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ABSTRACT

Rural areas lag behind urban areas in access to information technologies. Public institutions play a critical role in extending the benefits of information technologies to those who would not otherwise have access. The most successful rural telecommunications plans address barriers to use, such as unawareness of the benefits, technophobia, the need for training, and the cost relative to perceived value, as well as barriers to access, such as higher installation costs due to distance and low population density. Rural communities are coming online through a number of initiatives. The National Telecommunications and Information Administration has two programs that fund demonstration projects and assist rural communities in gaining access to information services and technologies. Regional and state initiatives include the Rural Datafication Project, which enables state networks to deliver services to rural communities, and several initiatives in Nebraska that focus on stimulating demand. Big Sky Telegraph has pioneered efforts to bring rural residents online and is a model for rural networking systems. The National Public Telecomputing Network's Rural Information Program helps rural communities set up local information networks that are owned and controlled by the community. Information is provided on 12 organizations and online resources. Contains 11 references and 9 additional resources. (TD)

COMMUNITIES ADDRESS BARRIERS TO CONNECTIVITY - DIGEST

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Communities address barriers to connectivity

by Anne Byers

For most rural Americans, access to the Information Superhighway is still more than a local phone call away. Rural households, libraries, and schools lag behind those in urban areas in their access to information technologies. However, recognizing the economic, social, and economic benefits of telecommunications, an increasing number of rural communities across the United States are building their own on-ramps to the National Information Infrastructure.

Rural telecommunications use

Although rural Americans often lack easy access to advanced information technologies, they regularly use a number of telecommunications technologies. A survey of rural businesses and residents conducted by the Rural Policy Research Institute (Allen et al., 1995) found that 69 percent of the rural community respondents regularly use fax machines, 46 percent use computers, 25 percent use computer modems, 15 percent use e-mail, and 6 percent use the Internet.

Nearly two-thirds of the respondents see telecommunications as important or very important for future economic growth. An even greater percentage of respondents (over 75 percent) believe telecommunications is important for the delivery of educational and medical services. Many rural residents are already taking courses online. The NTIA report, *Falling through the Net* (McConnaughey, Nila & Sloan, 1995), found the percentage of rural households with a computer and modem participating in online courses ranges from 12 percent in the West to 22.3 percent in the South. In both the South and Midwest, rural households with a computer and modem were more likely to take courses online than their urban counterparts.

For the most part, however, this report found that rural households lag behind urban households in their access to information technologies. Both personal computer and modem penetration are, in most instances, lower in rural areas than urban areas. The percentage of rural households with a computer ranges from 18.6 percent in the South to 29.5 percent in the West. In the Northeast and Midwest, the percentage of rural households having computers is 27.4 and 24.6 respectively. Modem penetration in rural computer households ranges from 35.3 percent in the West to 46.9 percent in the Northeast.

A more serious concern is the inequity in institutional access to the Internet between rural and urban areas. Because computer and modem ownership is highly correlated with income and education, public institutions play a critical role in extending the benefits of information technologies to those who would not otherwise have access.

A more serious concern is the inequity in institutional access to the Internet between rural and urban areas. Because computer and modem ownership is highly correlated with income and education, public institutions play a critical role in extending the benefits of information technologies to those who would not otherwise have access. By providing opportunities for citizens to learn about information technologies, schools and libraries can also stimulate interest and support for community technology initiatives.

While 78.9 percent of public libraries located in urban areas have Internet access, only 16.8 percent of rural libraries have Internet access. Rural and small schools are also less likely than those in urban areas to have Internet access. Only 30 percent of schools with enrollments under 300 have Internet access. In comparison, 58 percent of schools with enrollments of over 1,000 have access to the Internet (Gonzalez, 1995).

Barriers to connectivity

Rural communities face two types of barriers to full connectivity to information technologies—barriers to access and barriers to use. Barriers to access are the physical, technological, regulatory, and economic barriers which currently impede the provision of expanded telecommunications services to rural areas. Rural telecommunications policy discussions tend to focus on overcoming barriers to access and creating physical infrastructure. The most successful strategic telecommunications plans, however, also address barriers to use. These barriers include unawareness of the benefits of information technologies, technophobia, the need for training in the use of information

technologies, and the cost of information technologies relative to their perceived value.

Barriers to access. Distance and low population density, the defining characteristics of rural areas, increase the cost of providing wireline telecommunications services. The wireline systems and technologies developed for urban areas may be less than optimal for rural areas—especially for more isolated areas. Connecting isolated farms and ranches will most likely require the deployment of emerging wireless technologies. The higher costs and lower return on investment involved in servicing rural areas discourages many telecommunications providers from providing expanded telecommunications services to their rural costumers. While urban markets are able to support multiple service providers, many rural markets may only be able to support a single provider. Appropriate regulations are needed to ensure that all Americans have access to information technologies at a fair price (U.S. Department of Commerce, National Telecommunications and Information Administration, 1995).

