

Chapter 4.2.

Using Community Information Networks to Increase IT Capacity and Use in Rural Areas

William J. Grigsby, William C. Shuffstall and Stephan J. Goetz

About the authors: Grigsby (wjg10@psu.edu) is Assistant Professor of Rural Sociology, Shuffstall (shuffy@psu.edu) is a multi-county CED extension agent and IT coordinator (Clearfield Office) and Goetz (sgoetz@psu.edu) is Professor of Agricultural Economics and Director of The Northeast Regional Center for Rural Development, The Pennsylvania State University, University Park, PA.

Abstract

Growing personal computer ownership and Internet access alone will not reduce the digital divide that threatens to further marginalize rural areas. Recognizing that a community's ability to benefit from IT is more than a technical or supply-side problem, the extension curriculum described here presents an incremental process for building community IT capacity from the ground up, involving four key sectors of a community. The activity begins with a planning process that helps communities develop sustainable strategies for building local IT and networking capacity, and for integrating them into the community-building process through Community Information Networks.

Introduction

Information technology (IT) is profoundly changing how people live and work. Korsching et al. (1999:3-4) suggest these changes are historic, and IT's rise as important as the development of the rail and interstate highway systems were to previous centuries. Wisely applied, IT confers competitive advantage to individuals, firms and communities and provides a medium for communicating and conducting business in ways never before possible. Yet geographic distribution of benefits from IT expansion is uneven: rural households are catching up in terms of computer ownership and Internet access (U.S. Dept. of Commerce, 2000a), but the deployment of broadband services favors larger population centers (U.S. GAO, 2001). Leatherman (2000:6) notes:

. . . remote geography both increases costs associated with infrastructure diffusion and makes rural markets less attractive for outside investment . . . the economic structure of rural places seems a detriment insofar as their industries are neither heavily IT-producing or IT-using . . . the human capital found in rural areas does not seem especially attractive either as a labor market or a consumer market.

Realizing the full potential of IT, especially at the community level, requires more than assuring access, however. It requires an incremental process of building awareness, capacity, infrastructure and networking capability supported by a strategic planning process. This takes considerable time, initiative and support. The extension materials underlying this chapter were developed to describe this process and help others adapt it to their own circumstances. They are based on the on-going experience of establishing a Community Information Network in Potter County, Pennsylvania.

Understanding the role and value of IT

Information and telecommunications technologies can offset disadvantages of lower population density and geographic isolation, making available critical information and resources concentrated in larger cities, or seats of government. However, IT caters to more sophisticated, savvy computer users and instead of leveling access and literacy may widen the gap that favors the educated, wealthy, young and city-dwelling (e.g., Schirmer and Goetz, 1997). A key lesson for rural residents, Extension personnel and researchers is that tapping technology's potential is more than a technical or a supply problem, reinforcing a multi-dimensional conception of the digital divide. The accelerating pace of technological change at the same time raises the urgency of responding to the challenge of using IT for strategic advantage. For rural communities, new tools are needed to address contemporary social, economic and environmental changes. For individuals, technology literacy has become a fundamental workforce skill, enhancing workers' value and transforming their roles as IT consumers and producers.

Technology transfer may be necessary, but is certainly not sufficient, to realize IT's potential. Grassroots planning, training and community participation are critical for helping people not only access or use IT, but for using it to build community capital and *improve the quality of their lives*. The following quote illustrates the paradigm shift that using IT successfully may require (Pardo, 2000):

Yes, yes, my daughter can build a Web site, too, but digital government is more than that. The more of us who understand that digital government isn't about building a Web site, that it's not about technologies, that it is about transforming government service delivery through the use of technology, the better off we'll all be.

Economic forces favor communities that can identify and marshal IT resources to take advantage of emerging opportunities. Rural communities that develop plans to help their citizens, organizations and institutions use these tools can better position themselves in a global economy, and pursue quality of life issues while preserving local culture and values (Allen and Dillman, 1994; U.S. Department of Commerce, 2000b). The value of IT investment can also be measured in terms of changes (presumably increases) in community involvement or engagement.

