

The Network in the Garden: Designing Social Media for Rural Life

American Behavioral Scientist
53(9) 1367–1388

© 2010 SAGE Publications

Reprints and permission: <http://www.sagepub.com/journalsPermissions.nav>

DOI: 10.1177/0002764210361690

<http://abs.sagepub.com>



Eric Gilbert,¹ Karrie Karahalios,¹
and Christian Sandvig²

Abstract

History repeatedly demonstrates that rural communities have unique technological needs. Yet little is known about how rural communities use modern technologies, which therefore results in a collective lack knowledge about how to design for rural life. To address this gap, the present empirical article investigates behavioral differences between more than 3,000 rural and urban social media users. With a data set collected from a broadly popular social network site, the current work analyzes users' profiles, 340,000 online friendships, and 200,000 interpersonal messages. Based on social capital theory, differences are predicted between rural and urban users, and strong evidence supports the present hypotheses—namely, rural people articulate far fewer friends online, and those friends live much closer to home. Results indicate that the groups have substantially different gender distributions and use privacy features differently. The article concludes with a discussion of the design implications drawn from these findings; most important, designers should reconsider the binary friend-or-not model to allow for incremental trust building.

Keywords

social media, rural, digital divide, social network sites

Rural communities are famous for using technology in novel ways. When the telephone first came to rural America in the early 20th century, communities applied the rural custom of “visiting” to it. Although a system of rings signaled an individual home on a party line,¹ other people would invariably join in or just eavesdrop. It was common enough that speakers would often adjust their conversations for large audiences.

¹Department of Computer Science, University of Illinois at Urbana-Champaign

²Department of Communication, University of Illinois at Urbana-Champaign

Corresponding Author:

Eric Gilbert, Department of Computer Science, University of Illinois at Urbana-Champaign,
201 North Goodwin Avenue, Urbana, IL 61801-2302

Email: egilber2@illinois.edu

The practice so irritated Bell Telephone that the company instructed rural customers to behave more like its urban ones. In the end, however, Bell recognized a business opportunity and created a telephone specifically designed to support the rural custom (Atwood, 1984; Kline, 2000).

In the landmark 1964 study of pastoralism *The Machine in the Garden*, Leo Marx (1964) wrote of the pervasive “urge” in American culture “to idealize a simple, rural environment” and the struggle to understand how technology could fit within it. Designers of communication technologies have often thought that new communication systems would finally solve the problems of the hinterland, annihilating distance and making all places and users the same (Carey, 1989).

Yet history is full of examples documenting the unique technological needs of rural communities (Atwood, 1984; Kline, 2000; Umble, 1991). Despite this wealth of historical evidence, we lack basic data on how rural communities use modern technologies. Consequently, we lack knowledge on how to design for them. Rural people compose roughly one quarter of the U.S. population, a greater percentage than that of both senior citizens and people with disabilities (U.S. Census Bureau, 1995). However, a search for *rural* in indices related to information technology and design turns up almost no academic work. The little that exists takes place outside the United States. A search for *urban*, however, turns up many pages of relevant results.

This article attempts to fill the gap. Our empirical study analyzes the behavioral differences between more than 3,000 rural and urban social media users, each from a different U.S. location. We use the theory of social capital to analyze users’ profiles, more than 340,000 online friendships, and more than 200,000 interpersonal messages. We focus on rural life for several reasons. First, rural life is fundamentally a social setting: Although certainly not a complete definition, rurality foremost implies low population density. Rural communities, for example, amass social capital in markedly different ways than do urban communities (Falk & Kilpatrick, 2000). In particular, rural communities build bonding social capital more easily than do urban communities. Furthermore, a rural location brings with it a number of other correlated social indicators: income, education level, race, religious affiliation, and socioeconomic class. A focus on rurality is a focus on the distance between people, which suggests opportunities and scenarios for the use of communication technologies because they are often designed to bridge the distance between people. This lens further suggests new design implications in ways that studies organized around other multicollinear factors may not. Although we know a great deal about the impact of work settings on technology use, we know relatively little about the impact of these other, less-constrained social variables. Finally, our study focuses on the U.S. in part because rurality is so relevant there. Previous scholarship has suggested that understanding the rural character of the United States may explain large differentials in Internet access and use—for example, the difference in broadband Internet adoption between the United States and European countries (LaRose, Gregg, Strover, Straubhaar, & Carpenter, 2007).

To investigate the impact of rural life on social media, we focus on MySpace.com, the most popular online social network site (SNS) in the United States at the time of

our data collection (Hitwise, 2007). SNSs offer many of the features commonly found in social media: user profiles, publicly articulated friendships, blogs, comments, and privacy settings based on network topology (boyd, 2004; Donath & boyd, 2004). SNSs also provide a place in which users amass weak ties and derive emotional strength from strong ones (Donath & boyd, 2004; Ellison, Heino, & Gibbs, 2006; Granovetter, 1973; Wellman et al., 2003; Wellman et al., 1996; Wellman, Haase, Witte, & Hampton, 2001). In contrast with previous work on SNSs and online communities (boyd, 2004; Ellison, Steinfield, & Lampe, 2007; Golder, Wilkinson, & Huberman, 2007; Hancock, Toma & Ellison, 2007; Lampe, Ellison, & Steinfield, 2007; Whittaker, Terveen, Hill, & Cherny, 1998), our study focuses on a broadly popular site that has always been open to everyone. Therefore, we can investigate a fairly broad, comparative research question: In what ways do rural and urban people use social media differently?

We first review the demographics of rural America, then outline historical precedents for social technologies in rural communities. Next we use the theory of social capital to predict differences between rural and urban SNS users. Put in a rural context, social capital theory generally predicts that rural users will articulate far fewer friends and keep their networks close to home. Our hypotheses address the following questions: Do rural and urban users articulate different numbers of friends? Do the groups use messaging differently? Do rural and urban users view privacy and, therefore, visibility differently? Whose friends live physically closer? Do the groups have different gender distributions? Do rural people show a preference for strong ties over weak ones in an online social network? We conclude by applying our findings to implications for designers of social media.

Literature Review

In this section, we review descriptive and analytic work that informs this article's research question: In what ways do rural and urban people use social media differently? We begin with a survey of the demographics of rural America, laying a foundation for understanding modern rural life. We then provide a brief history of social technologies in rural America, focusing on the telephone and the Internet. Along with the theoretical motivations introduced in the next section, the work presented here informs our hypotheses about modern-day social media use.