Some independent telephone companies, like Pioneer Telephone Company in Ulysses, Kansas, have begun providing Internet access to their customers. These telephone companies have generally been more responsive than larger telephone companies to the expanding telecommunications needs of rural communities. In areas not served by independent telephone companies, the formation of telecommunications cooperatives may accelerate the process of bringing rural communities online.

"The issue is not really information haves and have nots, but rather information cans and cannots."

E. Michael Staman

Building partnerships between public and private sectors is a powerful strategy to overcome barriers to both access and use. Aggregating demand between sectors within a community and between communities can make telecommunications services more affordable. By time-sharing and using funds that were being spent on out-of-town training conferences, the business, health, education, and government sectors in one Nebraska town were able to purchase their two-way interactive videoconferencing system (Hoy, 1995). Rural residents support incentive programs to encourage the linkage of users, ranking it as one of the most important telecommunications policy initiatives (Allen et al., 1995).

Barriers to use. Connectivity involves more than a physical connection. As Michael Staman, president of CICNet, stated at the Rural Datafication IV conference (Byers, 1995b), "The issue is not really information haves and have nots, but rather information cans and cannots."

Unawareness of the value of telecommunications is a major barrier to connectivity in rural areas. Many residents are simply unaware of how information technologies work and how they can be used to enhance economic and cultural opportunities in rural areas.

"I have discovered that the average rural citizen has never, ever heard an explanation of the value of information technology and telecommunications that made any sense to them," says Christopher Hoy (personal communication, December 1995), Nebraska Department of Economic Development. "Therefore, they are not interested in spending a lot of time or money on it."

Technophobia may also hamper the adoption of information technologies. Apprehension about learning to use new technologies may stem from previous failed encounters with computers. Fortunately, information technologies are becoming increasingly user friendly.

"As user interfaces become more user friendly, that will bring in an entirely new quadrant of the population that up until now has certainly not wanted to go through the whole learning curve that was involved in accessing information," says Hoy.

There is also an unmet need for training and educational opportunities to increase awareness, allay the apprehensions of technophobes, and build telecommunications skills. In fact, rural residents rank the provision of education and training programs as the most important telecommunications policy initiative (Allen et al., 1995).

"I have discovered that the average rural citizen has never, ever heard an explanation of the value of information technology and telecommunications that made any sense to them."

Christopher Hoy

Because it is often not profitable for the private sector to provide introductory telecommunications training, rural communities may have to rely on libraries, schools, or other public sector organizations to provide this service. As residents learn basic telecommunications skills, a market for advanced training from private-sector businesses may emerge. One successful approach to raising awareness of the value of information technologies and building skill levels is the creation of technology learning centers. In Gordon, Nebraska a technology learning center housed in the local hospital provides access to information technologies and training in their use (Hoy, 1995).

Lastly, the cost to individual consumers in both time and dollars forms a barrier to use. Many rural residents perceive that these costs are high relative to the value of information technologies as a cultural or economic tool. While policies which promote access at a fair price are important, they only partially address this barrier. The development and organization of valuable

Organizations/Online resources

Applied Rural Telecommunications Online Clearinghouse (AeRie)
http://www.yampa.com/aerie

The Colorado Advanced Technology Institute (CATI) has developed AeRie, the Applied Rural telecommunications online clearinghouse. AeRie contains resources and case studies designed to help rural communities harness the potential uses of telecommunications for economic development.

Americans Communicating Electronically (ACE)
Internet: letters@ace.esusda.gov
Voice Mail (301) 277-5085
fax (301) 699-1371

Members of Americans Communicating Electronically (ACE) work to increase interest in information technologies and advance access to information and educational resources.

Benton Foundation Home Page
http://cdinet.com/Benton/

Through its Communications Policy Project, the Benton Foundation is helping non-profits realize the promise of the National Information Infrastructure. Several papers dealing with electronic access are available.

Big Sky Telegraph
Western Montana College
710 S. Atlantic
Dillon, MT 59725-3598
phone (406) 683-7870
telnet://bigsky.bigsky.dillon.mt.us/ (login: bbs)

Big Sky Telegraph provides online courses on microcomputer telecommunications and supports community networking interests.

CICNet, Inc.
2901 Hubbard Drive
Ann Arbor, MI 48105
phone (313) 998-6103
http://www.cic.net/

CICNet's Rural Datafication project has focused on strengthening the ability of state networks to deliver services to rural communities.