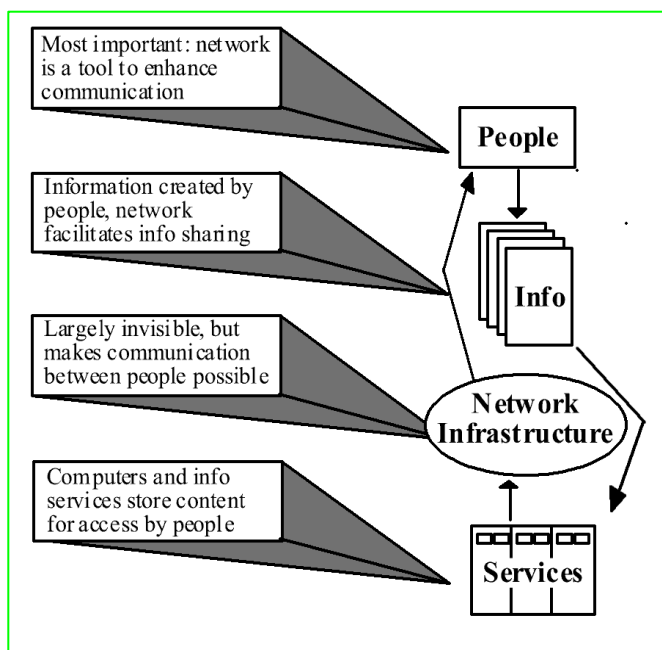
Integrating IT through community information networks

Community information networks (CIN) provide a medium for people to communicate about local issues, to work together toward shared goals, to exchange information and resources, and to

create a local knowledge base. CINs can add value to problem-solving approaches and existing community-building and development processes. They potentially save time and travel, provide a gateway to services and information never before available, and stimulate local flows of information and dialogue. Figure 1 identifies the elements of a CIN.

A CIN publishes information about or of benefit to the community, and provides electronic means for members to communicate (Beamish, 1995). Synonyms include civic networks, Free-Nets, community computer systems, telecommunities, and public access networks. CINs are generally Web-based, and restricted to communities of place (versus online, virtual or interest-based communities). The 'network' concept implies [electronic] communication among members – an important distinction between Web sites and CINs (Law and Keltner, 1995). The latter generally operate on low budgets and depend on external funding sources and local volunteers (Beamish, 1995). The CIN can be a blueprint for incorporating telecommunications and IT into

community-building and development activities (McMahon and Salant, 1999). A well-designed CIN connects people with public, private and non-profit organizations to address issues of local importance. Moreover, a CIN can create important opportunities in both the agricultural and non-agricultural sectors of rural economies.



The Challenge

Not all CINs, nor efforts to popularize them, have thrived. The federal government has funded numerous 'telehealth' networks to expand access to health care in underserved areas, for example. While data on network attrition are limited, use of these networks has not come close to matching the level of investment in the sector (Grigsby and

Figure 1. Elements of a CIN (Shuffstall, 2000a) Brown, 2000). Technology and access do not ensure use, and use does not guarantee long-term sustainability. Schuler (1996a), a co-founder of the Seattle Community Network and a pioneer within the CIN community, cites three scenarios that doom CIN efforts:

- 1) *When communities lack a sense of ownership of the network.* In telehealth, network development is often driven by the needs of large participating hospitals, to the neglect of rural facilities needed to bring in patients (Grigsby, 2001).
- 2) *When financial needs and the quest for money take precedence over community needs and participatory planning.* Networks are often understaffed, and administrators may have to devote scarce resources to seek external funding, or manage existing grants, rather than maintaining and building their networks.

- 3) *When technology drives the process.* Software engineers are generally not experts in community building. CINs are emergent socio-technical systems (Hughes, 1990), and are likely to work better when the design reflects community needs and not vice versa.

CIN benefits and applications

Table 1 lists services commonly provided by CINs. Typical goals of CINs include strengthening community, increasing IT literacy, improving democracy, producing better-informed citizens, supporting economic growth, education and social services (Beamish, 1995; Schuler, 1997).

Table 1. Potential IT benefits for five key community sectors¹

Sector	Benefits, applications	Examples
Local government	Improved communication w/ public; increased transparency, accountability; expanded hours of service; automation of services; acceptance of electronic payments; agency-to-agency interaction; use of decision making tools	Document downloads (e.g., meeting minutes, municipal ordinances); ² feedback mechanisms; ³ online license applications; use of GIS for land use planning/conflict management; emergency and rescue information systems; ⁴ posting of employment opportunities.
Schools/ education	Improved communication capabilities; home/school communication; posting of services, curricula, course content; develop partnerships with other educational, non-educational institutions; continuing education information; increase community appeal to IT industry	Work with local hospital to strengthen school health education; work with local businesses to address potential rural 'brain drain' of IT literate; provide resources for home schooled; raise awareness of local secondary, post-secondary, and lifelong educational opportunities; ⁵ closer ties with local libraries, government.
Business	Focus on small, home-based businesses; expand customer base; advertise services; raise awareness of contract bidding opportunities, processes; ⁶ reduce printing; manage inventory; expand firm-to-firm services; raise awareness of IT/IS outsourcing; export opportunities, trade shows; collaborate with public agencies, trade groups; recruit personnel	Directory of local services (e.g., similar to Blacksburg's 'Village Mall,'); ⁷ identify distance learning opportunities for employees; address access needs of people with disabilities; online marketing of hospitality services (e.g., bed and breakfast Web site); strengthen farm-extension relationships; join commodity online marketing cooperatives ⁸ ; work with local banks to reduce small loan transaction costs; job creation ⁹
Not for profits	Raise local awareness of activities, events; more timely communication; strengthen horizontal ties; fundraising;	Expanded access to information for organizations (e.g., about their own communities, theirs and similar organizations facing similar issues); en-

¹ Based on Shuffstall (2000a).

