

DIGITAL DIVIDE EVIDENCE IN FOUR RURAL TOWNS

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ABSTRACT

The debate about a digital divide between rural and urban America suggests that communities of place still influence how telecommunications and other advanced technologies are used. This article examines the utilization of email and the Web, based on a sample of 471 residents from four rural communities in Nebraska and Wisconsin, in which the study found nearly identical levels and patterns of use across the communities. The findings are discussed in terms of the two variations on the digital divide. The first is a digital divide between rural people at the same place, based on their location within networks of co-workers and friends, which in turn influences awareness, knowledge and eventual adoption of information technologies. The second divide is between rural communities that have growing economies and populations and those that are no growing, based on their locations relative to metropolitan areas and urban consumers. Policy implications and directions for future research designs on the adoption of information technology are also described.

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Do concepts of community and place retain any importance for contemporary analyses of the economic, social and cultural dynamics of people, groups and societies? Nearly 40 years ago, the noted sociologist, Don Martindale (1964), wrote:

It was convenient....to view communities as territorially based systems of common life. However, the development of contemporary communication and transportation facilities has rendered such conceptions obsolete. Systems of common life still arise, but they are relatively free most of the time of any narrow dependence on a restricted territory." (p. 71)

Yet today, one impact of rapid change in the development and utilization of information technology has been the emergence of scholarly concern and policy debates about the digital divide. Further, an important part of these considerations centers on a possible lag in the adoption of information technology among people who live in rural communities of place (Allen and Dillman 1994; U.S. Department of Commerce 1999; Korsching, Hipple and Abbott 2000).

Potentially, information technology and a knowledge economy may send rural communities down one of two possible paths. On the positive side is the promise that information technology will allow people and businesses located in rural and other communities of place to overcome the disadvantages of distance and usher in a new era of prosperity. The other is that rural communities will lag even further behind in their development, with growing gaps in both the economic and social welfare of their populations (Parker, Husson, Dillman, Strover and Williams 1992).

The core elements behind the scientific concept of community have not changed since Martindale's days. Community is still defined as a geographic place in which people and groups interact toward the achievement of common goals (Hillery 1955; Warren 1978; Tolbert, Lyson and Irwin 1998). What has changed is the extent to which the over-all cohesion of community has declined, to be replaced by more segmented, local social structures in which people and groups are differentially connected to large-scale, national-level organizations (Sampson 1988). One stimulus for this change has been information technology, and in turn, the current segmented structures found in rural communities of place influence patterns of adoption as new information technologies come along (Brown 1981). Without knowledge about how these networks operate, the ecology of adoption of information technologies and the nature of the rural-urban digital divide cannot be understood.

Scholars of contemporary rural American society generally identify two common dimensions of persisting differences between urban and rural places in the U.S. First, rural life and culture remain distinctive to some degree from urban life and culture. Political attitudes are more conservative, rates of church

attendance are higher, and participation in voluntary organizations is above average (Luloff and Swanson, 1990; Lobao, 1990; Flora et al, 1992; Sharp, 2001). Second, there remains a greater density of acquaintanceship among members of communities of place located in rural areas (Freudenburg, 1986). These networks of interpersonal relationships influence patterns of sociation and social control.

It is commonly assumed that barriers to the use of information technologies among people living in rural communities of place include 1) lack of knowledge and awareness, 2) lack of infrastructure that allows access to technologies in rural areas, 3) the added cost of establishing appropriate infrastructures in rural areas, 4) affordability to rural people, and 5) the complexity of new technologies, [item 4 does not make sense] and the related cost of learning how to use them (Crosby 1997). If place makes a difference in the ways people become acquainted with and learn about any kind of new information technology, then knowledge of these differentials can inform policy debates about their impacts among populations living in diverse rural and urban localities. Although there has been much debate and commentary concerning the rural-urban digital divide, there has been, unfortunately, little research—particularly on patterns of adoption at the specific community level.

This article examines the local ecology of adoption of the two most popular forms of information technology—email and the Web—among residents of four matched rural communities. To date, most of the focus on information technology and rural places has considered its economic impact (Dholakia and Harlam, 1994; Cronin et al., 1995; U.S. Department of Commerce, 1999; Hales, Gieseke, and Vargas-Chanes, 2000). The general assumption is that information-technology development and economic development go hand-in-hand and that the Internet provides a new hope for overcoming the disadvantages of being located in rural and isolated locations.

