pennsylvania, USA: Idea Group Publishing**:** 52-80.

Cox, E. (1995). Boyer Lectures 1995. URL: <http://www.ldb.org/evacox.htm>. Consulted 9 October 2001.

Craig, B. 2003. 'Social Consequences of Connecting Low-income Communities: the New Zealand Experience.' In Many Voices, Many Places: Electronically Enabling Communities for an Information Society. A Colloquium, Prato, Italy, Centre for Community Networking Research, Monash University.

DCITA. 2003a. Annual Report of the Networking the Nation Board 2002-2003. Department of Communications, Information Technology and the Arts, Annex B, Australian Government. URL: <http://www.dcita.gov.au/Article/0,,0_1-2_11-4_117327,00.html>. Consulted 8 February 2004.

DCITA. 2003b. Maintaining the Viability of Online Access Centres in Regional, Rural and Remote Australia. Department of Communications, Information Technology and the Arts, Australian Government. URL: <http://www.dcita.gov.au/Article/0,,0_1-2_11-4_117075,00.html>. Consulted 1 January 2003.

Denison, T., G. Hardy, G. Johanson, L. Stillman & D. Schauder. 2002. 'Community Networks: Identities, Taxonomies and Evaluations.' Electronic Networking 2002- Building Community: Conference Proceedings (CD Rom), Monash University, Centre for Community Networking Research.

Denomme, R. & Associates. 2001. Risk Management and Sustainability of Community Learning Network Projects. Community Learning Network Ontario Forum. Toronto, Ontario. URL: <http://www.ecommons.net/sustain/>. Consulted 1 December 2003.

Gurstein, M. 1999. 'Flexible Networking, Information and Communications Technology and Local Economic Development.' First Monday (Peer-Reviewed Journal on the Internet) 4(2). URL: <http://www.firstmonday.dk/issues/index.html>. Consulted 23 March 2004.

--- 2000. 'Introduction.' Community Informatics : Enabling Communities with Information and Communications Technologies, ed. M. Gurstein. Hershey, Pennsylvania, USA: Idea Group Publishing: 1-31.

--- 2003. 'A Community Informatics Strategy: Beyond the Digital Divide.' Many Voices, Many Places: Electronically Enabling Communities for an Information Society. A Colloquium, Prato, Italy, Centre for Community Networking Research, Monash University.

Haythornthwaite, C. 2001. 'The Internet in Everyday Life.' The American Behavioral Scientist 45(3).

Horrigan, J. P. 2001. Online Communities: Networks that Nurture Long-distance Relationships and Local Ties. Washington, DC: Pew Internet & American Life Project.

Howe, B. and R. Cleary. 2001. Community Building. Policy Issues and Strategies for the Victorian Government. Melbourne: Centre for Public Policy, University of Melbourne.

Joseph Roundtree Foundation. 1995. Social Policy Summary 5: A Review of Community Development. URL: <http://www.jrf.org.uk/knowledge/findings/socialpolicy/SP5.asp>.   Consulted 17 March 2004.

Katz, J. E., R. E. Rice & P. Aspden. 2001. 'The Internet, 1995-2000: Access, Civic Involvement, and Social Interaction.' The American Behavioral Scientist 45(3).

Kavanaugh, A., D.D. Reese, J.M. Carroll & M.B. Rosson. 2003. 'Weak Ties in Networked Communities.' Communities and Technologies: Proceedings of the First International Conference on Communities and Technologies; C&T 2003, ed. M. Huysman, E. Wenger & V. Wulf. Dordrecht, Kluwer Academic Publishers.

Kavanaugh, A. L. & S. J. Patterson. 2001. 'The Impact of Community Computer Networks on Social Capital and Community Involvement.' The American Behavioral Scientist 45(3).

Loader, B. 2002. 'Whither Electronic Communities? Community Informatics in Principle and Practice.' Paper presented at Search Conference: Community and Information Technology: The Big Questions. Melbourne: Centre for

Community Networking Research, Monash University. URI: <http://www.ccnr.net/searchconf/loader.htm>. Consulted 21 January 2003.