Demographics of Rural America

The United States is the 62nd-most-rural country in the world, with a population density similar to Madagascar. Although Internet use in the United States is often compared to that of European and Asian countries such as the United Kingdom and Japan, these countries are 7 to 10 times more densely populated than the United States (Central Intelligence Agency, 2008) The U.S. Census (1995) defines a rural area as "a town with less than 2,500 people, or an open area" (read "open area" as "farm"). Based on this rather conservative definition, 24% of Americans live in rural areas. However, more

than 97% of the land area in the United States qualifies as rural (U.S. Census Bureau, 2000a, 2000b). After a long period of migration to the cities, rural areas are growing again, faster even than urban ones (Isserman, 2001). Latinos immigrating directly to rural areas mostly account for this renewed growth.

Rural Americans tend to be older, less educated, less wealthy, and less mobile than urban Americans (Bell, Reddy, & Rainie, 2004). Senior citizens, for example, account for 22% of the rural population but only 15% of the urban and suburban populations. Often working in professions such as agriculture and manufacturing (Parker, Hudson, Dillman, & Roscoe, 1989), rural Americans have not profited much from the new, information-centered economy (Castells, 2001).

Living in rural America means more than geographic or social isolation. As evidenced above, a number of other social indicators distinguish rural life as well, and these are worth studying. However, it makes sense to look at social media through the lens of rural life because rural life is fundamentally a social setting. Rural communities have dramatically different social structures than do urban communities. In the past, these structures have affected rural communities' use of technology. Given the role of information and communication technologies in reformulating space and distance, we would expect the use of media technologies to be especially distinctive.

Social Technologies in Rural America

Rural people enthusiastically adopted America's first widespread social technology (Fischer, 1994). As with the Internet at a later time (Toffler, 1981), telephone pioneers thought that the device would reduce rural isolation and bridge social distance:

The old time isolation and lonesomeness of farm life is a thing of the past. Modern communication has increased the activities and broadened the social life of the rural family. — "Making Farm Life Enjoyable," Bell Telephone advertisement, 1907 (as quoted in Fischer, 1994)

To some extent they were right. However, rural Americans did not use the telephone in the same way as urban Americans: They appropriated it in ways unique to their settings (Umble, 1991). For example, instead of private phones in private homes, small towns would often own a single phone and summon individuals to it. It had little to do with price; the arrangement worked well in rural culture (Kline, 2000).

As with any technology situated in a rural area, access is an issue. When farmers had difficulty convincing Bell to serve them in the early 20th century, they constructed phone networks out of barbed wire fences (Kline, 2000). In modern times, rural access to the Internet has lagged behind urban and suburban areas, but the gap is closing. Today, 60% of rural people and 71% of urban people can access the Internet (Horrihan & Murray, 2006). Yet there is still a significant rural lag in the adoption of broadband, with just 38% of rural users using broadband at home, compared to 57% of urban users and 60% of suburban users (Horrihan, 2008). In fact, some rural leaders see the

Internet and online communities as tools for ensuring the viability of their communities (University of Maine, 2009).

In a recent study relevant to ours, Larson (2008) interviewed 63 rural people to understand how they talk about the Internet. The discursive approach allowed her to extract themes about rural users' conception of the Internet. Two findings emerged from her research that bear directly on ours: Women are the primary guardians of Internet knowledge in rural communities, and rural people generally distrust meeting new people over the Internet.

Social Capital in Rural Communities

We ground our work in the theory of social capital, which refers to the resources accumulated over time in human relationships. People and communities can draw on social capital to effect change (Portes, 1998). Although a detailed discussion of social capital is beyond the scope of this article, such capital can distinguish communities and, more broadly, affect their overall health (Ellison et al., 2007; Granovetter, 1973).

Rural communities possess a kind of social capital not readily found in urban settings. High population densities often create social capital rich in weak ties (Jacobs, 1961), which are important and provide access to the nonredundant information found outside the network of strong ties. Rural communities, however, prefer strong ties over weak ones. For example, in interviews with rural communities, Falk and Kilpatrick (2000) found participants attributing their community's vitality to "teamwork," "working together," "supporting each other," "pulling together," "cooperation between everyone," and "banding together." In other words, rural communities value bonding as opposed to bridging social capital.

Note that the Internet, like cities, easily supports the formation and maintenance of bridging social capital (Norris, 2002; Resnick, 2001). In this way, social media seems to align better with the values and needs of urban communities than with rural ones.

Hypotheses

The theory advanced above, along with prior work, leads us to introduce the following hypotheses concerning rural and urban SNS use:

Hypothesis 1: Rural users will have far fewer friends and comments than will urban users.

Hypothesis 2: Females will account for a greater proportion of rural users than urban users.

Hypothesis 3: Rural users will set their profiles to private at higher rates than those of urban users.

Hypothesis 4: Rural users' friends will live much closer than will urban users' friends.

Hypothesis 5: As compared to that of urban users, rural users' distribution of friends will reflect a preference for strong ties over weak ties.

Hypothesis 2 primarily derives from Larson's findings (2008) on the social use of the Internet in rural communities. Social capital theory primarily motivates the other four hypotheses, although Hypothesis 3 draws inspiration from Larson's work.

Method

To test our hypotheses, we sampled 2,000 rural and 2,000 urban MySpace users from 4,000 zip codes in the United States. Between May 11 and May 15, 2007, automated scripts searched MySpace for users in zip codes randomly selected from a zip code database (Hart, 2007). The database, created by the University of Washington's Rural Health Research Center, classifies every zip code in the United States along a continuum from urban to rural. Its authors primarily considered two variables in determining a classification: population and relationship to a metropolitan area. For example, a small town in the Sierra Nevada mountains receives a rural classification; yet, a small town whose residents commute to New York receives a more urban classification. For our study, we selected zip codes classified at the ends of the spectrum. (The urban end of the spectrum typically includes a city's entire metropolitan area.) We sampled this way to examine the difference between urban and rural social media users at a high level. Yet, two weaknesses emerge from this approach. First, our design misses subtle changes along the continuum from urban to rural. Second, the database clearly has more resolution at the rural end than at the urban end; for example, Champaign-Urbana (Illinois) receives the same urban classification as Manhattan—that is, they are both considered cities. We do not think that these shortcomings critically impair our findings, but we would like to see future work address this sampling problem.

For every selected zip code, our scripts searched for users within 10 miles of its center, randomly selecting one user from among the first 200 search results. After collecting 2,000 rural and 2,000 urban users, we removed accounts that had never been used, resulting in a sample of 1,661 rural users and 1,721 urban users, indicating that a substantial number of users never use their accounts once they sign up. We chose to remove orphaned accounts because our study focuses on usage patterns; the orphaned accounts could not provide that information.

Independent Variable

We considered one independent variable in our study: location, a categorical variable that takes on the values of rural and urban. We excluded many other possible variables by focusing solely on location: gender, education level, income, and so on. In fact, some of these, as described earlier, have specific and well-known correlations with the categories of rural and urban. However, because we are the first to investigate the impact of rural life on social media, we believe that it is important to first study it at a coarse level (e.g., rural versus urban), as have other studies (Horrigan & Murray, 2006).