Community Information Technology Home Page
http://neon.nlc.state.ne.us/cit/cit.html

The Community Information Technology Home Page includes information on Nebraska's efforts to promote telecommunications and links to other community networking resources.

Morino Institute
1801 Robert Fulton Drive, Suite 550
Reston, VA 22091
phone (703) 620-8971
http://www.morino.org/

The Morino Institute is a non-profit organization which helps people improve their lives and communities through the use of interactive communications. Their Web site includes a directory of public access networks.

National Public Telecomputing Network (NPTN)
30680 Bainbridge Road, Suite B
Solon, OH 44139
phone (216) 498-4050
fax (216) 498-4051
http://www.nptn.org/

NPTN helps communities establish their own locally-controlled Free-Nets.

Non-Metropolitan Development (non-met-dev) Discussion List

This discussion list is sponsored by the Chair in the Management of Technological Change at the University College of Cape Breton. Non-Metropolitan Development focuses on economic, political, social, or technological development in non-metropolitan areas. To subscribe, e-mail non-met-dev@chatsubo.com. Put the command subscribe *in the command line. Leave the body of the message blank.*

Rural Consnmers Coalition for the Advancement of Telecommunications
http://policy.net/rural/index.html

The Rural Consumers Coalition for the Advancement of Telecommunications is a coalition of organizations, individuals, and businesses representing rural consumers of telecommunications. The coalition's purpose is to impact telecommunications legislation.

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http://www.ksu.edu/~rcled/

The Rural Clearinghouse's bimonthly newsletter, the Rural Adult Education FORUM, *focuses on issues concerning rural education and development. Our Web site includes links to a number of telecommunications resources.*

United States Department of Commerce National Telecommunications and Information Administration
Washington, DC 20230
phone (202) 482-3999
fax (202) 501-6198
http://www.ntia.doc.gov/

The NTIA administers both the Telecommunications and Information Assistance Program (TIIAP) and the Public Telecommunications Facilities Program (PTFP). In addition, several publications on rural access are available.

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information resources is an equally important, yet often overlooked, strategy to promote the use of telecommunications.

Telecommunications initiatives

Rural communities are coming online through a number of national, regional, state, and local initiatives. The most successful initiatives incorporate a number of strategies which address both barriers to access and barriers to use.

National initiatives. One of the principles which form the basis of the Clinton Administration's agenda for telecommunications legislative reform is assuring the accessibility and affordability of information resources for all Americans. Through the National Telecommunications and Information Administration (NTIA), non-profit institutions and state and local governments have received funding for telecommunications infrastructure planning, development, and applications. One of the most successful initiatives in promoting access to the Internet in underserved communities has been the Telecommunications and Information Assistance Program (TIIAP). TIIAP was created in 1994 and has stimulated private investment and partnerships between public and private entities. Through the program, $24.4 million in federal funding has been leveraged to provide a total of $64.4 million in funding for demonstration projects (Gonzalez, 1995).

The Public Telecommunications Facilities Program (PTFP), also administered by NTIA, assists rural and remote communities in gaining access to public broadcasting and distance learning services and technologies. In 1994, 29 distance learning grants were awarded totalling $6.4 million (Gonzalez, 1995).

Regional and state initiatives. A number of regional and state initiatives are also bringing communities online. The Rural Datafication Project has focused on strengthening the ability of state networks to deliver services to rural communities (Byers, 1995b). The project, sponsored by CICNet, has points of presence in Illinois, Indiana, Iowa, Michigan, Wisconsin, and Minnesota. One of the major components of the Rural Datafication Project has been the development of thorough and easy-to-use documentation of the project's software and information services. To write the manual, the project team decided to incorporate a concept called usability. Usable documentation is accessible, task-oriented, readable, and is suited to the needs of its readers.

Good documentation can also cut support costs by reducing the amount of time help desk consultants spend assisting users, says Paul Holbrook, Rural Datafication project manager. The project team found, however, that the state networks involved in the project were reluctant to include the documentation in new user starter kits because it increased the initial start-up costs.

"Rather than attempting to design an architecture based on numerous uncertainties, a more effective approach is to promote the use of technology and help to identify and aggregate demand for new technologies."

Nebraska Statewide Telecommunications Infrastructure Plan

Through its four annual conferences, the Rural Datafication Project has shared its lessons learned and provided an opportunity for rural networkers to exchange ideas and share their success stories.

Through several statewide initiatives, Nebraska is working to connect communities across the state to telecommunications resources. Many of these initiatives focus on aggregating and stimulating demand. Based on a detailed needs assessment and inventory of existing infrastructure, the Nebraska Statewide Telecommunications Infrastructure Plan (Nebraska State Department of Communications, 1995) concluded:

"Rather than attempting to design an architecture based on numerous uncertainties, a more effective approach is to promote the use of technology and help to identify and aggregate demand for new technologies."

