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Do You Know What It Means to Miss New Orleans? Internet Communication, Geographic Community, and Social Capital in Crisis

Claire H. Procopio & Steven T. Procopio

This study investigated Internet communication and use in a crisis situation, Hurricane Katrina, to explore the role of the Internet in supporting or diminishing geographically-based community during a crisis. The researchers conducted an online survey of Internet users ($n = 1192$) from the dispersed metropolitan New Orleans area. The survey focused on amount, type, function, and importance of Internet use to creating and maintaining social capital, supporting geographically-based communities, activating social networks, reducing uncertainty, and achieving both expressive and instrumental communication goals. The results indicated that Internet users in a crisis situation went online to seek interactive fora specific to their neighborhoods and to activate weak ties in their social networks. They engaged in more uncertainty reduction behavior when experiencing higher degrees of damage. They turned to the Internet in place of other media as a result of disruptions caused by the crisis. Women valued online expressive communication more than men did. The findings suggest that social capital theorists would benefit from a communication perspective on the Internet. The study also led to the formation of suggestions for emergency preparedness agencies, shelter providers, crisis victims, and online news providers that can improve emergency response.

Keywords: Internet; Computer Mediated Communication; Social Capital; Crisis; Uncertainty reduction; Community

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Introduction

Entire metropolitan areas are flooded. Thousands of residents are displaced. Government agencies are having difficulty working together. Katrina? No, the Red River Valley flood of 1997. This natural disaster (see Sellnow, Seeger, & Ulmer, 2002) offered many lessons for students of crisis communication. In that crisis, Sellnow et al. uncovered novel forms of reorganization consistent with chaos theory's predicted self-organization, in which "new forms, structures, procedures, hierarchies, and understanding emerge, giving a new form to the system, often at a higher level of order and complexity" (p. 272).

During the crisis generated by Hurricane Katrina, few previously existing, community-sustaining processes were unaffected in New Orleans. Just as in the Red River Valley flood, novel forms of communication emerged in this crisis to help in "reconstituting normalcy, relationships, and a sense of community" (Sellnow et al., 2002, p. 290). In their analysis, Sellnow et al. called on communication scholars to "focus specifically on the ways in which crisis creates novel communication processes with particular attention to the role of communication technologies" (p. 290). They identified the role of the Internet in crisis communication as an important site for new research. This study was a response to that call.

Evacuees' use of the Internet after Hurricane Katrina highlights an important area for improved crisis communication employing an evolving communication medium. The study drew on social capital, network, and uncertainty reduction research to provide for a better understanding of the ways a displaced geographic community may reconstitute itself in a virtual space and to recommend strategies to sustain community in crisis situations.

Geographic Versus Virtual Community

Many researchers have decried the death of geographic community. In October 2005, sociologist Barry Wellman declared that "the proliferation of computer-supported social networks has afforded changes in the way people use community: "Community is becoming defined socially not spatially" (p. 53). Wellman and others see the "computerization of community" as revolutionizing the unit of connectivity from a place-based conception to a person-based community of networked individuals. In short, they propose that geography as the basis of our social networks is dying (Boase, Horrigan, Wellman, & Rainie, 2006).

Contrary to this view, in the days and weeks following the now infamous New Orleans diaspora in the wake of Hurricane Katrina, the voices of people hungering for geographic community emerged. Although there were certainly many who did not wish to return to New Orleans ("Fewer," 2005), news reports were full of evacuees echoing a similar theme: "I just want to go home" (e.g., *All things*, 2005; Bryant, 2006; Gaynair, 2005; Hastings, 2005; Johnson, 2005; Krupa, 2005; Sentell, 2006). As one evacuee put it, "[S]omeone get me some ruby slippers!" (*Renew,* 2006).

This study examined the interplay of what Wellman and others see as an increasingly irrelevant aspect of community—place—with the medium that is the principal catalyst for that irrelevance—the Internet. In a crisis situation, how, if at all, did Internet users from south Louisiana use Internet communication to reconnect with their communities? Did the Internet break down social capital as much research on routine situations suggests it does? Or, during the crisis, did novel uses of Internet communication support and foster geographic communities?

In non-crisis situations, there is a good deal of evidence to suggest the Internet erodes what political scientist Robert Putnam (1995, 2000) refers to as "social capital." Putnam (2000) has proposed that social capital, defined as those "features of social life—networks, norms, and trust—that enable participants to act together more effectively to pursue shared objectives" (pp. 664–665), is essential to the health of any democracy. Unfortunately, social capital appears to be on the decline in the United States. A number of scholars have lamented our transformation from a nation of joiners to a nation of watchers and the concomitant loss of community (see Putnam, 1995, 2000; Verba, Schlozman, & Brady, 1995). Television and, increasingly, the Internet are often disparaged as the media we watch that prevent us from going out and joining the civic body (Nie & Ebring, 2000; Stroll, 1995; Turkle, 1996). Nie and Ebring (2000) observed in a national study that reported increases in the amount of time spent using the Internet correlated negatively with reports of attending events outside the home, visiting with family and friends, and talking to friends and family on the telephone. Even just two to five hours per week of Internet use correlated with increased social isolation. Other scholars have advanced this argument as well (Davis, 1999; Gackenback, 1998; Patterson & Kraut, 1998).