² See Teller County Government's Web page in Colorado at www.co.teller.co.us/.

³ See Hart and Teeter (2000) for an opinion poll of public attitudes toward e-government.

⁴ E.g., Michie and Lockwood (1999).

⁵ See <http://pottercountyedcouncil.org/> for an example from one of the project communities.

⁶ E.g., see site co-developed by one of project participants at www.rosenet.org/gov/administration/bids/default.htm.

⁷ On World Wide Web at www.bev.net/mall/index.html. Also <http://swain.ces.state.nc.us/smallbus/>.

⁸ See Miller (1999).

⁹ See Cable Kakela (1995).

	strengthening linkages with regional, national non-profit organizations;	courage strategic thinking about use of information; ¹⁰ public charity lobbying activities. ¹¹
Individuals and families	Increased involvement in the community/knowledge of issues affecting community; increased awareness of volunteering opportunities; expanded access to health care information	Public service announcements; action alerts (e.g., recalls, safety); ¹² online discussions; bulletin board services; events calendars; ¹³ collaborate with health providers on online health care information; ¹⁴ volunteering opportunities. ¹⁵

Building community, strengthening social capital and local capacity, and promoting economic development cut across sectors of the rural community. Schuler (1996b) contends that effective CINs emphasize community over individual interests, and Stallings (1996) notes that many make this explicit in their by-laws. These goals are admirable, yet require much more than providing access and encouraging use to achieve community development and better quality of life.

Steps and Procedures

Based on the experience in Potter County, PA, four specific steps have been identified in the effective implementation of a CIN. These include: 1) creating a community network taskforce; 2) setting up 'IT camps' for local secondary school students; 3) establishing community technology centers, and; 4) delivering IT curricula to key sectors.

Step 1: Create a Community Network Taskforce

Raise the awareness of IT's potential among a group of community stakeholders by forming a Community Network Taskforce.

Three major tasks are involved in this activity (#1). The first is to *create a Community Network Task Force* (CNTF). Logistically, developing the CNTF entails initial small group presentations by project personnel to key leaders in the selected communities (e.g., school superintendent, city council/mayor, business leaders, influential health care providers, church leaders, local residents with IT expertise, representatives of different community groups [e.g., ethnic groups, farming community]). Fundamental to this process is the *identification of at least one project champion*, who understands the potential benefits of digital technologies for the community and can convey them in non-technical terms. The champion is also an organizer, participant and recruiter.

The CNTF should have from 3 to 9 members, representing as broad a spectrum of the community as possible. Task Force members need access to and rapport with local leaders within the public, private, non-profit (e.g., government, business, churches and non-profits) and volunteer (e.g., social organizations, service clubs) spheres. Members must understand the potential of information technology to impact the long-term well-being of the community. While they do not

¹⁰ See Vinson (1999) for example of impact on organizations' access to and use of electronic information.

¹¹ Independent Sector (2001).

¹² E.g., see Agre 1999 (<http://dliis.gseis.ucla.edu/people/pagre/alerts.html>).

¹³ The Laboratory for Community and Economic Development (2001).

¹⁴ The Ars Portalis (www.arsportalis) project is experimenting with CINs providing Web space for hospital patients.

¹⁵ See for example www.Prairienet.org's link to community volunteering Website at <http://cuvolunteer.org/>

have to be technology experts, they must be willing to learn and work together to bring the community's leadership and resources to bear on the task of helping move the community into the Information Age.

Task Force Responsibilities

The CNTF needs to conduct a *Technology Infrastructure Assessment*, both of information and telecommunications technology resources and needs. What technologies are currently available, who are the service providers, with whom would the community likely work, what questions must be asked, what needs must be addressed to ensure reliable, secure broadband access for the community, and what are the gaps between existing resources and CIN-capable IT resources? This assessment forms the basis for developing the CIN Technical Plan, establishing Community Technology Centers, community resources and organizations or people who can help implement CIN projects.¹⁶

The CNTF's second task is to develop a 'working' community network vision statement – a brief, accessible and evolving statement that conveys the objectives and benefits of the effort – essentially a tool for marketing the initiative to the broader community. Included is a description of how the community will "look and feel" at some future time. Task Force members must share this vision in the community to set the stage for local organizations to 'buy in' and collaborate on the CIN project as the community moves toward a shared vision.