Through the Global Communities Initiative (Hoy, 1995), approximately 50 Nebraska communities have formed Information Technology Committees to promote the use of information technologies. Each committee includes representatives from health, education, business, and local government. As a first step, the committees raise the level of awareness in the community about the value of information technologies. The committees are then encouraged to go through a strategic planning process developed by Christopher Hoy, Global Communities Initiative Project Director.

Approximately 40 percent of the communities initially targeted by the initiative are actively engaged in grassroots efforts to develop both their human and physical telecommunications capacity. Participating communities have developed community technology plans, sponsored technology fairs, built community technology centers, and developed community bulletin boards. The communities of Holbrook and McCook were awarded a grant from the Small Business Administration to build a telebusiness center.

Two communities, Broken Bow and Grant, also hosted student Internet Navigators (Byers, 1995c). The project was a cooperative effort of the communities, the University of Nebraska, and the Nebraska Department of Economic Development. Through the pilot project, two University of Nebraska students, equipped with a laptop computer and an LCD projector, spent the summer in their hometowns demonstrating how to use the Internet and what resources were available online.

To facilitate training in information technologies throughout the state, a mobile network was purchased by the Nebraska Library Commission. The Mobile Net consists of two routers, two 28.8k modems, and six laptop computers fitted with ethernet adaptor cards. The mobile network allows the commission to offer training at locations without computer facilities. The Mobile Net has visited technology fairs and community information technology workshops, as well as conferences and training sessions for the state's librarians (On the road, 1995).

"Every community that I've put a system in has within six months come back and said, 'We need more phone lines. We need to expand our system.' That's kind of amazing. And they do very little marketing. It just happens. But as you get information out there that is very valuable to them, it becomes a function."

Dennis Hoops

Community initiatives. Recognizing the importance of telecommunications, many rural communities are building their own on-ramps to the Information Superhighway. A community-based approach allows rural communities to customize their information infrastructure to best meet their needs.

Big Sky Telegraph, based at Western Montana State University, has pioneered efforts to bring rural residents online and served as a model for rural networking systems (Byers,1994). Big Sky Telegraph began operating January 1, 1988 to provide self-teaching course for K-12 teachers on microcomputer telecommunications. The courses were offered via modem. Big Sky Telegraph also acts as a clearinghouse of K-12 telecurricular activities and was awarded a grant from the US WEST Foundation and Annenberg/CPB to develop a library of math and science lessons. In addition to providing educational resources, Big Sky Telegraph also promotes community networking interests. Currently, Big Sky Telegraph offers full Internet access.

"Big Sky Telegraph is a open to anyone, anytime." says Frank Odasz, Telegraph Director. "We are a one-of-a-kind rural Free-Net championing electronic access for rural citizens."

Civic networking efforts, like the National Public Telecomputing Network's Rural Information Program are giving rural residents access to local community information, supplemental databases of information, and e-mail access to the Internet (Byers, 1995a). Over the past ten years, NPTN has helped communities in 44 states, one U.S. territory, and 10 countries establish Free-Nets (NPTN-affiliated community information systems).

"We were the first and still probably only one of the few organizations that promote community computing across the nation—in fact, we also work internationally," says Dennis Hoops, Director of NPTN's Rural Information Network.

With NPTN's Rural Information Network kit, rural communities with a population base of under 50,000 can set up a local community information system for $15,000 or less. Although NPTN provides assistance, the process of bringing an information system online is community controlled.

"The information is owned and controlled by the community, so what usually happens is that local organizations maintain certain areas of the local network," says Hoops. "Each one of these areas has a number of individuals who are responsible for a small segment of information that is within the scope of their knowledge. Then we assist them and help them in the sense of supplementing and supporting that information with state and federal information."

Meeting rural information needs

NPTN's Rural Information Network and the other rural telecommunications initiatives profiled have been successful because they meet the information needs of rural Americans.

"Every community that I've put a system in has within six months come back and said, 'We need more phone lines. We need to expand our system.' That's kind of amazing," says Hoops. "And they do very little marketing. It just happens. But as you get information out there that is very valuable to them, it becomes a function."

Although rural communities face both barriers to access and barriers to use, these barriers can be overcome. Policy initiatives and community plans must address both types of barriers in order to extend the benefits of the Information Age to rural America.

The Rural Clearinghouse for Lifelong Education and Development, a national effort to improve rural access to continued education, serves community and state colleges, universities, cooperative extensions, libraries, schools, rural health advocates, community based organizations, and community/economic development providers.

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