Nie (2001) describes the debate as one concerning whether Internet use is an isolating activity or an activity that increases interpersonal communication and enhances human connectivity. He determined in his research that Internet users do not become more sociable through online activities, but rather online users come to the keyboard with a higher degree of social connectivity and participation because they are well-educated, more affluent, and less likely to be elderly. He concluded that Internet use might actually reduce interpersonal interaction because of the inelasticity of time.

Stressing the role of geography in community formation and maintenance, Baker and Ward (2002) noted that although people may join virtual communities for many reasons, long-term continued engagement in the online community is much more likely if the interest affects their "lives as physically-instantiated and geographically-centered individuals and citizens" (p. 207). Internet users in the South were split almost evenly concerning whether or not the Internet has been a benefit to their relationships, especially with family (Spooner, 2003).

Not all scholars agree with those who find that the Internet erodes social capital with its reduction of the importance of geographically-based community. Shah, Jaeho, Eveland, and Kwak (2005), for instance, suggest the Internet may be an effective tool for *increasing* social capital by fostering online political discussions and information exchange. Hiller and Franz (2004) outlined the uses of the Internet for

building social capital among migrants. Researchers have uncovered evidence that some individuals use online interactions to form significant interpersonal relationships (Baym, 2002; Clement & McLean, 2000; Drentea & Moren-Cross, 2005; Maheu & Subotnik, 2001). Indeed, Shah, Schmierbach, Hawkins, Espino, and Donavan (2002) concluded that time spent online related positively to public attendance and civic volunteerism. Their findings suggest that Internet use does not "isolate individuals from their communities in favor of interactions with geographically and socially remote groups" (p. 978). These scholars reasoned that "a sufficient amount of Net usage promotes proximate relationships to offset any isolating or distancing effect" (p. 979). Shah, McLeod, and So-Hyang (2001) suggested that this was particularly true if the online activities in question centered on information-gathering: "[I]nformational uses of mass media are positively related to the production of social capital, whereas social-recreational uses are negatively related to these civic indicators" (p. 464). One concern about Internet use eroding community stems from the belief that time online cuts into other communicative activities. However, Wellman, Haase, Witte, and Hampton (2001) discovered that online interaction supplements other interpersonal channels, such as face-to-face and telephonic communication, without increasing or decreasing their use. Kavanaugh, Reese, Carroll, and Rosson's (2005) exploration of the Internet's connection to social capital produced evidence that heavy Internet users with bridging ties (i.e., ties that link separate network groups) have higher degrees of social engagement, use the Internet for social purposes, and attend more local meetings.

Given the relative youth of the Internet, it is not surprising that findings concerning its relationship to communication, geographic community, and social capital are unclear. A more precise view of the Internet's role in creating or eroding social capital will no doubt emerge with continued research. The effects of Hurricane Katrina presented a unique opportunity to contribute to that discourse by exploring the Internet's relationship to community construction and maintenance through communication in non-routine circumstances.

Internet Communication in a Disrupted Community

Crises disrupt the regular communication processes that sustain communities in routine circumstances. During Hurricane Katrina, New Orleans news outlets relocated to Baton Rouge where, in an unprecedented move, news teams from rival stations shared the anchor's desk. One station commandeered the broadcast equipment at Louisiana State University's journalism school and broadcast via streaming video online. Radio stations across the dial combined for one collaborative broadcast using all of their news reporters to provide 24-hour coverage daily for months after the storm. The *Times-Picayune*, forced to leave its presses as water rose, published exclusively online for two days after the storm before alternate printing arrangements could be made in nearby Houma (Parks, 2005). Telephone communication throughout south Louisiana was disrupted. Telephone lines and cellular towers were destroyed. Working systems were overloaded. Frustrated with telephone

failures, it was common to hear agency leaders attempt to communicate with each other by going to local radio stations and broadcasting a message not directed to citizens but to other government agencies. An entire city was evacuated and, in the process, neighbors and even families were ripped apart. If communities were going to be sustained, it could not be through the regular channels of communication.

Indeed, research has shown that even communication specifically focused on crises often falls short of the mark in providing the kind of community-sustaining interactivity people in a crisis desire. For example, Paul's (2001) content analysis of 64 disaster relief home pages revealed only moderate levels of interactivity with users and little actual responsiveness to users. In the minute-by-minute drama unfolding around levee breaches, flooding, looting, and roof-top air lifts, such a stagnant format was unlikely to be sufficient to meet evacuees' information needs. As Rice and Katz (2003) explain, people are concerned with communicating their message to meet their needs, not enamored of particular communication technology. Thus, if normal communication channels are disrupted, people will resort to other technologies (Noll, 2003, p. 92).