The third task is to draft a community network plan, designed to address development of IT training and community tech center(s), access to broadband, network/Website development and maintenance, and collaboration with agencies and organizations furthering their own mission(s) or self-interest through involvement with a sustainable CIN. The draft plan is the product of an all-day meeting of the CNTF with project personnel and key invited stakeholders. The network plan is essentially an evolving blueprint for how the community envisions integrating IT into local community-building and development processes.

The importance of broad community support and participation in creating and sustaining a CIN cannot be underestimated. CNTF members need to identify key community leaders who understand the importance and potential benefits of the CIN to their own organizations, and to the larger community. Some will serve as key liaisons and sounding boards between Task Force members and their own constituents. Part of the CNTF's mission is to find meaningful and appropriate ways to involve these individuals in project activities, since they are critical sources of volunteer labor and knowledge.

Step 2: Set up 'IT Camps' for local middle and high school students

The IT camp creates a local cadre of IT-literate citizen volunteers. Students are taught how to develop Web content, and then begin to use their skills to address tasks in the community network plan. Emphasis is placed on usability and creating relatively simple, uniform interfaces for potential network users.¹⁷ Interaction with senior citizens is encouraged as an intergenerational

¹⁶ See 'CIN tools and resources' table; also Shuffstall (2000c).

¹⁷ E.g., see www.useit.com or Universal Usability.org's Web site at <http://www.universalusability.org/index.html>.

activity (and centers considered for CIN points of access). The strategy for planning and conducting IT Camps should be included in the community network plan. In the Potter county experience, holding one IT camp with 20 students costs about \$10,000. The CNTF should spearhead fundraising efforts and develop a donor list to support the important work of the IT camps, and to make them an educational fixture within the community.

The initial CIN will likely be a product of IT camps (e.g., see www.pottercountypa.net). It is useful to encourage teachers from local schools to participate, enhancing computer/IT literacy and capacity within the school systems. Senior projects for high school classes can also be tailored around the IT Camps.

Step 3: Set up Community Technology Centers

Increase access to IT use and training through community technology centers (CTCs).

The plan for CTCs will emerge from the CNTF's network plan. Seed money needs to be provided if basic facilities do not already exist to establish CTCs and public access to broadband computing and network resources within the community; one possible revenue source is advertising funds from local businesses. The CTCs are critical to both access- and capacity-building activities. Broad-based support among community groups is essential to long-term sustainability of CINs, and to the community's sense of ownership of them. Their siting will consider traditional patterns of information access within the community, and build upon these and the institutions considered 'trustworthy' and 'user-friendly' (e.g., public library, schools).

The CTCs serve as training and technical support centers. Volunteer staffing is critical to their success. They increase the user base within the community, increase IT literacy, and increase the community's appeal to employers utilizing IT, and to telecommunications service providers seeking markets.

Step 4: Deliver IT Curricula for Key Sectors

Integrate IT into community activities and decision making through curricula development and teaching for businesses, local government, and not-for-profit groups.

An e-business curriculum needs to be delivered to local businesses (including those that are home-based or on the surface appear not to be information-intensive), chambers of commerce, and others in surrounding communities, drawing on local volunteers to teach the curriculum. Small business owners participating in the e-commerce program learn how to use the Internet as a business marketing and research tool, decide if a Web presence is advantageous for their business, understand the components of Website creation, and learn techniques to effectively promote Websites and to incorporate Internet-based components into their business plans. One component of the CIN Website is a listing of local businesses, providing a community portal for linking Websites. Special attention can be paid to the needs of the farming communities (e.g., through auctions, input and output markets, access to a wide range of information providers, agencies, lenders, and services such as GIS).

A local 'e-government' curriculum is an essential element for building capacity within the public sector for online interaction between government officials and their constituents. This would in-

clude interaction involving community residents, as well as government-to-government interaction (e.g., municipalities communicating with state or federal agencies). An e-government software product that suits the needs of selected communities is currently being developed.¹⁸ Residents and local officials need to be involved in the choosing of appropriate software and the development of the curriculum, therefore it is difficult to anticipate what the curriculum will look like early in the planning process. Specific applications should be driven by perceived needs of residents. Sub-activities may include training for local government officials and staff and government agency directors and employees; the construction of a 'virtual town hall'; and the provision of GIS capacity (recognizing the critical importance of spatial issues in local government decision making).