METHODOLOGY

Study Locations: A telephone survey of 471 respondents was completed as part of a larger research effort to examine telecommunications and development in rural communities (Hollifield, Donnermeyer, and Wolford 2001). Two communities with telecommunications self-development projects from Nebraska and Wisconsin were matched with two control communities. A telephone survey of the adult population was conducted through the auspices of a university survey research center. All four locations had dial-up Internet access available locally at least one year prior to the study.

Table 1 provides a summary of selected 2000 Census characteristics of the towns/counties of the study sites and respondents who participated in the survey. The communities with telecommunications self-development projects were Aurora and Platteville, matched with two similar communities, except in population size and density. The two Wisconsin communities were larger and

more densely populated, hence, less rural. However, the densities of all four sites were much lower than their state averages (22.3 and 98.8 persons per square miles in Nebraska and Wisconsin).

Data Collection: The survey instrument included information on the frequency of use of email and the Web and where these technologies are used. The survey was conducted in October and November, 1998. Potential respondents were selected through random digit dialing. Interviewers asked to speak to any adult living in the household with the most recent birthday. Of those contacted, 18 percent refused to participate, usually based on an unwillingness to participate in a survey over the telephone. With the exception of gender in Aurora, Nebraska where the majority of the respondents were male, the characteristics of respondents were rather similar across all four communities.

FINDINGS

At the time of the survey, about 40 percent of the respondents had used email. (See Table 2). There was little variation across the four communities, although it should be noted that email use was only slightly more frequent in the project communities. With the exception of Platteville, the university community, fewer than one out of five respondents indicated having used email seven or more times in a normal week. The results were similar for the use of the Web or Internet. About 47% of respondents reported use of the Internet, but only 13.9% said that they used the Web or Internet seven or more times in a usual week. If there was an influence from the efforts initiated in the two project communities on either email or Internet use, there was little evidence of benefits as the proportion of adopters were nearly identical across the four communities.

Similarities across these four rural communities of place extended to other dimensions of email and Internet use as well. First, nearly two-third of the respondents who were gainfully employed used email, the Web or both, with little variation across communities. The range for email use was 60 (Aurora) to 70percent (Platteville).¹ Use of the Internet varied from 54 percent (Fairbury) to 64 percent (Rice Lake). Second, about two-thirds of rural residents across all four communities who used these information technologies at home also used them at work. Few used the technology at one place but not the other. Third, there was a very strong association between personal use of email and Internet use and the presence of these same technologies at the workplace of respondents. About 65 percent of email users worked at places with email, and about 67 percent of Internet users said that the Internet was used at their

¹ Relationships between e-mail and Internet use at work excluded 64 cases, including fulltime homemakers, retirees, students and those who were not employed at the time of the interview.

workplace. Conversely, most who had not yet used either email or Internet worked at places that used neither technology. Finally, email and Internet use was strongly associated with the educational status of respondents, a finding consistent with national studies (U.S. Department of Commerce, 2002), and weaker associations were found for several other personal characteristics of respondents. Those who had not attended college, when compared to those who had attended college or who had at least a two-year college degree, were twice as likely to be non-users of email (73% versus 35%) and the Internet (65% vs. 30%). Further, non-users were found to be slightly older, to have lived in the community longer, to have more close friends who lived in the same community, and to have indicated that a greater proportion of their friends lived in the same community. This pattern of results fits a common profile found in adoption research—that is, younger, more educated individuals with more contacts beyond their place of residence tend to be earlier adopters for a variety of innovations, from the latest in information technologies to new agricultural practices (Rogers 1995).

DISCUSSION AND IMPLICATIONS

Martindale (1964) suggested that technology renders place irrelevant to a considerable degree. The results of this survey across four rural communities about the use of email and the Web suggest that on the surface, he may be correct. There were only minor variations in the level of use and patterns for both technologies across the four communities—despite attempts by two of these communities to initiate self-development projects by providing public access to these technologies.