As normal communication channels broke down during Hurricane Katrina, Internet sites responded to rapidly changing circumstances. Colleges along the Gulf Coast activated emergency Web sites (Foster, 2005) resembling "bare-bones announcement page[s]" (p. A39). NOLA.com, the Internet face of the New Orleans *Times-Picayune*, created neighborhood-based fora for public postings. In the days following the storm traffic to the site multiplied five-fold (Jarvis, 2005).

How did individuals respond to these changing media? Pundits contend that "millions of regular people mobilized themselves online" (Gaither & Gold, 2005, p. A1). These circumstances raise two important research questions about online activities during a crisis:

RQ1: Among Internet users, how do problems with other communication media affect Internet use in a crisis situation?

RQ2: What types of sites do Internet users visit and value online in a crisis situation?

Social Network Activation Online During a Crisis

The Internet has the potential to bridge and expand social networks (Kavanaugh et al., 2005). One of the authors of this article ran a telephone response center for his university immediately after the storm. The hotline's number was emailed exclusively to the university community. That single broadcast email generated over 5,000 telephone calls, including calls from non-university personnel, such as sheriffs in the storm area, doctors stranded in New Orleans, and federal agencies looking to house their personnel. The ambassador's office of the Czech Republic even called.

Activating these kinds of social networks for support is important during a crisis and has been researched. For instance, Hurlbert, Haines, and Beggs (2000) explored which characteristics of people's core social networks affected the degree to which

they activated their ties to gain informal support during Hurricane Andrew. Boase et al. (2006) noted that the Internet has a unique ability to mobilize groups of weak ties. Interweaving these research threads, it seemed reasonable for us to ask:

RQ3: What types of network ties, if any, will users activate through the Internet in crisis situations?

Uncertainty Reduction Online During a Crisis

In routine circumstances, one function of any thriving community is information exchange (Wright, 2002). Crisis situations create even higher informational needs (Seeger, Vennette, Ulmer, & Sellnow, 2002). Uncertainty reduction theory may help one explore the interrelationships of Internet communication, crisis, and the social capital of a community. Berger and Calabrese (1975) first proposed uncertainty reduction theory as a way to understand initial interpersonal encounters. However, the theory has expanded to include workplace, health, and even media-generated uncertainty through news coverage of traumatic events, such as the terrorist attacks of September 11, 2001 (Boyle et al., 2004; Brashers, Goldsmith, & Hsieh, 2002; Morrison, 2002; Seeger et al., 2002).

Boyle et al.'s (2004) study revealed that people used the media, including the Internet, to reduce uncertainty after 9/11. Those experiencing anger and fear reported greater efforts to seek information than those reporting pride and confidence. "[C]learly affect can drive an interest in information" (p. 162). Kubey and Peluso (1990) detected a similar tie between emotions and information-seeking following the Challenger space shuttle crisis.

On the basis of this analysis, we would expect those people experiencing greater uncertainty and more negative emotions in a crisis to engage in greater amounts of information-seeking to reduce uncertainty than those experiencing less uncertainty and less negative emotions. As information from areas that are most damaged in a crisis is usually slow to emerge and often conflicting, it is logical that people from those areas will experience greater uncertainty and dread than those from areas where reporters are able to broadcast some sense of the level of damage. Thus, we hypothesized:

H1: Internet users from areas most damaged in a crisis will spend more time online than Internet users from less damaged areas.

H2: Internet users from areas most damaged in a crisis will engage in information-seeking activities online to a greater degree than people from less damaged areas.

Emotional Support Online During a Crisis

A second major function of any community is emotional support. Wright's (2002) work regarding online communities suggests that online groups communicate two types of support to members: informational support and emotional support. Jones

and Rainie (2002) studied Internet use following the terror attacks of September 11, 2001. Respondents to their survey indicated they had used the Internet for emotional support during the crisis through sending email and posting or reading comments on bulletin boards and chatrooms.

Research in interpersonal communication has consistently revealed that, in general, women communicate more expressively and share feelings and personal issues to a greater degree than men. Conversely, men's communication prioritizes instrumental goals (Aries, 1987; Beck, 1988; Coates & Cameron, 1989; Johnson, 1989; Martin, Fabes, Evans, & Wyman, 2000; Treichler & Kramarae, 1983; Wood, 1994a, 1994b, Wood, 1998). Instrumental action is undertaken to reach a specific goal, whereas expressive action is undertaken for the sake of the interaction itself. According to Lin, Woelfel, and Light (1985), "[S]uccess in either type of action depends upon access to and use of social resources" (p. 249). We would expect to see both types of communication in a functioning community—geographically instantiated or virtual. The Pew Internet and American Life Project (Fallows, 2005) has noted that these gendered patterns of expressive versus instrumental goals extend to online activities. Specifically, women engage in more communication online and value that communication's effect on relationships more than men. Conversely, men are more likely to pursue instrumental goals online, such as conducting transactions or seeking information. In a study they undertook, Seeger et al. (2002) reported that gender played an important role in determining information needs in a crisis.