A third curriculum needs to be provided to not-for-profit groups, including churches, civic clubs, youth groups and special interest groups. Not-for-profits are critical not only in building social capital within the communities, but for energizing their members to volunteer for local initiatives. Web sites and a community Web presence increase community members' knowledge and awareness of group activities and volunteer opportunities. In addition, not-for-profits can benefit from better connections to affiliated groups outside their community (e.g., for fund raising). Local chapters of national groups will be able to take advantage of resources difficult to obtain 'offline.' Training services need to be made available at the Community Tech Centers and equipment provided at little or no cost, but the organizations should provide volunteers to maintain and update their websites.

The delivery of curricula for IT applications represents the critical 'deployment' phase of the CIN. Intermediate outcomes such as use of network resources, IT graduates, growth of CNTF and related committees, are critical, but do not ensure that the knowledge and capacity gained are used to address local development problems and respond to opportunities (Table 1 lists some of the potential benefits of implementing these curricula).

Benchmarks and evaluation criteria

Community networks are evolving entities, driven in this method by local participatory planning. However, communities are expected to achieve certain benchmarks, and these can be monitored or tracked by practitioners: (1.) The community will form a network task force and draft a plan for integrating IT. (2.) It will host IT Camps, plan for and establish technology centers, coordinate training in IT applications curricula, and (3.) develop elements of an online network (Table 2). In the process, (4.) the activities are expected to expand knowledge, use and value of IT in the community.

Of particular interest are communities' abilities to integrate IT in strategic ways by incorporating it into community building, networking and development processes, and more generally social life, and to use it not as a substitute for convention, but to do things never before possible or feasible. It is also anticipated that communities will use this capacity to form strategic alliances with organizations that have a vested interest in supporting the community or the CIN develop-

¹⁸ Co-author Bill Shuffstall is working on this project in collaboration with a design team from the University of Minnesota.

ment process. Four principles drive the process and the evaluation: (building) capacity, (designing and promoting) access, (planning for) sustainability, and application (translating into action).

Time Table

A time table for a typical four-year CIN-building effort is presented in Table 2.

Table 2. Project task time table

Project tasks	Year 1	Year 2	Year 3	Year 4
Technology assessment				
CNTF establishment				
Community network plan				
Develop Web-based data collection forms, database				
Develop Web site				
Ongoing evaluation				
Develop IT applications curricula				
IT camp				
Establish community technology centers				
IT applications curricula training				

Outcomes from an ongoing CIN project (Potter County, PA)

The proposed method is based on an ongoing project begun in 1999 in Potter County, Pennsylvania (www.pottercountypa.net/). The initiative was spearheaded and the methods developed by William Shuffstall <link> and consultant Elwood Kerkeslager <link>. Early outcomes include:

Building local capacity: A graduate of the initial IT training camp hosted by the county developed www.pottercountyedcouncil (PCEC)—a Web site designed to increase local awareness of higher education, workforce training, and continuing professional education opportunities in the county. The effort's stated goals are to better inform local citizenry and contribute to the vitality of local educational institutions. Now employed at Coudersport-based Adelpia Communications Business Solutions, the student creator continues to volunteer his time and expertise. Computer classes are now available in all five local school districts. Last year total enrollment was 467; this year it exceeded 300 in the first 6 months. In addition, the number of people accessing the Web site and seeking information from the council has doubled to over 1,000 in the last year. The county is also meeting its goal of expanding the cadre of volunteer Webmasters. Preliminary outcomes suggest that growth, interest and participation in network-related activities are increasing and diffusing to other communities.

Growth of IT Camp (activity two of the present proposal): The IT Camp, conducted in the summer, is in its third year. Camp officials (from the community and Penn State University [www.psu.edu]) identify 20 local sophomore and junior class high school students for the two-week intensive course, taught by PSU faculty and extension. Adelpia Communications has committed \$10,000, up from \$8,000 last year. The first year's product was www.pottercountypa.net, the community's Web page. The second year, community, network task force and camp staff decided to add the Potter County Historical Society Web page (www.pottercountypa.net/history/). This year's goal is to create Web pages for local human services agencies.

Planning activities: Oswayo Valley School District begins task force, IT and network planning in the Fall (objective and activity 1). Potter County Commissioners are reviewing virtual town hall sites to determine how best to bring county government online. The Coudersport Borough Manager and Council President would like to establish a presence on the site. The Human Services Director and Management Team have become involved in CIN and IT Camp planning, which will expedite the process of bringing the agencies online, and better familiarize students and IT volunteers with the structure and functioning of local social services.