Meredyth, D., L. Hopkins, S. Ewing & J. Thomas. 2002. 'Measuring Social Capital in a Networked Housing Estate.' First Monday (Peer-Reviewed Journal on the Internet). URL: <http://www.firstmonday.dk/issues/issue7_10/meredyth/index.html>. Consulted 23 January 2003.

Milio, N. 1996. Engines of Empowerment: Using Information Technology to Create Healthy Communities and Challenge Public Policy. Chicago, Illinois, USA: Health Administration Press.

NOIE. 2002. Digital Divide, National Office for the Information Economy, Australian Government. URL: <www.noie,gov.au/projects/access>. Consulted 18 February 2004.

O'Neil, D. 2001. Merging Theory with Practice: Towards an Evaluation Framework for Community Informatics. Atlanta, Ga.: Georgia Institute of Public Policy.

Pigg, K. 2001. 'Applications of Community Informatics for Building Community and Enhancing Civic Society.' Information, Communication and Society 4(4): 507-527.

Preece, J. 2002. 'Supporting Community and Building Social Capital.' Association for Computing Machinery. Communications of the ACM 45(4).

Putnam, R. 1995. 'Bowling Alone: America's Declining Social Capital.' Journal of Democracy 6(1): 65-78.

    --- 2000. Bowling Alone: The Collapse and Revival of American Community. New York: Simon & Schuster.

Raysmith, H. 2001. Building Better Communities: The Way to Go. URL: <http://www.vlga.org.au/>. Consulted 8 October 2001.

Simpson, L. 2002. 'Big Questions for Community Informatics Initiatives: A Social Capital Perspective.' Paper presented at Search Conference: Community and Information Technology: The Big Questions. Melbourne: Centre for Community Networking Research, Monash University. URL: <http://www.ccnr.net/searchconf/>. Consulted 8 February 2003.

Statistics Canada. 2003. Household Internet Use Survey. September 18. URL: <http://www.statcan.ca/Daily/English/030918/d030918b.htm>. Consulted 18 March 2004.

Stoecker, R. 2002. 'Towards a People's Technology.' Paper presented at Search Conference: Community and Information Technology: The Big Questions. Melbourne: Centre for Community Networking Research, Monash University. URL: <www.ccnr.net/searchconf/>. Consulted 24 November 2002.

Stoecker, R. & A. Stuber. 1999. 'Building an Information Superhighway of One's Own: A Comparison of Two Approaches.' Research in Politics and Society 7: 291-309.

Sullivan, J. L., E. Borgida, M. L. Jackson & E. Riedela. 2002. 'Social Capital and Community Electronic Networks: For-profit versus For-community Approaches.' The American Behavioral Scientist 45(2): 868-886.

Taylor, W. 2003. The Information Society as Community Informatics Systems (CIS) Research Focus for the Faculty of Informatics and Communication Central Queensland University. Rockhampton: Coin Internet Academy.

University of California, Los Angeles (UCLA). 2004. Findings from the First UCLA World Internet Report, UCLA World Internet Project. URL: <http://ccp.ucla.edu/pages/internet-report.asp>. Consulted 27 January 2004.

Wellman, B. 2001. 'Computer Networks as Social Networks.' Science. Washington. URL: <http://www.chass.utoronto.ca/~wellman/publications/index.html>. Consulted 6 June 2003.

Wellman, B. and K. Hampton 1999. 'Living Networked On and Offline.' Contemporary Sociology. Washington. URL: http://www.chass.utoronto.ca/~wellman/publications/index.html>. Consulted 27 June 2003.

Wellman, B., A. Quan Haase, J. Witte & K. Hampton. 2001. Does the Internet Increase, Decrease, or Supplement Social Capital? Social Networks, Participation, and Community Commitment. URL: <http://www.chass.utoronto.ca/~wellman/publications/index.html>. Consulted 22 June 2001.

Winter, I. 2001. 'Major Themes and Debates in Social Capital Literature: The Australian Connection.' Social Capital and Public Policy in Australia, ed. I. Winter. Melbourne: Australian Institute of Family Studies. 2002**:** 17-42.

World Bank. 2002. Social Capital Home Page. URL: <http://www.worldbank.org/poverty/scapital/index.htm>. Consulted 1 December 2003.