Given the potential importance of gender as a factor in determining Internet use for engaging community during a crisis, clarifying this relationship is important. Accordingly, we hypothesized that:

H3: Women will engage in more expressive communication with their social networks online than men.

H4: Men will engage in more instrumental communication with their social networks online than women.

Data and Methods

It is important to note that the data presented here are not presumed to be representative of the entire pre-Katrina greater New Orleans area population. Since this was a study of the tension and opportunities Internet use creates between virtual and geographic communities, the sample was drawn from those community members who were already Internet users. Caution in interpreting the results is further warranted by the convenience-sample nature of any online survey, the time-lag between the hurricane and surveying, and the lack of precise demographics of the New Orleans population post-Katrina.

To answer the research questions and test our hypotheses in the two months following Katrina, we created an online survey. We developed a 36-item survey with items pertaining to demographic characteristics, as well as to the amount, type, function, and importance of Internet use. On October 20, 2005, we disseminated the

survey by posting a link on the New Orleans newspaper's Web page and the Web pages of seven schools in the affected area. The schools included a New Orleans high school, two community colleges, an historically black university, a Catholic university, an elite private university, and a state-funded four-year university. Directions to respondents asked them to complete the survey only if they had been residents of the greater New Orleans metropolitan area prior to the storm. Zip codes served as a secondary check on residence. The link remained active until December 23, 2005. We obtained 1,192 completed surveys.

The respondents' demographics appear in the first three columns of Table 1. An annual random digit dialing (RDD) telephone survey conducted in Louisiana by the Louisiana State University Public Policy Research Lab can be used to analyze the particular idiosyncrasies of this Internet survey sample. The Louisiana survey results for the New Orleans area from April 2006 (before the diaspora) appear in columns four through nine: columns four through six show results for respondents who said they used the Internet at least once in the past week to get news about public affairs and politics; the last three columns show responses from all respondents in the New Orleans area.

With respect to race, since the Internet survey allowed for an "other" category, it is difficult to compare to the RDD survey. Although the Internet survey was skewed toward those of European descent (i.e., white), it did not have as many whites as either of the RDD samples. Some racial skew is to be expected due to the digital divide findings that suggest that African Americans constitute only 8% of Internet users (Spooner, 2003). Some of the skew may be attributable to response bias. Viewed this way, the racial response bias of the Internet survey was not unlike that found in a typical RDD survey. The large "other" category was consistent with the rich racial heritage of New Orleans, which includes such groups as Cajuns and Creoles.

Somewhat more unusual was the high response rate among women. This may be attributable to the fact that women found the Internet to be more valuable in the wake of Katrina, as predicted in H3. However, it may be at least partly attributable to survey response bias. The RDD survey also had high proportions of women. Since the Internet survey was self-administered, it is possible that gendered response bias was more pronounced.

The income and education of the respondents to the Internet survey seemed to be less skewed toward higher values than the RDD study. This difference may be due, in some part, to a higher proportion of college students taking the Internet survey since it was available on several campus message boards.

Although we were able to make a comparison to the RDD study, one should exercise caution in evaluating the sample. First and most important, no one really knows what the demographic make-up of New Orleans was after Katrina. Any extrapolations of a particular sample to the "new New Orleans" population would be laden with guess-work. Second, because of the rapidly changing nature of the affected area, any survey, at most, is a snapshot in time. Third, while the RDD phone survey and the Internet survey were both voluntary, since the Internet survey was self-administered the problem of self-selection is of greater concern. Last, since an