Diffusion of CIN throughout county: The first community tech center (step 3 of this curriculum was opened in September 2000, at a Northern Potter school district building. The most frequent users have been students doing homework and research, parents with children doing Internet-based homework assignments, various individuals accessing e-mail accounts, and adults doing Web-based research (e.g., on health topics). In addition, a committee in the Northern Potter School District added three more communities to the county web site and continues to expand local history information. The community of Austin will be online by Summer 2001.

Conclusion

The empirical evidence available clearly shows that, while money is important for expanding IT use in communities, it is not enough. A great deal of money can be spent in support of IT development. However, if it is not accompanied by local broad-based efforts to build capacity to use it both at an individual and at a strategic community level, and to mobilize residents and local organizations, then returns on investment are likely to disappoint. The most critical elements in the process are the development of human capital and organizational capacity that provide communities with the means to use technology and the CIN to address local problems and better local conditions. The presence of an interested county extension agent provides impetus, but what may be more critical is the identification of committed community leaders who are willing and able to take advantage of the wealth of available Web-based resources on CINs, to work with and identify key governmental and technology partners, and to engage residents and build local support.

Additional resources on CINs

Bill Shuffstall's factsheets: http://www.cas.nercrd.psu.edu/e-comm_cin_materials.htm

Links to CINs
http://www.state.co.us/communities_dir/communities.html
<i>Colorado CINs.</i> An 'unofficial' site that includes links to over 20 known CINs in Colorado.
http://www.more.net/projects/mo_express/cins.html
<i>Missouri Express.</i> Links to over 20 CINs in the state of Missouri.
http://www.rosenet.org/
<i>Rosenet.</i> Madison, New Jersey CIN. One novel feature is contracts and bid postings.
http://www.bev.net/
<i>Blacksburg Electronic Village.</i> One of the oldest, best-developed (and best-funded) CINs.
http://pottercountypa.net
<i>Potter County Website.</i> Also of interest is the Potter County Educational Council, www.pottercountyedcouncil.org .

CIN Tools, Resources, Funding
http://www.bev.net/project/evupstart/planning.html
<i>Blacksburg Electronic Village, Community Network Planning Guide.</i> Offers a host of resources for communities in the CIN planning process.
http://outreach.missouri.edu/moexpress/guides/
<i>Missouri Express Resource Guides.</i> More CIN planning resources from a Missouri-based CIN association.
http://www.benton.org/Practice/Toolkit/planning.html
<i>The Benton Foundation.</i> This page provides more planning resources from one of the most respected nonj-profits providing IT information and resources for communities, organizations and individuals.
http://mel.merit.edu/citoolkit/content/book/
<i>Michigan Electronic Library Community Information Took Book.</i> Online resources for CINs. Provides a series of downloadable chapters addressing key issues in planning, implementation and maintenance of a CIN.
http://www.communitiesofthefuture.org/
<i>Communities of the Future.</i> ‘An evolving network of people and organizations throughout the U.S. and other countries that are working in collaboration to develop new concepts of governance, economic development, and education/learning for a fast-paced, interconnected, and increasingly complex society.’
http://www.afcn.net/
<i>Association for Communit Networking.</i> A member-based trade organization that supports CINs and community networking through information and advocacy.
http://www.scn.org/ip/commnet/gov-resources.html
<i>Community Networks Funding Resources.</i> Provided by Melinda Flemming and Doug Schuler (a pioneer of the Seattle Community Network). A wealth of resources for communities seeking funding to help build their IT capacity.
http://www.benton.org/Practice/Toolkit/funders.html
<i>Benton Foundation Funders’ Corner.</i> Benton Foundations Web page of funding resources for IT, non-profit, and community-related initiatives.
http://www.helping.org/nonprofit/findinghelp.adp
<i>Helping.org.</i> This site attempts to connect people with resources (e.g., community technology centers) available in their region. Good for becoming aware of the resources that might be available locally, or for adding to their database.
http://www.ctcnet.org/
<i>CTCNet</i> is a non-profit organization that provides resources and advocacy focused on providing equitable access to information technology. It is a very good source for learning about technology centers.
http://www.perscholas.org/
<i>Perscholas</i> is an electronics recycling center, and supplies recycled and new computers, services and training, concentrating on schools and non-profit organizations.
http://www.ag.uiuc.edu/~lced/resources/factsheets/needsizes.html
Laboratory for Community and Economic Development (LCED). At the University of Illinois-Urbana-Champaign. Includes a variety of resources for current and prospective communities.