Dependent Variables

To assess rural and urban SNS differences, we collected 16 dependent variables from users' MySpace profiles, broadly falling into four categories: basic SNS usage, gender, privacy, and physical distance. Basic SNS usage includes variables that form the building blocks of all SNSs (e.g., friends, comments, relationships). We take a closer look at gender and privacy settings because our theoretical motivations indicate that they will differ between groups. The physical-distance variables—average distance to friends and friendship strength—address our distance hypothesis. The Results section describes each variable in detail.²

In contrast with other SNS studies (Ellison et al., 2007; Lampe et al., 2007), ours did not include most profile elements in its measures. The reason is that most profile elements typically reported on MySpace (e.g., education level, ethnicity, religious views) can be deduced from census data (given rural or urban status). Instead, our study addresses the usage aspects of SNSs.

Finally, there is no way to verify the self-reported information on users' profiles. Information that we collected most likely contains errors, oversights, and deception (Donath, 1998). For example, one of our participants probably does not live "on the moon, in New York." At this time, it is not clearly understood how much deception and reporting error occurs in communities such as MySpace. In our study, we view errors and deception as noise and employ random sampling to distribute it uniformly across rural and urban groups.

Results

Overall, rural users demonstrate different SNS behavior than that of urban users. On nearly every measure, rural and urban groups differ significantly (most at the $p < .001$ level). The variables do not tend toward normality: Most are power-law or exponentially distributed. Therefore, in the following sections, we perform nonparametric statistical tests to compare the groups, and we report medians as measures of central tendency. As is true in any statistical analysis, it is crucial to analyze findings that are substantively and statistically significant. Although most results are statistically significant here, some are an artifact of our large sample size.

We begin by presenting an analysis of basic SNS usage by rural and urban users. Next we discuss differences in privacy settings and proportions of users by gender. We conclude this section by analyzing the relationship between physical distance and the strength of a friendship.

Basic SNS Usage

Table 1 shows differences in basic MySpace usage between rural and urban users: number of friends, age, time since last log-in, use of images and video, comments, and commenting relationships. MySpace assigns every user a unique, sequential ID. Consequently, MySpace IDs tell us about the order in which users create accounts. The

Table 1. Rural and Urban Users' Basic Social Network Site Usage (in Medians)

Measure	Rural	Urban	z
<i>n</i>	1,661	1,721	
MySpace ID ^a	54M	2.7M	-40.1
Age	22	24	-7.9
Friends	45	104	-14.6
Comments	40	118	-14.9
Images	17	21	-3.5
Embedded videos	0	0	-5.5
Days since last log-in	4	10	-12.1
Unique commenters	11	29	-14.9
Reciprocal relationships	2	5	-10.1

We report medians as measures of central tendency in rural and urban. *z* refers to the Mann-Whitney test. All measures, $p < .001$.

^aThe higher-median ID for rural users reflects their later arrival at MySpace, given that IDs are assigned sequentially; that is, the lower the numbered ID, the earlier the registration.

median rural ID is more than an order of magnitude greater the median urban ID: Rural users clearly signed up much later than urban users did. Whereas a one-to-one mapping from ID to account creation time is problematic (surges in MySpace adoption would lead to nonlinear growth, e.g.), the vastly different IDs indicate a substantial time difference.

Rural users are also significantly younger than their urban counterparts, perhaps an artifact of rural users' late adoption (Rogers, 1995). In other words, urban users may have grown up with the site.

Rural users publicly articulate far fewer friends than do urban users (in roughly a 1:2 ratio). The relative imbalance of comments is about the same. A *comment* here refers to the act of leaving a text note on someone's profile page, similar to comments on a blog or on Facebook's wall. Paradoxically, rural users log in to MySpace more often. At the time of our sample, rural users had not logged in to MySpace in 4 days, whereas urban users had spent 10 days away, indicating that rural users log in to the site about twice as often as urban users.

We see the 1:3 ratio again between rural and urban profiles in the number of unique commenters and the number of reciprocal relationships. We calculated commenters by counting the unique individuals (known by their IDs) who left comments on a user's profile page. A *reciprocal relationship* refers to a pair of users, each of whom has left at least one comment on the other's profile.

Gender

The relative proportions of males and females differ significantly between rural and urban groups, $\chi^2(1, n = 3,379) = 40.436, p < .001$. Figure 1 shows that rural women outnumber rural men by 3.0%; however, urban men outnumber urban women by a

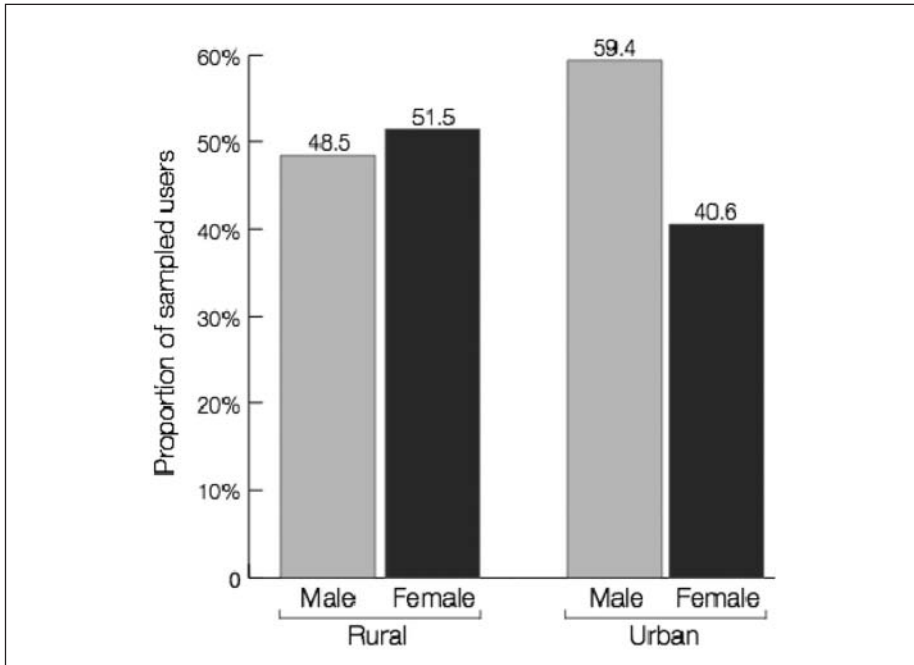


Figure 1. Proportions of sampled rural and urban MySpace users by gender. Although rural women outnumber rural men, the trend is reversed and magnified in urban users.

much wider margin, 18.8%. Because we sampled users with the MySpace search interface, we had no way to include private profiles in our sample. If urban women set their profiles to private at significantly higher rates, it might explain their relatively low representation in our sample. We investigate this possibility when we discuss privacy shortly.