Table 1 Demographics

Internet survey	Frequency	%	RDD (Internet users only)	Frequency	%	RDD (entire sample)	Frequency	%
Race								
African American	127	11	African American	8	17	African American	20	19
Asian American	14	1				Asian American	3	3
European American	813	68	European American	37	79	European American	80	75
Hispanic	29	2	Hispanic	2	4	Hispanic	3	3
Other	199	17						
Gender								
Female	858	73	Female	30	64	Female	66	62
Male	325	28	Male	17	36	Male	40	38
Income								
Less than $15,000	297	25	Less than $10,000	0	0	Less than $10,000	2	3
$15,000–$25,000	125	11	$10,000–$19,999	1	3	$10,000–$19,999	5	8
$25,000–$35,000	146	12	$20,000–$29,999	1	3	$20,000–$29,999	6	9
$35,000–$45,000	144	12	$30,000–$39,999	7	21	$30,000–$39,999	9	14
$45,000–$55,000	130	11	$40,000–$49,999	6	18	$40,000–$49,999	10	16
$55,000 and above	335	29	$50,000 and above	19	56	$50,000 and above	32	50
Education								
Less than high school	27	2	Less than HS diploma	1	2	Less than HS diploma	4	4
High school diploma	138	12	High school	5	11	High school	24	23
Vocational certification	57	5	Some college or vocational	12	26	Some college or vocational	31	29
Some college	413	35						
Four-year college degree	326	27	College degree	20	43	College degree	28	26
Professional degree	64	5	Some graduate	1	2	Some graduate	3	3
Master's degree	123	10	Graduate degree	8	17	Graduate degree	16	15
Ph.D.	44	3						

Internet survey is inherently disjointed from geographic location, it is never possible to correlate completely such a sample to a physical one.

This disjunction between the virtual and the geographic is reflected in the findings of the study. Most of those surveyed (93%) accessed the Internet from somewhere besides their homes. This is not surprising in view of the widespread devastation in New Orleans. Of the respondents, 60% relied on friends or family to keep them connected. One positive finding was the relatively large number (12%) who used public libraries to access the Internet, which suggests that efforts to increase access by providing Internet connections in public places may be paying some dividends.

In terms of the delay before accessing the Internet after Hurricane Katrina, the distribution was almost bimodal. In one category, there were those who either did not lose access to the Internet (26%) or reconnected within three days (32%). At the other extreme, there were those who could not access the Internet for at least seven days after the storm (26%). This most likely is reflective of damage to power lines. Those who evacuated far enough away were less likely to lose power for an extended period of time. Those who stayed close to home were more directly affected by the hurricane.

Results

What Effects did Problems with Communication Media Have?

RQ1 concerned the effect of problems with communication media on Internet use in a crisis situation. During Hurricane Katrina, large numbers of telephone lines and cellular towers were destroyed. Functioning telephone systems throughout Louisiana were overloaded (Leith, 2005). Outside the metropolitan New Orleans area, Internet cable access was largely unaffected. Problems with telephone systems had no effect on a majority (51%) of respondents' use of email. However, 28% of respondents reported increased use of email as telephone communication became difficult. Conversely, 20% of the sample reported decreased use of email (presumably because they had dial-up connections).

Rates of Internet use, as defined by number of hours online per day, varied considerably: 36% of respondents accessed the Internet for one hour or less per day; 40% spent two to four hours per day online; a smaller but still sizeable group reported being on the Internet for five to nine hours per day (15%); and finally, 9% of respondents indicated using the Internet for 10 or more hours a day.

What Types of Internet Source Do Users Prefer? The Role of Geographic Connection and Interactivity in Internet Communication During a Crisis

RQ2 related to the types of site Internet users visit and value during a crisis. Table 2 summarizes data involving the types of Internet source respondents preferred. Many respondents reported Internet activity consistent with Baker and Ward's (2002) analysis that suggested Internet users would seek sources geographically connected to them: 57% of respondents reported hometown news outlets as their most visited

Table 2 Internet Sources

Type of site visited most in the week following Katrina	Frequency	%
Local news outlets from your hometown (e.g., 2theadvocate.com, NOLA.com)	670	57
National news outlets (e.g., CNN.com, Foxnews.com, MSNBC.com)	227	19
Email provider	145	12
Other	99	8
Blog	36	3
Online source most informative to you in the week following Katrina		
Reports from hometown media outlets	580	49
Information from other citizens	348	30
Reports from national media outlets	188	16
Other	57	5
Visited online forum specific to one's neighborhood while evacuated		
Yes	883	75
No	302	26
Posted to neighborhood forum		
Yes	478	54
No	408	46

Internet sites in the week following Hurricane Katrina; 49% rated hometown media sites as their most informative online source. The importance of geography to Internet activity is further highlighted by the respondents (75%) who visited online fora specific to their own neighborhoods.

The review of prior research also suggested that Internet users during a crisis would prefer information sources that were more interactive rather than static (Paul, 2001). As noted above, three-quarters of respondents indicated visiting online fora set up as discussion threads. Over half (54%) of those reporting visiting such fora reported posting messages. This level of interaction also appeared to contribute to another phenomenon: the emergence of the citizen reporter. Internet users took it on themselves to provide information to others in this crisis situation. Users seemed to value information from other users, with 30% of respondents labeling it their most informative online source in the week following the hurricane.

Table 3 portrays some of the activities in which respondents engaged. Although the most common activities were forms of information-seeking, several involved information-giving and ranged from descriptions of damage to advice on other sites people could visit for pertinent information.