Despite the similarities across communities, however, place remained important in the way that Brown's (1981) classic work on diffusion of innovations suggests. For these four rural communities of place, most respondents learned about and used these technologies according to their level of education, or whether they worked at a place that also used the email and Internet. In other words, their place or position in a network of interaction—that is, a social infrastructure—clearly influenced their rates of adoption.

The results of this and other studies shed additional light on the rural-urban divide in information technologies. One of the latest reports of the U.S. Department of Commerce's (2002) found that nationwide, Internet use by rural residents was now nearly at the national average. Yet there are other aspects of the digital divide that are important to rural communities of place, where one out of every four Americans live.

TABLE 1: SELECTED CHARACTERISTICS OF STUDY COMMUNITIES AND RESPONDENTS

Characteristic	Aurora, Nebraska	Fairbury, Nebraska	Platteville, Wisconsin	Rice Lake, Wisconsin
1. Population (2000) (community)	Self-development	No	Self-development	No
a. City	4,225	4,240	9,989	8,320
b. County	9,403	8,333	49,597	44,963
c. Per square mile (county, 2000)	17.3	14.5	43.2	52.1
2. Age (county) %				
a. % persons <18 yrs. (2000)	29.1%	23.3%	23.7%	25.3%
b. % persons ≥ 65 yrs (2000)	15.3%	22.7%	15.3%	16.4%
3. Race: % White (community)	98.7%	97.6%	99.2%	99.2%
4. Education (age ≥ 25 yrs) (county)				
a. % High school graduates (2000)	89.6%	84.2%	83.5%	82.4%
b. % College degree + (2000)	18.6%	14.4%	17.2%	14.9%
5. Homeownership rate (2000) (county)	75.1%	76.1%	72.3%	75.8%
6. Income (county)				
a. Median household (1999)	\$40,000	\$33,000	\$36,000	\$37,000
b. % persons below poverty (1999)	7.5%	8.9%	11.2%	8.8%
SURVEY DATA				
7. Gender (Respondents % female)	37.8% (42)	60.0% (81)	52.3% (53)	56.9% (66)
8. Education (Respondents % College degree)	36.9%	25.2%	39.3%	33.6%
9. Average Age (Respondents)	49.7	49.0	47.9	46.6
10. Years in Community (Respondents)	23.4	26.5	25.8	21.5

TABLE 2: FREQUENCY OF USING EMAIL AND WEB

	Aurora, Nebraska	Fairbury, Nebraska	Platteville, Wisconsin	Rice Lake, Wisconsin	Total
a) How many times each week do you normally use email?					
	(n=111)	(n=135)	(n=109)	(n=116)	(n=471)
None	57%	67%	58%	61%	61%
Less than once	7%	4%	4%	10%	6%
1 to 3 times	12%	7%	11%	6%	9%
4 to 6 times	10%	8%	6%	7%	8%
7 or more times	14%	13%	21%	17%	16%
	100%	100%	100%	100%	100%
b) How many times each week do you usually use the Web page or the Internet?					
None	47%	59%	52%	54%	53%
Less than once	19%	13%	13%	9%	13%
1 to 3 times	13%	13%	16%	13%	13%
4 to 6 times	9%	6%	2%	8%	6%
7 or more times	13%	9%	17%	17%	14%
	100%	100%	100%	100%	100%

One such divide is the lag among rural residents in the adoption of broadband connections for Internet use, which is very central to business development. Perhaps, in a few years, the rural-urban divide in this information technology will diminish as well, but only to be replaced by other technologies that today are still in the developmental phase. In other words, without appropriate policies at the federal and state levels, the rural-urban information technology divide will persist, perhaps advancing through a fairly predictable cycle of lag and catch-up (Allen and Dillman 1994; Robertson 1996; Korsching et al. 2000; Lee 2001).

At first glance, this cycle of lag and catch up suggests that the marketplace alone will solve the problem, but readers should look again. This cycle means that at best, just as rural communities become competitive, they will fall behind again. Rural businesses will not adopt to gain a competitive edge, but adopt to survive.

A primary finding from this study was that across all four study sites, even if the physical and technological infrastructure was in place, there existed a social infrastructure or social ecology that determined who benefited from information technologies and who did not. Hence, many rural people are doubly-disadvantaged members of the information technology “have nots” (Flora 1998; Tolbert, Lyson and Irwin 1998; U.S. Department of Commerce 1999). First, they

live in communities of place that frequently lag behind national trends, and second they themselves lag behind in possession of the social capital (i.e., awareness, knowledge, access to information, and resources to purchase technology hardware and services) necessary to utilize new information technologies.