Because we found such a stark contrast between the gender distributions of rural and urban groups, we investigated the impact of gender on friendships. Table 2 shows the relative distributions of male–male, male–female, female–male, and female–female friendships in the two groups (e.g., *male–female* refers to a male in our sample with a female friend). Although rural and urban groups differ in this respect, the difference is not substantial: Rural men befriend women at a slightly higher rate than that of urban men, $\chi^2(1, n = 2,101) = 6.509, p = .011$. Table 2 also indicates that men and women, regardless of the rural–urban division, prefer women as friends.

Privacy

Given our social capital theoretical motivations, we wanted to investigate differences in privacy settings between rural and urban SNS users. As noted above, our sampling

Table 2. Effect of Gender on Friendships (in Percentages)

Friendship Type	Rural	Urban
Male–male	35.5	38.6
Male–female	64.5	61.4
Female–male	42.5	43.7
Female–female	57.5	56.3

Rural men befriend women at slightly higher rates than those of urban men. Regardless of location, participants prefer women as friends.

Table 3. Comparison of Public and Private Profiles by Location via a Derived Snowball Sample

Privacy Setting	Rural	Urban
Public, %	68.5	74.9
Private, %	31.5	25.1
Total, <i>n</i>	998	2,069

Rural users set their profiles to private more often than urban users.

method precluded us from collecting private profiles. To address this problem, we derived a snowball sample from our original random sample in the following way: Using a randomly selected subset from our original sample, we coded each user's friends into rural and urban categories. Snowball sampling can introduce unwanted biases, such as oversampling users from large social networks. We defended against this bias by randomly selecting the same number of friends from every user's network.

Table 3 shows that rural users set their profiles to private more often than urban users, $\chi^2(1, n = 3,067) = 13.626, p < .001$. Given two equally sized samples of rural and urban MySpace users, we would expect 25.5% more private rural profiles than private urban profiles ($31.5/25.1 = 1.255$).

As previously noted, our sample included far more urban men than urban women. We speculated that profile privacy might explain the large discrepancy. However, Figure 2 demonstrates that rural women set their profiles to private at much higher rates than those of urban women, $\chi^2(1, n = 1,777) = 26.602, p < .001$. Furthermore, it shows that urban women set their profiles to private only slightly more often than urban men, $\chi^2(1, n = 2,069) = 5.257, p = .022$. Men set their profiles to private at the same rates across rural and urban, $\chi^2(1, n = 1,290) = .255, p = .613$. Rural women seem to drive the privacy difference between urban and rural users.

Distance and the Strength of Friendships

We conclude this section by analyzing the relationship between physical distance and friendship strength, as measured by the number of comments between two friends. For

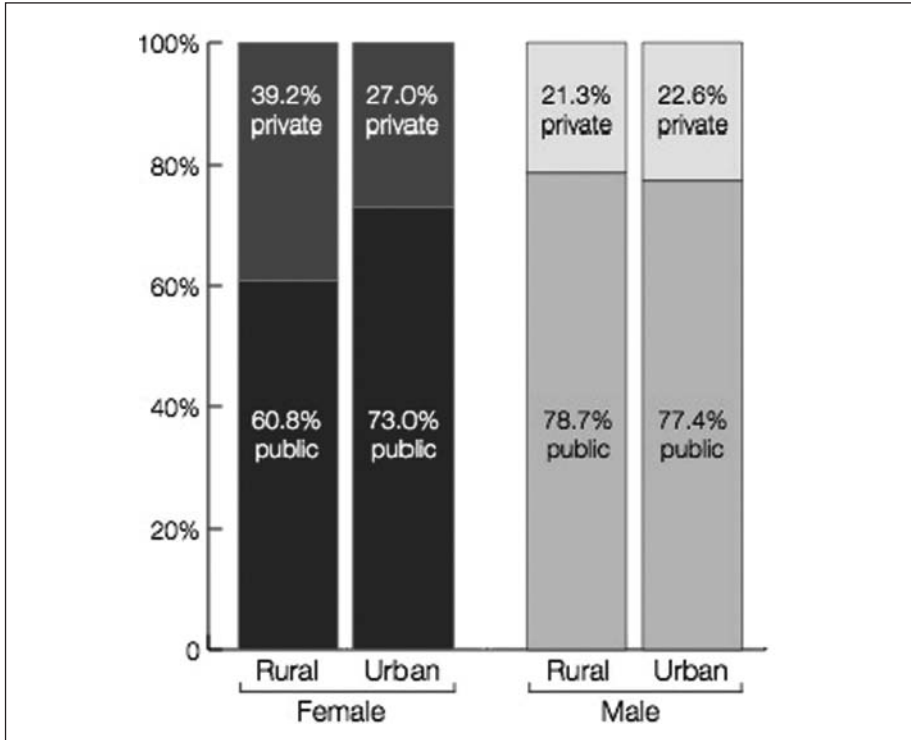


Figure 2. Breakdown of profile privacy by gender. Rural women drive the privacy difference between rural and users seen in Table 3.

each user in our sample, we examined the pairwise comments between the user and each friend, building a corpus of more than 200,000 messages. We did not examine or store the content of the messages. For each friendship for which it was possible, we computed the physical distance between users’ reported locations, using the distance of the shortest path on the globe.

Rural users live, on average, 88.8 miles from their friends, whereas urban users live 201.7 miles from their friends, Mann–Whitney $z = -7.791$, $n_1 = 1,051$, $n_2 = 1,266$, $p < .001$ (88.8 and 201.7 are medians). When friendships do include comments, both rural and urban friendships tend to have the same number of messages, with the pair writing two comments, Mann–Whitney $z = -.253$, $n_1 = 1,104$, $n_2 = 1,355$, $p = .801$. However, a large portion of friendships never comment on one another’s profiles: 43.5% of friendships go commentless.