Social Network Activation Online During a Crisis

RQ3 dealt with the activation of social networks (Granovetter, 1973) via the Internet during a crisis. Respondents reported using the Internet to activate a number of networks: familial (59%), social (79%), geographic (31%), and school-related (25%). Interestingly, close to half (46%) of the respondents used the Internet to contact people they had not contacted in over a year. It appears Internet use served to activate both strong and weak ties following the storm.

Table 3 Respondent Activity in Neighborhood Fora

	Respondents viewing	%	Respondents posting	%
In any capacity	883	74	478	40
Descriptions of the damage in your neighborhood	710	59	128	11
Aerial footage of your neighborhood	607	51	49	4
Advice on other sites to visit for information	569	48	120	10
Flood maps	540	45		
Pictures of your neighborhood	517	43	54	5
Accounts from neighbors who stayed during the storm	473	40	78	7
Reports of missing or found persons	466	39	130	11
Words of encouragement	466	39	158	13
Other	73	6	46	4
Questions			350	29

Uncertainty Reduction Online During a Crisis

Internet users reported that part of the impetus to activate social networks related to uncertainty reduction: 72% of respondents rated the Internet as important or very important to "gathering specific information on the likely property damage" to their homes; 64% placed similar value on "getting word out" to friends of their status; and 61% rated "gathering specific information on friends" as important or very important.

Consistent with previous research involving affective state and uncertainty reduction communication (Boyle et al., 2004; Kubey & Peluso, 1990), we reasoned in H1 and H2 that Internet users from areas sustaining the most damage in the crisis would experience more negative emotions, would spend more time online, and would engage in more information-seeking activities to reduce uncertainty than their counterparts from less damaged areas.

Testing these hypotheses required a measure of hurricane damage suffered. Data pertaining to damage in New Orleans were difficult to obtain because of the vast number of people affected and total disruption to normal city processes. One of the most readily available objective sources for storm damage suffered was the U.S. Postal Service. The USPS maintained a regular listing of zip codes for which service was unavailable as a result of damage. It listed zip codes that lost postal service but had it restored by November 1, 2005 (*Mail*, 2005). It also listed zip codes for mail that was still undeliverable on that date, a full two months after Hurricane Katrina. For the purposes of this study, those respondents (28%) who indicated that they were from areas that did not have mail service more than two months after the storm were identified as being from heavy-damage areas, those respondents (64%) from areas that lost mail service initially but had it restored within two months were classified as being from moderate-damage areas, and all others (8%) were identified as suffering light damage. This application of a basic government function to geographic location provides construct validity to this measure, as one would expect more heavily damaged areas to lack services for greater periods of time.

H1 posited that those from more heavily damaged areas would spend more time online than respondents in the other categories. Table 4 shows ANOVA results for the average amount of time spent online by the level of damage in the respondent's area of residence. Although respondents from the most heavily damaged areas did spend the greatest amount of time online, the difference was not significant ($F = 1.31$, $p < .23$).

H2 predicted that Internet users from areas most damaged in a crisis would engage in information-seeking activities online to a greater degree than people from less damaged areas. The data in Table 5 suggest that there were, in fact, important damage-based differences in online activity. Respondents from moderately and heavily damaged areas were more likely to turn to local news outlets and less likely to turn to national news sources ($\chi^2 = 25.1$, $p < .005$). Similarly, those in moderate and heavy damage areas were more likely to use neighborhood fora ($\chi^2 = 32.4$, $p < .001$). These findings indicate that people in crisis prefer geographically-connected information sources and interactivity online. Those in moderate and heavy damage areas were also more likely to report participating in each of the particular neighborhood information-gathering activities listed in Table 6. That is not surprising given the differences in online fora use by respondents from each damage level: Low (50%), Moderate (73%) and Heavy (82%). Table 5 further shows that damage level related to attempts to reactivate social networks. As the level of damage increased, so did the proportion of respondents who contacted friends and family with whom they had not communicated in more than a year ($\chi^2 = 14.2$; $p < .063$). Thus, those from areas with higher levels of damage communicated in ways even more consistent with predictions about those in crisis than those from areas with lower levels of damage.

Not only did experiencing greater degrees of damage increase the focus on "hometown news" and "neighborhood," damage level also seemed to affect how much those activities were valued. Those from highly damaged areas valued the Internet's information-gathering capacity to a greater extent than did those from other areas (see Table 6). For almost every category of information-gathering, there was a significant association between the level of damage a respondent's area received and the importance placed on a particular activity. However, respondents with greater levels of damage did not place increased significance on "getting the word out" activities.