In this study, social capital of respondents was based on two sets of characteristics that are interrelated to some degree: formal education (a key determinant of social class in American society) and opportunities to be exposed to and learn about new information technologies at places of work, from co-workers, and from friends and family. Despite Martindale's advice about the extenuation of place as a definer of social and cultural forces, in the foreseeable future, place will count, because it is at specific localities that people are either part of networks or not part of networks by which they learn about new ideas and how to apply these ideas to their work, personal lives, families, churches, civic associations and other groups of which they are members (Robertson, 1996; Flora, 1998).

Respondents from the four study communities who used email and the Internet, in addition to being more educated and working at places where these technologies were used, also were younger and had by number and percent fewer friends living at the same locality. These younger individuals are more mobile, both geographically and in the job market. They are less committed to place and more likely to move if new and better opportunities arise. This pattern of adoption characteristics represents a third variation or expression of the digital divide. On the one hand, many rural communities find it difficult to maintain a skilled work force, which in turn, diminishes their chances of recruiting new businesses and of being places that are considered friendly to new business start-ups. On the other hand, many rural communities with developing economies exist, especially those near the edge of metropolitan areas with many commuters who possess the educational, job skill and income characteristics of early information adopters; or they may be growing because they are attractive to tourists and retirees (Brown, 2002). These rural communities of place will find it easier to develop and maintain the physical and social infrastructures which promote the use of information technologies by citizens and businesses alike (Flora et al. 1992; Allen and Dillman 1994; Korsching et al. 2000). Hence, the third divide represents the uneven development currently occurring and likely to continue among rural U.S. communities. Further, this divide is likely to grow as new information technologies bring differential opportunities to some rural communities, but not others.

What are the policy implications of these three divides: 1) the general gap between rural and urban communities of place; 2) the chasm between the information technology "haves" and "have-nots" among rural people, based on their social class location and associated characteristics; and 3) the disparity across rural communities themselves? One implication is that the developers of

federal and state policies to assist rural communities need to recognize the diversity of rural America within the context of information-technology use. There are, in essence, divides within divides. "One size fits all" policies are not likely to be effective.

Second, while two of these study sites were communities with their own self-development projects seeking to promote information technologies, neither had much influence. The reason was simple: both projects located access to email and the Internet at public places, such as libraries and schools (Hollifield et al. 2001). Yet few of the public places were frequently used for email and Internet, with home and work being the preferred places. Across all four study sites the diffusion process seems to occur from the workplace to the home, so that policies and development projects should focus on preferred places to use information technologies by targeting rural-located businesses of all sizes. Small businesses, especially locally owned ones, can increase both business and household demand for information technologies, both to reduce the rural-urban digital divide in general, and to reduce the divides between rural peoples and across rural communities.

Future research to enlighten aspects of the rural-urban digital divide needs to be conducted at two levels. There remains the need for national-level, time-series data that update the benchmark information about differences between rural and urban communities of place. In addition, however, policy development needs to be informed by supplemental in-depth studies designed as both comparative and local.

In other words, it is time to undertake studies utilizing multi-level models of information technology, models that consider adoption as a function of both individual-level characteristics of adopters (i.e., income, education, etc.) and the changing infrastructure of information technology available at the local level, primarily through the economic structures of communities of place (Brown, 1981; Sampson, 1988; Tolbert et al., 1998). Whether rural or urban, communities of place can be measured according to the distribution of different kinds of businesses and industries that employ workers, and the extent to which workers travel or commute to other places for employment. Within these structural contexts, individual-level factors come into play, but the precise ways may vary with differing structural contexts.

Discovering these patterns will pinpoint more precisely how the ever-changing world of information technologies potentially creates new expressions of the rural-urban digital divide, and how specific federal and state policies can help close these gaps. Perhaps, someday "systems of common life" within a "restricted territory" (Martindale, 1964) will truly be irrelevant, but, for the moment, rural communities remain central to understanding both national-level expressions of the rural-urban digital divide and variations on this divide among rural people and rural places.

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