To understand the relationship between distance and friendship strength more deeply, we separated friendships into two categories, strong ties and weak ties, and examined them as a function of distance. To define a strong tie, we used the criterion of 10 comments between friends; this represented approximately 4% of the friendships in both groups. We chose 10 because it was the first integral value of comments

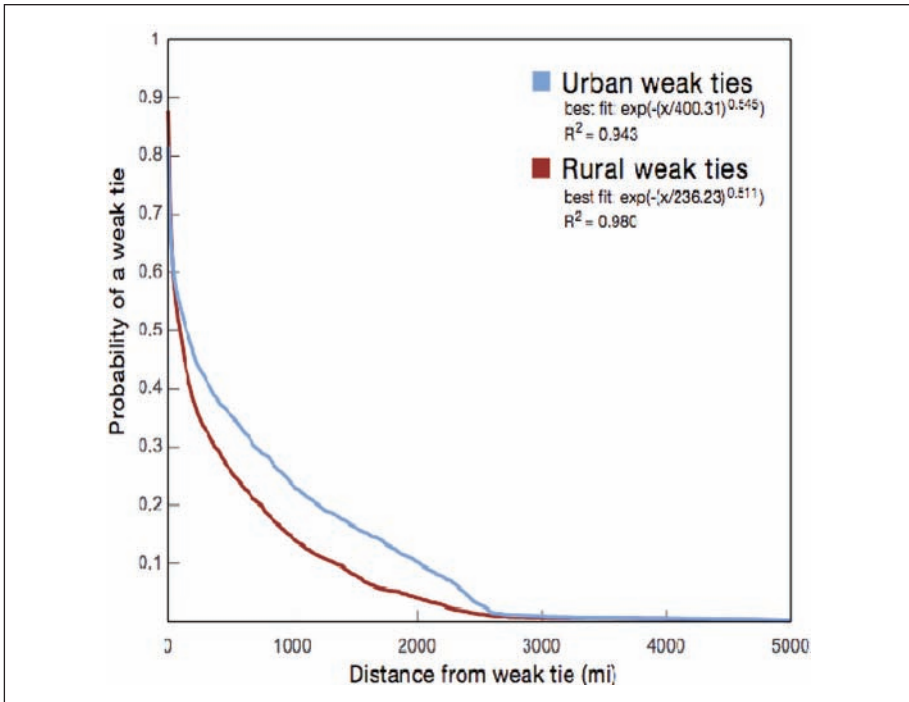


Figure 3. Probability density of weak ties as a function of physical distance. Urban users' weak ties are physically farther than rural users' weak ties.

to reach the mark of mean plus two standard deviations. A strong tie is notoriously difficult to quantify; we use 10 largely to contrast it with weak tie. To define a weak tie, we include friendships with either no comments or just one comment (nonreciprocal relationships). As noted previously, this represents a large proportion of the friendships in our sample. Figures 3 and 4 show the results of the analysis.

At all levels, rural social networks do not reach as far as urban social networks. The gap is most pronounced when we look at strong ties. To take some sample numbers from the probability density functions, only 20% of rural users' strong ties live more than 414 miles away. The farthest 20% of urban users' friends live more than 948 miles away. Interestingly, all the probability density functions fit a stretched exponential exceptionally well (Laherrere & Sornette, 1998). The probability density function for rural strong ties, for example, fits a stretched exponential with $a = 132.84$, $b = .441$, $R^2 = .994$. Among the four probability density functions, the lowest R^2 is .943.

Figure 5 visualizes the findings of Figures 3 and 4 on the U.S. map. To create the visualization, we randomly selected 50 rural participants and 50 urban participants from our sample and plotted their physical locations. For every rural participant, we

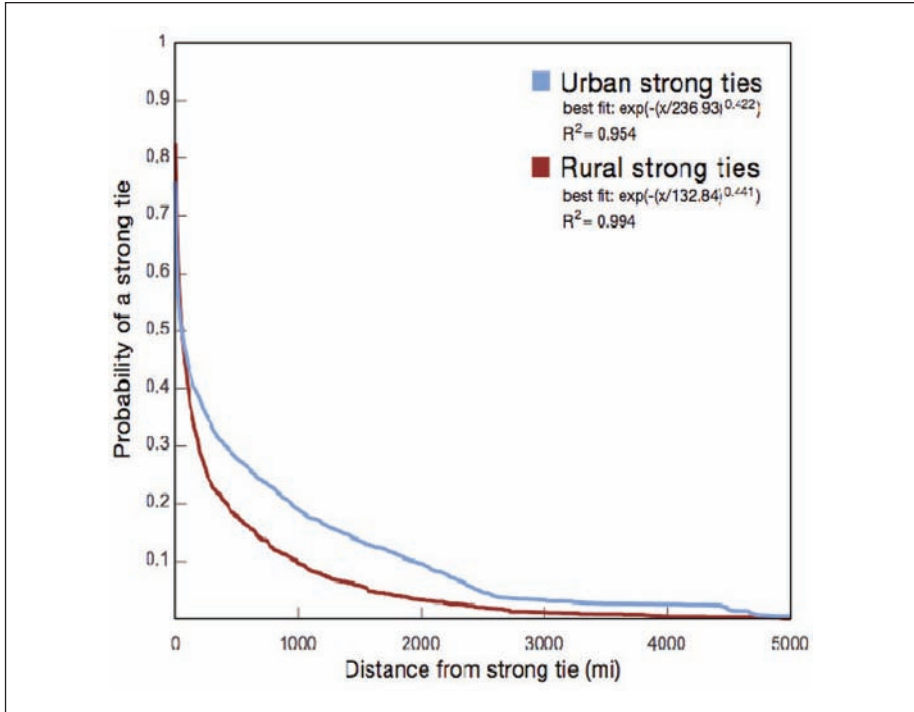


Figure 4. Probability density of strong ties as a function of physical distance. The gap between rural and urban users widens when we examine strong ties.

also plotted a translucent circle with a radius of 414 miles, centered at his or her location (80% of rural participants’ strong ties fall within this boundary). Where the circles overlap, they form more saturated areas, corresponding to higher likelihoods of finding rural friends at those locations. The method is similar to Venn diagrams. Because we produced the visualization by randomly selecting participants, it is not biased; at the same time, because the number of participants is small, it does not overwhelm the viewer. Figure 5 demonstrates that most urban participants fall outside the reach of rural social networks. (Some cities fall in high-probability regions, but most do not.) The rural networks cannot overcome the distance imposed by rural locations.