Emotional Support Online During a Crisis

One last area of exploration in the study was the nexus of crisis, Internet use, and gendered communication. Consistent with previous research, H3 and H4 predicted

Table 4 Time Spent Online (Hours Daily) by Level of Damage

Damage	Mean	*n*	Std deviation
Low	3.2	88	3.14
Moderate	2.97	752	3.04
Heavy	3.28	333	2.9
Total	3.08	1173	3.01

Table 5 Most Visited Internet Sites by Level of Damage

	Low	%	Moderate	%	Heavy	%
Types of Internet sites most visited						
Blog	4	4	24	3	8	2
Email provider	19	21	93	12	32	9
Local news outlets from your hometown (e.g., 2theadvocate.com, NOLA.com)	35	38	440	58	191	57
National news outlets (e.g., CNN.com, Foxnews.com, MSNBC.com)	24	26	133	17	65	19
Other	8	8	54	7	35	10
Visited neighborhood fora						
Yes	50	54	550	73	274	82
No	42	45	198	26	57	17
Contacted tie not activated in >1 year						
Yes	36	39	346	46	162	49
No	56	60	406	54	171	51

women would engage in more expressive communication and men in more instrumental communication within their social networks online. To operationalize these two forms of communication, we coded survey responses related to family, friends, cathartic descriptions of one's Katrina experience, and offering or receiving words of encouragement, as primarily expressive forms. We coded survey responses related to information gathering (e.g., finding flood maps, aerial footage, or pictures of one's neighborhood) as primarily instrumental communication.

Framed strictly in terms of amount of communication, there was little support for H3 and H4. Table 7 shows that men were just as likely as women to describe their Katrina experiences. Similarly, there were no significant differences between men and women in regard to either reading or posting words of encouragement online.

The rankings of importance of various Internet activities tell a different story. Table 8 shows that women reported valuing expressive communication more than men did. Women also thought that gathering information about their families, getting word out to their families and friends, and receiving emotional support were more important than men thought they were. In conjunction with the information in Table 7, this indicates that although men and women communicated instrumentally and expressively at similar rates, they did not value each form of communication in similar fashion.

Discussion

We have responded to Sellnow et al.'s (2002) call to "focus specifically on the ways in which crisis creates novel communication processes with particular attention to the role of communication technologies" (p. 290) by exploring the role the Internet played for users in a crisis situation, Hurricane Katrina. Drawing on social capital, network, uncertainty reduction, and gender research, we have suggested that the Internet may be an important site for sustaining geographic community in a crisis.

Table 6 Internet Evaluation by Damage

How important was the Internet to you in each of the following areas:	% very important				
	Low	Moderate	Heavy	χ^2	*p*
Gathering specific information on the likely property damage to my home	17	20	30	26	.004
Gathering specific information on the whereabouts of family members	38	34	44	17	.070
Gathering specific information on the whereabouts of coworkers	17	20	30	38	.000
Gathering specific information on friends	38	34	44	18	.052
Gathering specific information on neighbors	22	15	28	38	.000
Receiving emotional support	22	20	25	18	.052
Receiving information on reporting back to work	22	28	26	8	.670
Getting word out to family members of my status	32	35	38	7	.733
Getting word out to coworkers of my status	23	21	27	17	.070
Getting word out to friends of my status	32	41	44	8	.610

Obviously, this study is far from the final word concerning the communicative uses of emerging technologies in crisis situations. The failure of cellular and wireless communication in the aftermath of Hurricane Katrina would be a fruitful site for exploration. The roles of cellular telephones and personal digital assistants in crisis communication also are worthy of examination. A principal limitation of this study, as with all Internet surveys, is the difficulty in gauging the representativeness of the sample. More studies of Internet crisis communication employing an array of different methods for data collection to check for replication of findings could further extend our understanding of this important technology's role in crisis communication.

Our analyses confirmed the expectation that problems with other communication media in a crisis lead to novel uses of Internet technology. As such, the study offers an interesting wrinkle to social capital theorists' concerns that Internet technology erodes social capital by downplaying the importance of geographic community (Nie & Ebring, 2000; Stroll, 1995; Turkle, 1996). Our look at Internet use in a crisis revealed users seeking interactive fora that favor the instrumental and expressive types of communication essential to community creation and maintenance (Wright, 2002). Women valued these latter forms of communication more than men did. A geographic locus of community was evident in online users as well. They gravitated toward the Web sites of familiar bricks-and-mortar local news stations to acquire information they trusted in a crisis situation. The community/Internet connection was further complicated by the finding that Internet users in crisis used the medium to activate weak ties. It is questionable as to whether those ties would have been (or indeed could have been, given the ravages of the hurricane) activated via other communication media.

That the crisis itself was responsible for much of the character of the online interactions reported in this study is apparent in the findings regarding extent of

Table 7 Expressive Communication by Gender

	% of male	% of female	χ^2	*p*
Described Katrina experiences via email	67	65	1.59	.452
Read words of encouragement	38	40	0.31	.575
Posted words of encouragement	13	13	0.05	.828

damage and uncertainty reduction. Those most affected by Hurricane Katrina's winds and water were even more likely to seek local news sources and interactive neighborhood fora, and to activate weak ties. All of these are community-building and -sustaining forms of communication. This is not to imply that in routine situations, social capital theorists' concerns are unwarranted. However, this study revealed that geographic communities in crisis may reconstitute their physical connections via communication in virtual space.