E-government links
http://www.excelgov.org/egovpoll/
<i>E-Government: The next American revolution.</i> Report on a survey of citizens conducted by pollsters Hart and Teeter for the Council for Excellence in Government (the report can be downloaded from here; there is also a Powerpoint presentation). Attempts to assess attitudes and demand for specific services that might be offered online.
http://virtualsociety.sbs.ox.ac.uk/reports/gis.htm
<i>Web-based GIS Used to Enhance Public Democratic Involvement.</i> A research report from the virtual society? Web page. Provides three examples from Britain of how Geographic Information Systems can be used and publicly accessed—two at the community level, one addressing nuclear waste management.
http://www.firstgov.gov/
<i>FirstGov</i> is a portal for accessing online information content and services provided by the Federal Government. Includes links to access legislative, judicial and executive branches, as well as state and local governments, and includes governmental job postings, web-forms for giving feedback to concerned governmental body, online filing of taxes etc.
http://www.ctg.albany.edu/
<i>Center for Technology in Government.</i> Describes itself as an information technology research and demonstration resource for local, state, and federal government. Employs partnerships, problem solving, and knowledge building to help public agencies test new ideas in a low-cost, low-risk environment. CTG is part of the University at Albany/State University of New York.
http://www.co.teller.co.us/
<i>Teller County (Colorado) Government home page.</i> A good example of the sorts of local services and information that can be provided online.
E-business links
http://www.extension.umn.edu/mainstreet/
<i>Access Minnesota Main Street.</i> A state-funded e-business curriculum developed at the University of Minnesota. Connects small- to medium-sized businesses to the Internet, electronic commerce, and global trade, through educational programs and demonstration projects.
http://www.acn.net/
<i>ACNOdyssey.</i> An online source of information to assist communities and companies in building mutually beneficial networking capacities.
http://www.exportit.ita.doc.gov/
<i>ExportIT.</i> U.S. Government Website providing information on information technology and export markets.
http://www.bankrate.com/brm/links/business1.asp#Tips
<i>Bankrate.com.</i> Web page providing information resources and services for small businesses.
http://www.bev.net/mall/index.html
<i>Blacksburg Electronic Village (BEV), Business Directory.</i> BEV in Southwest Virginia is one of the oldest and most well-developed CINs. It is more than an electronic directory of businesses in the region—most of the links are to Websites that offer both descriptions and services to users.

IT for Not-for-Profits

<http://www.ombwatch.org/npt/activity/pr/121998.html>

OMBWatch. Link to a report on OMBWatch's Non-Profits' Policy and Technology Report, entitled 'Democracy At Work: Nonprofit Use of Internet Technology for Public Policy Purposes.' Focuses specifically on non-profit public policy activities using IT.

<http://www.surdna.org/>

Surdna Foundation. Links to a report entitled 'More than Bit Players: How Information Technology Will Change the Ways Nonprofits and Foundations Work and Thrive in the Information Age.' Surdna Foundation is a non-profit philanthropic and grant making organization.

<http://www.techsoup.org/articlepage.cfm?articleid=33&topicid=11>

Techsoup. Bills itself as 'the technology place for nonprofits.' This link is to planning resources to help nonprofit organizations plan for and use information technology.

Rosenet example:



References

- Agre, P. 1999. Designing effective action alerts for the Internet. Available on World Wide Web: <http://dliis.gseis.ucla.edu/people/pagre/alerts.html>.
- Allen, J., and D. Dillman. 1994. *Against all Odds: Rural Community in the Information Age*. Boulder, CO: Westview Press.
- Beamish, A. 1995. *Communities on-line: Community-based computer networks*. Master's Thesis, Department of Urban Studies and Planning, Massachusetts Institute of Technology, Cambridge, Massachusetts. Available on the World Wide Web at: <http://alberti.mit.edu/anneb/cn-thesis/index.html>.
- Cable Kakela, L. 1995. *Measuring economic development outcomes of telecommunications projects in rural communities*. Washington, DC: Economic Development Administration. Available on World Wide Web at: <http://bcn.boulder.co.us/aerie/evaluation/impact.htm>.
- Grigsby, B. 2001. *Telehealth: An assessment of growth and distribution*. Unpublished manuscript.
- Grigsby, B. and N. Brown. 2000. *ATSP Report on U.S. Telemedicine Activity*. Portland, OR: Association of Telehealth Service Providers.
- Hart, P. and R. Teeter. 2000. *E-government: The next American revolution*. Intergovernmental Technology Leadership Consortium. Available on the World Wide Web: <http://www.excelgov.org/egovpoll/>.
- Hughes, T. 1990. The evolution of large technological systems. Pp 51-82 in W. Bijker, T. Pinch and T. Hughes (eds) *The Social Construction of Technological Systems*. Cambridge, MA: MIT Press.
- Independent Sector. 2001. *Charity lobbying in public interest*. Available on World Wide Web at: <http://www.indepsec.org/clpi/index.html>.
- Korsching, P., Hipple, P., and E. Abbott. (eds) 1999. *Having all the right connections: Telecommunications and rural viability*. Westport, CT: Praeger.
- Laboratory for Community and Economic Development. 2001. *Technology Tools*. Available on World Wide Web at: http://www.aces.uiuc.edu/~fra/tech_tools.html.
- Law, S.A., B. Keltner. 1995. *Civic networks: Social benefits of on-line communities*. Rand Corporation publication MR – 650 – MF.
- Leatherman, J.C. 2000. *Internet-based commerce: Implications for rural communities*. Washington, DC: U.S. Economic Development Administration. Available on the World Wide Web at: <http://www.doc.gov/eda/pdf/leatherman.pdf>.
- McMahon, K., and P. Salant. 1999. *Strategic planning for telecommunications in rural communities*. *Rural Development Perspectives* 14(3):2-7. Available on the World Wide Web: <http://www.ers.usda.gov/publications/RDP/RDPOCT99/>
- Michie, J. and J. Lockwood. 1999. *Alliance of Information and Referral Systems — NERIN 95105*. National Telecommunications and Information Administration. Available on World Wide Web: www.ntia.doc.gov/otiahome/top/research/EvaluationReport/case_studies.htm.
- Miller, P. 1999. *Cooperatives Online*. *Rural Cooperative Magazine* (March/April). Available on World Wide Web: <http://www.rurdev.usda.gov/rbs/pub/mar99/online.htm>.
- Pardo, Theresa, A. "Realizing the Promise of Digital Government: It's More than Building a Web Site," *Information Impacts Magazine*, available at www.cisp.org/imp/october_2000.

- Schirmer, P. and S.J. Goetz. 1997. *The Circuits Come to Town: An Analysis of Technology Use and Electronic Delivery of Government Services in Kentucky*. Frankfurt, Kentucky: The Kentucky Long-Term Policy Research Center. <http://www.kltprc.net/PDFs/Circuits.pdf>
- Schuler, D. 1997. 'Community networks: Building a new participatory medium. Pp. 191-218 in P. Agre and D. Schuler (eds) *Reinventing technology, rediscovering community*. Greenwich, CT: Alex Publishing Co.
- Schuler, D. 1996a. How to kill community networks. *The Network Observer* (January). Available on the World Wide Web at: <http://dliis.gseis.ucla.edu/people/pagre/tno/january-1996.html#schuler> or <http://www.scn.org/ip/commnet/kill-commnets.html>.
- Schuler, Douglas. 1996b. *New Community Networks: Wired for Change*. New York: ACM Press.
- Shuffstall, B. 2000(a). Community information networks. Penn State Cooperative Extension, Clearfield County. Available online at: http://www.cas.psu.edu/docs/casconf/nercrd/e-comm_cin_materials.htm.
- Shuffstall, B. 2000(b). Building a community information network. Penn State Cooperative Extension, Clearfield County. Available online at: http://www.cas.psu.edu/docs/casconf/nercrd/e-comm_cin_materials.htm.
- Shuffstall, B. 2000(c). Community IT infrastructure assessment. Penn State Cooperative Extension, Clearfield County. Available online at: http://www.cas.psu.edu/docs/casconf/nercrd/e-comm_cin_materials.htm.
- Shuffstall, B. and E. Kerkeslager. 2000. Community information network initiative: Penn State Cooperative Extension and Outreach. University Park, PA: Pennsylvania State University.
- Stallings, B. 1996. A Critical Study of Three Free-Net Community Networks. Available on the World Wide Web: http://ofcn.org/whois/ben/Free-Nets/FN_TOC.html.
- U.S. General Accounting Office. 2001. Characteristics and choices of Internet users. Report 01-345. Available on the World Wide Web at: <http://www.gao.gov/new.items/d01345.pdf>.
- U.S. Department of Commerce. 2000a. *Falling through the net: Towards digital inclusion*. Washington, DC: National telecommunications and Information Administration. Available on the World Wide Web at: <http://www.ntia.doc.gov/ntiahome/ftn00/contents00.html>.
- U.S. Department of Commerce. 2000b. *Community connections: Preserving local values in the information age*. Washington, DC: Department of Commerce. Available on the World Wide Web at: http://www.ntia.doc.gov/otiahome/top/publicationmedia/comm_conn/community_connections_illus.html.
- Vinson, M. 1999. *NcexChange and the North Carolina Justice and Community Development Center*. National Telecommunications and Information Administration. Available at World Wide Web: http://ntiaotiant2.ntia.doc.gov/top/details.cfm?tiiap_no=960392.