Discussion

Our results strongly confirm Hypotheses 1–4. Compared to urban users, rural users have roughly one third as many friends and profile comments (Hypothesis 1). Three years ago, Donath and boyd (2004) argued that SNSs could cheaply support the creation and maintenance of large numbers of friends. Despite the technical possibility,

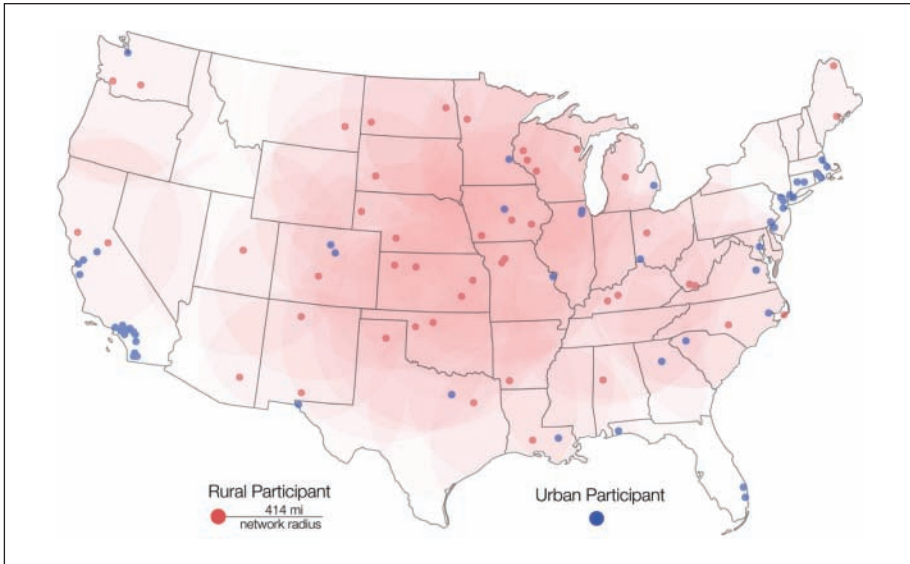


Figure 5. A visualization of the reach of rural social networks: 50 random rural participants and 50 random urban participants are plotted. A translucent circle accompanies each rural participant. Stacking them creates likelihoods of rural friends in different parts of the country. Most urban people live in low-likelihood areas.

urban users have 104 friends on average, and rural users have much fewer. This is a compelling finding in the case of rural users. Despite their relative geographic and social isolation, rural users do not use SNSs to find and articulate lots of friends. This result might stem from the users' tendency to form friendships offline and then move them online, or it could be an artifact of access to broadband Internet (Lampe et al., 2007). Upon further analysis, a curious similarity appears between the groups. Although rural and urban users have vastly different numbers of friends, they tend to keep contact with nearly the same percentage of them. In each group, any given commenter is responsible for about four comments, and only about 4% of friendships are reciprocal. An interesting corollary of this 4% result is that when friendships are reciprocal, they almost certainly consist of at least 10 messages.

Even after correcting for privacy settings, women represent a much larger proportion of rural SNS users than urban SNS users (Hypothesis 2). This result supports Larson's finding (2008) that rural women are the guardians of Internet knowledge in rural communities. Larson found that rural men see the Internet as a communication medium most appropriate for women.

We also find that rural users, particularly women, set their profiles to private at higher rates than do urban users (Hypothesis 3). At first glance, this finding appears counterintuitive. As Jane Jacobs (1961) wrote, "privacy is precious in cities." Why

should urban SNS users set their profiles to private at lower rates? We draw support from Larson's finding (2008) that rural people do not view the Internet as a place to meet new people; they view it as a place to communicate with people with whom they already share a strong connection. Our rural social capital theory also indicates that rural communities keep their networks nearby, something that appears to have replicated itself online. Urban people may view visibility differently because of their location. In cities, people are on display all the time, a fact that keeps cities vibrant and safe. In rural communities, most people already possess deep knowledge about one another. In fact, rural people view this detailed interpersonal knowledge as an important prerequisite for friendship (Larson, 2008). Our empirical results indicate that rural users, particularly women, view privacy with more importance than that of urban users. This is especially surprising given the geographic isolation of rural communities and its greater affordance of privacy from outsiders but not insiders, when compared to urban locations. In other words, a stranger viewing your profile is much more likely to live close by if you live in a city.

Along similar lines, we find that rural users' friends live significantly closer than urban users' friends (Hypothesis 4). Again, this result may seem counterintuitive. With so many people to choose from, why would an urban person need to go far to find friends? With so few people to choose from, why wouldn't a rural person search far and wide? Combined with Hypothesis 1, this result is compelling: Rural people have far fewer friends, and those friends live much closer. As Figure 5 demonstrates, the result has even more force when aggregated over many rural users. Most rural people only befriend other rural people. The strong center in the Plains and Midwest visualizes this result.

We offer two interpretations of this behavior. The first hinges on the geographic mobility of urban people. With cities offering refuge for young transient populations, it is entirely possible that urban friends move quite often, making the distance to their friends substantially greater than that of rural people. In this way, MySpace differs markedly from possible studies on Facebook. Because Facebook only recently extended its audience beyond college campuses, most of its users are bound by college networks for many years. However, cities are more dynamic than college campuses. An alternative explanation is that rural people need deep interpersonal knowledge before friendship. At an average distance of 88.8 miles, most rural online friends could come from only a handful of surrounding towns: Most of the areas around any given rural location are sparsely inhabited. The small distances covered by rural networks represent an area that can be easily covered in person.

We found disconfirming evidence for Hypothesis 5—that rural users prefer strong ties over weak ones in online networks. When we examined the distributions of friendship strength for rural and urban users, we found nearly parallel curves. At every level of measurement of friendship strength (e.g., five messages between the pair), the same percentage fit the description in both groups. This finding implies that rural and urban people use SNSs to communicate with roughly the same percentages of strong and weak ties. Yet, given the confirmation of Hypotheses 1–4, rural people have far fewer connections overall, and those connections are closer to home.

Design Implications

Although it is technologically possible to do so, rural users do not use social networks to find many friends far from home. They do just the opposite. Our findings indicate that rural social networks span other nearby rural areas, creating limited access to social capital.

In interviews, Larson (2008) found that rural people would like access to a wider range of people online, but trusting a distant person hinders the process. Similar results have been found in work settings (Bradner & Mark, 2002). Our results support this finding. If most friendships start offline and move online, then rural users ultimately have very few people with whom they can start online friendships. Perhaps the binary friend-or-not model is to blame. Moving to a system of incremental trust would more easily support trust building in distant online relationships. Consider the following analogy: Before committing to a serious relationship, couples usually date for a long time. As the relationship grows, each person gradually introduces the other to his or her friends and provides increasingly detailed and accurate personal information. The binary friend-or-not model found in almost all SNSs is something akin to never meeting versus going steady: Either you know almost nothing about the other person, or you know everything. We believe that our work argues for incremental trust from a novel perspective. Moreover, moving to a more sophisticated and subtle incremental trust model may allow more online friendships to actually originate online.

Moving to an incremental trust model benefits more than just rural people. Many have documented this shortcoming in social media because the current model does not support varying degrees of friendship (Gilbert & Karahalios, 2009). Implementing this feature will benefit not only rural users building social capital but every person who does not want to disclose everything with every social media friend. We argue that this covers just about everyone.

Limitations

This study looks only at one SNS, MySpace, over a short time span. Although the findings here most pertain to MySpace and similar SNSs, we believe that the behavioral findings for rural users represent a general contribution to the study and design of social media.

Our quantitative approach did not allow us to fully explain the behavior of SNS users. Although theory and prior work often offer compelling possibilities, interviews would complete the picture.