Theoretical and Practical Implications

Our analyses have a number of important theoretical and practical implications regarding crisis communication. First, researchers interested in promoting social capital need to recognize that the Internet is neither the panacea for building community that some suggest (Boase et al., 2006; Wellman, 2005) nor the harbinger of civil anarchy others fear (Nie, 2001; Nie & Ebring, 2000; Stroll, 1995; Turkle, 1996). It may be best viewed from the communication perspective as a medium. This study demonstrated that the Internet has the capacity to sustain geographic community as much as any other communication tool. The telephone has existed as a communication medium for considerably longer than Putnam suggests we have been bowling alone (Putnam, 1995, 2000). Certainly, the telephone may be employed for entertainment purposes that in no way facilitate community, yet we all recognize it can be used to reach out and touch someone. The same conception of the Internet as a communication medium needs to be advanced. It is not as passive a medium as television. Nor is its role as entertainer versus tool an all-or-nothing one. The Internet will have some functions that decrease communal connections. However, it can play

Table 8 Expressive Communication Evaluation by Gender

	% very important			
	Male	Female	χ^2	*p*
Gathering specific information on the whereabouts of family members	23	30	12.65	.027
Getting word out to family members of my status	31	38	12.35	.030
Receiving emotional support	14	25	34.55	.000
Getting word out to friends of my status	35	44	26.47	.000

Evaluations of other Internet communications did not have statistically significant differences.

a powerful role in sustaining community as well—especially, as this research shows, in a time of community dispersion and crisis.

A second practical implication of this study is that taking along one's laptop computer with multiple methods of connecting to the Internet should become as standard a piece of crisis preparedness advice as having batteries and bottled water. The Federal Emergency Management Agency (FEMA) publishes a 204-page pamphlet concerning citizen preparedness for any emergency situation (FEMA, n.d.). The word "computer" appears in the document only three times: once to explain a computer-based viral attack and twice more to recommend unplugging one's computer in certain emergencies. The importance that Internet users in this study placed on information they received online suggests that evacuees in a crisis would benefit from Internet access. As one survey respondent explained, "I brought my laptop when I evacuated. Only 3 casual changes of clothes because 'we would only be gone until Tuesday', but knew I needed connectivity" (A. Cadard, personal communication, October 26, 2005). It may be a stretch to suggest that most people would value connectivity over clothes, but with the proper preparedness guidelines and education, many could have both. Agencies such as FEMA, the Be Ready Campaign, the Centers for Disease Control and Prevention, the Department of Homeland Security, the National Weather Service, and the U.S. Geological Survey should integrate into all of their preparedness literature advice to bring one's laptop and to access the Internet in public places like libraries.

A third and related practical outgrowth this study suggests is the importance of providing Internet access to evacuees in shelters. Five months after the hurricane, 2,500 people were still reported missing (Grudgings, 2006). Online fora quickly established missing person registries and query spaces in the days following August 29 ("Internet access," 2005). Many of the people who ended up in shelters were separated from their families and could have benefited from online access. Indeed, many businesses scrambled to offer their aid in providing Internet access to shelter residents ("AMD," 2005; "RadioShack," 2005; "SBC," 2005). In addition to this important function, shelter residents could have benefited from the same community-sustaining uncertainty reduction information, social tie activation, and expressive functions these respondents reported. The communities of those in shelters should be no less important than the communities of those fortunate enough to land some place with easy Internet access. Meeting this need should become a routine part of shelter planning.

Finally, traditional news outlets should be prepared to set up localized interactive fora. The *Times-Picayune*'s online presence (NOLA.com) established discussion threads organized according to neighborhoods almost immediately following the storm. By providing a neighborhood-based structure, the threads enabled Internet users to communicate their messages to particular audiences and to find specific communication to reduce their uncertainty about places left behind.

Conclusion

Is community, as Barry Wellman (2005) suggests, truly devoid of place? Or do our geographic connections simply play out differently in virtual spaces? Continued research will have to be done before it is clear what exactly it means to miss New Orleans, but this study does shed some light on the question. Our findings demonstrate that the Internet has a good deal of capacity to sustain a geographic community. It facilitates neighborhood-specific communication. It allows for uncertainty reduction through information gathering. It is a medium that can be available when other channels are not. It may be used to contact distant members of social networks. It can even enable valued expressive communication in a crisis. These are activities that scholars interested in promoting social capital endorse in traditionally-conceived geographic communities. Their facilitation through an online medium should not discourage our valuation of them.

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