Future Work

Researchers may find that a rural perspective has traction with other modern technologies. For example, we question why so much research has focused on securing wireless networks, whereas so little has focused on neighbors sharing wireless connections easily, safely, and efficiently. We hypothesize that social norms in rural and urban

settings play a substantial role. Of course, many technological systems are probably unintentionally optimized for urban life because most technology design occurs in cities.

Our foremost design implication is to extend the binary friend model. We have recently taken up this thread by focusing on tie strength in social media (Gilbert & Karahalios, 2009). We see this as a profitable, practical, and technically feasible way to implement the suggestions that we propose here. Although the technique that we present in this work applies more generally, we think that designers could find in rural populations a good-use case.

Conclusion

Rural and urban people use social media differently: Four of our five hypotheses are confirmed. Rural people articulate far fewer friends, and those friends are located much closer to home. Women occupy a much greater segment of the rural user base than the urban user base. Rural users, particularly rural women, set their profiles to private at higher rates than those of urban users. However, both rural and urban users seem to communicate with roughly the same proportions of strong and weak ties. Our work further emphasizes how a priori social patterns manifest themselves in social media even when the technology could be used to change the patterns.

Designers of social media may be able to apply our findings toward building richer experiences for rural users. Rural people would like to reach beyond their geographic isolation using social media, but they have trouble establishing trust with distant people. Building systems that enable incremental trust may overcome this problem and provide rural users with access to a greater diversity of people online.

In the 1970s, human-computer interaction pioneer Douglas Engelbart produced a slideshow to describe his NLS (oNLine System)—the first computer system to use a mouse along with many other innovations. This collaboration system was connected to ARPANET (Advanced Research Projects Agency Network), and to explain it, Engelbart's team made a slide that juxtaposed two cartoons, each containing two people. In the first, the people are seated at computer monitors, whereas in the second, these users are shown flying on airplanes to see each other in person. The message was that travel and computing were substitutes and that computing could collapse distance. The idea that computer networks are distributed communication tools and not just distributed computation tools was novel enough that Engelbart had to explain it to his audiences in great detail.

Thirty years later as we write this article, communication between humans now drives most time spent with computing applications. Computers are widely recognized as communication tools, and rurality should have a special relevance for designers as they work on systems that are explicitly designed to address problems related to distance.

Yet designing applications to take rurality into account is more complex than it first appears. Rurality (i.e., rural “isolation”) is often thought of as a disease that communication can cure. In this view, rural users must want more communication. The word *rural* is often used in an unnecessarily pejorative way. Leo Marx (1964) cautioned

us that *rural* is also sometimes unnecessarily admiring. American culture privileges decentralization and views an ideal geography to be a pastoral idyll. In this view, rural users must want less communication—perhaps their goal is a more contemplative life.

Defining the category *rural* by population density includes artificial islands created in Florida to house a mansion for the ultra rich. It also includes Indian reservations near the Mexican border where the roads are not paved, there are no stores, and there is no electrical power or telephone service. Accounting for rural Internet users must then include people who seek out a particular lifestyle. These people may have an individual disposition that leads them to communicate less and have friends who are closer to home. Rurality is not a disease that they want cured. Accounting for rural Internet users must also include people who are trapped by poverty or circumstance in places that afford them structurally limited opportunities to communicate and few chances to travel or meet new people.

These competing examples of rurality are relevant today. As large-scale efforts such as the Tennessee Valley Authority and the Rural Electrification Service transformed rural life in the 20th century, policy makers are now contemplating a similar agenda for rural broadband Internet service. To combat large-scale migration of young people away from small towns in the United States, one policy vision calls for Internet technology to provide a means of communication that would make rural places functionally equivalent to urban ones and so promote decentralized economic production to sustain them. Computing tools such as social networking systems are one way that this vision might be achieved—the present take on “the machine in the garden.”

Of course, social networking systems are unlikely to serve or create a MySpace Arcadia (the Greek province now synonymous with rural utopia) or a MySpace Cahulawassee (the fictional location in Georgia where the movie *Deliverance* is set). But any careful consideration of the design implications for rural users will show that the design choices crucially depend on the system designer’s attitudes toward these spaces. To design for rurality, we must consider not only differences among people but also what our ideals for these spaces and lifestyles might be and how technology might transform them.

Acknowledgments

We thank Nancy Baym, Scott Golder, Jonathan Grudin, Kiley Larson, Marc Smith, and the Social Spaces Group at the University of Illinois at Urbana-Champaign for their comments on early versions of this work.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research and/or authorship of this article: This material is based on work supported by the National Science Foundation under Grant No. IIS-0546409.

Notes

1. Party lines are telephone lines shared by multiple households.
2. In this article, the designation of these variables as *independent* versus *dependent* is conceptual. In nonexperimental research designs, these labels are interchangeable because neither set of variables has been manipulated (i.e., controlled to demonstrate causation). In this study, we aim to demonstrate that a simple dichotomy of urban–rural can be used to classify users: Rurality is then *independent* in the sense used in statistics; it is the explanatory factor in this design.

References

- Atwood, R. A. (1984). *Telephony and its cultural meanings in southeastern Iowa*. Iowa City: University of Iowa Press.
- Bell, P., Reddy, P., & Rainie, L. (2004). *Rural areas and the Internet*. Washington, DC: Pew Internet & American Life Project.
- boyd, d. m. (2004, April). *Friendster and publicly articulated social networking*. Paper presented in CHI 2004 Extended Abstracts on Human Factors in Computing Systems, Vienna, Austria.
- Bradner, E., & Mark, G. (2002, November). *Why distance matters: Effects on cooperation, persuasion and deception*. Paper presented at the ACM Conference on Computer Supported Cooperative Work, New Orleans, LA.
- Carey, J. (1989). *Communication as culture: Essays on media and society*. New York: Routledge.
- Castells, M. (2001). *The Internet galaxy: Reflections on the Internet, business, and society*. New York: Oxford University Press.
- Central Intelligence Agency. (2008). *World factbook*. Retrieved May 29, 2009, from <https://www.cia.gov/library/publications/the-world-factbook>
- Donath, J. S. (1998). Identity and deception in the virtual community. In P. Kollock & M. Smith (Eds.), *Communities in cyberspace* (pp. 29-59). London: Routledge.
- Donath, J., & boyd, d. m. (2004). Public displays of connection. *BT Technology Journal*, 22(4), 71.
- Ellison, N., Heino, R., & Gibbs, J. (2006). Managing impressions online: Self-presentation processes in the online dating environment. *Journal of Computer-Mediated Communication*, 11(2), article 2. Retrieved February 4, 2010, <http://jcmc.indiana.edu/vol11/issue2/ellison.html>
- Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook “friends”: Social capital and college students’ use of online social network sites. *Journal of Computer-Mediated Communication*, 12(4), article 1. Retrieved February 4, 2010, from <http://jcmc.indiana.edu/vol12/issue4/ellison.html>
- Falk, I., & Kilpatrick, S. (2000). What is social capital? A study of interaction in a rural community. *Sociologia Ruralis*, 40(1), 87-110.
- Fischer, C. S. (1994). *America calling: A social history of the telephone to 1940*. Berkeley: University of California Press.
- Gilbert, E., & Karahalios, K. (2009, April). *Predicting tie strength with social media*. Paper presented at the SIGCHI Conference on Human Factors in Computing Systems, Boston.

- Golder, S., Wilkinson, D., & Huberman, B. A. (2007, June). *Rhythms of social interaction: Messaging within a massive online network*. Paper presented at the Conference on Communities and Technologies (CT2007), East Lansing, MI.
- Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360-1380.
- Hancock, J. T., Toma, C., & Ellison, N. (2007, April–May). *The truth about lying in online dating profiles*. Paper presented at the SIGCHI Conference on Human Factors in Computing Systems, San Jose, CA.
- Hart, G. (2007). *Rural–urban commuting area codes: Version 2.0*. Seattle: University of Washington, Rural Health Research Center.
- Hitwise. (2007). *MySpace receives 79.7 percent of social networking visits*. Retrieved February 3, 2010, from <http://www.promotionworld.com/news/press/070522Hitwise.html>
- Horrigan, J. (2008). *Home broadband 2008*. Washington, DC: Pew Internet & American Life Project.
- Horrigan, J., & Murray, K. (2006). *Rural broadband Internet use*. Washington, DC: Pew Internet & American Life Project.
- Isserman, A. M. (2001). Competitive advantages of rural America in the next century. *International Regional Science Review*, 24(1), 38-58.
- Jacobs, J. (1961). *The life and death of great American cities*. New York: Random House.
- Kline, R. R. (2000). *Consumers in the country: Technology and social change in rural America*. Baltimore: Johns Hopkins University Press.
- Laherrere, J., & Sornette, D. (1998). Stretched exponential distributions in nature and economy: “Fat tails” with characteristic scales. *European Physical Journal B*, 2, 525-539.
- Lampe, C. A. C., Ellison, N., & Steinfield, C. (2007, April–May). *A familiar face(book): Profile elements as signals in an online social network*. Paper presented at the SIGCHI Conference on Human Factors in Computing Systems, San Jose, CA.
- LaRose, R., Gregg, J. L., Strover, S., Straubhaar, J., & Carpenter, S. (2007). Closing the rural broadband gap: Promoting adoption of the Internet in rural America. *Telecommunications Policy*, 31(6/7), 359-373.
- Larson, K. A. (2008). *The social construction of the Internet: A rural perspective*. Unpublished master’s thesis, University of Kansas, Lawrence.
- Marx, L. (1964). *The machine in the garden: Technology and the pastoral ideal in America*. New York: Oxford University Press.
- Norris, P. (2002). The bridging and bonding role of online communities. *Harvard International Journal of Press/Politics*, 7(3), 3-13.
- Parker, E. B., Hudson, H. E., Dillman, D. A., & Roscoe, A. D. (1989). *Rural America in the information age: Telecommunications policy for rural development*. Lanham, MD: University Press of America.
- Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, 24(1), 1-24.
- Resnick, P. (2001). Beyond bowling together: Sociotechnical capital. In J. Carroll (Ed.), *HCI in the new millennium* (pp. 247-272). Boston: Addison-Wesley.

- Rogers, E. M. (1995). *Diffusion of innovations*. New York: Free Press.
- Toffler, A. (1981). *The third wave*. New York: Morrow.
- Umble, D. Z. (1991). *The coming of the telephone to plain country: A study of Amish and Mennonite resistance in Lancaster County, Pennsylvania at the turn of the century*. Philadelphia: University of Pennsylvania.
- University of Maine. (2009). *Maine rural partners*. Retrieved June 3, 2009, from <http://www.mainerural.org>
- U.S. Census Bureau. (1995). *Urban and rural definitions*. Washington, DC: Author.
- U.S. Census Bureau. (2000a). *Summary file 1 (SF 1)*. Washington, DC: Author.
- U.S. Census Bureau. (2000b). *Summary file 3 (SF 3)*. Washington, DC: Author.
- Wellman, B., Haase, A. Q., Witte, J., & Hampton, K. (2001). Does the Internet increase, decrease, or supplement social capital? Social networks, participation, and community commitment. *American Behavioral Scientist*, 45(3), 436.
- Wellman, B., Quan-Haase, A., Boase, J., Chen, W., Hampton, K., Isla, I. D. d., et al. (2003). The social affordances of the Internet for networked individualism. *Journal of Computer-Mediated Communication*, 8(3). Retrieved February 4, 2010, from <http://jcmc.indiana.edu/vol8/issue3/wellman.html>
- Wellman, B., Salaff, J., Dimitrova, D., Garton, L., Gulia, M., & Haythornthwaite, C. (1996). Computer networks as social networks: Collaborative work, telework, and virtual community. *Annual Review of Sociology*, 22, 213-238.
- Whittaker, S., Terveen, L., Hill, W., & Cherny, L. (1998, November). *The dynamics of mass interaction*. Paper presented at the 1998 ACM Conference on Computer Supported Cooperative Work, Seattle, WA.

Bios

Eric Gilbert is a fourth-year doctoral candidate in the Department of Computer Science at the University of Illinois at Urbana-Champaign. He is a member of Professor Karahalios's Social Spaces Group at the university. His research has examined tie strength, rural social media use, argumentation in blog comments, and visualization of open source projects. He has received the Best Paper Award twice from ACM SIGCHI (Association for Computing Machinery Special Interest Group on Computer-Human Interaction). His current research interests include social media, visualization, and the places where the two intersect.

Karrie Karahalios is an assistant professor in computer science at the University of Illinois, where she heads the Social Spaces Group. She is also a fellow at the Berkman Center for Internet & Society at Harvard University. Her work focuses on the interaction among people and the social cues they emit and perceive in networked electronic spaces. Her work is informed by studies and visualizations of social communities. Of particular interest are interfaces for public online and physical gathering spaces, such as Twitter, chatrooms, cafes, and parks. One goal is to create interfaces that enable users to perceive conversational patterns that are present but not obvious in traditional communication interfaces.

Christian Sandvig is an associate professor of communication and research in the Coordinated Science Laboratory at the University of Illinois at Urbana-Champaign. He is also a fellow at the Berkman Center for Internet & Society at Harvard University. His research investigates the development of new communication infrastructure.