

911.gov

Ben Shneiderman and Jennifer Preece

When individuals need help for medical emergencies or fires, most U.S. residents reach for their phones to dial 911. But when natural disasters, public health threats, or terrorist attacks occur that effect thousands of individuals or more, 911 operators cannot handle all the requests. Such disasters may require massive coordination of public and private agencies, plus cooperation from millions of citizens.

Public use of Web-based social computing services, such as MySpace or Facebook, has spread to hundreds of millions of users. This suggests that local, state, and federal agencies could build community response grids (CRGs) where residents could report incidents in seconds, receive emergency information, and request resident-to-resident assistance. The current Internet and World Wide Web have proven effective for many purposes, but government agencies have been slow to adopt social computing for national security, disaster response, and emergency relief (1).

CRGs should be more than an emergency reporting service as already proposed (2). They should also be more than the U.S. Department of Homeland Security (DHS) Information Network (3), which focuses, like some European (4) and Asian (5) initiatives, on networking for professionals. CRGs would not duplicate DHS's CitizenCorps.gov, which is designed to build local volunteer groups for emergency response but doesn't include online reporting or resident-to-resident assistance.

Community members (who would register in advance) could use Web-based computers, mobile devices, and cell phones to give and get text messages, photos, or videos. The site would support coordination as emerging software tools could enable agencies to integrate

B. Shneiderman was the founding director of the Human-Computer Interaction Laboratory and is a professor in the Department of Computer Science, and J. Preece is professor and dean of the College of Information Studies, University of Maryland, College Park, MD 20742, USA.

*E-mail: ben@cs.umd.edu or preece@umd.edu

A community response grid. Mockup of a World Wide Web page that supports registering of households, reporting of incidents, requesting assistance, and responding to requests.

reports and promptly recognize patterns. Civic leaders could disseminate information on a street by street basis. A CRG would be most effective if it is used on a regular basis so that people know about it and develop closer community contacts. Such activities would build trust and increase social capital that will be needed during major emergencies.

Some catastrophes destroy infrastructure, but in many situations, such as avian flu, chemical and biological attacks, and temperature extremes, do not. Even when there is focused damage to communications infrastructure, the adjoining areas need to communicate to report and receive instructions. As the Internet matures, its reliability will improve, and if disrupted it is more likely to be easily restored than phone services (6, 7).

In the aftermath of Hurricane Katrina, local libraries helped to rebuild neighborhoods (8). After the Kobe earthquake (9), British foot-and-mouth disease outbreak (10), and Indonesian tsunami (11), resident collaborations, Internet communications, and community networks were effective in coordinating local assistance, supplies, and information dissemination (12). An effective, regional model is Craigslist.com, which has tailored Web pages for all 50 U.S. states and 22 metropolitan regions. The California Web pages already disseminate earthquake and weather information, but have no reporting system.

Just as 911 emergency phone services are run and funded locally by phone service fees,

Web-based communication can provide better reporting on disasters, coordination of responses, dissemination of information, and social networking to deliver assistance.

CRGs could be maintained through user fees collected by Internet service providers. In smaller communities, CRGs could be run by trained volunteers with a few professionals, much as volunteer fire departments now operate. Local 911 phone centers have annual budgets of \$200,000 to \$3 million (13). A reasonable estimate is that adding 911.gov services would do no more than double these budgets.

There are many challenges to be faced. We need to understand the norms and policies that generate intense participation in groups such as the Wikipedia community

and some health support groups (14). Many online communities fail, so we must learn what barriers reduce and what incentives create successful community interactions in which privacy is respected (15). It will be important to integrate with existing social networking sites and local community groups. However, developing a research agenda, pilot testing, and phased implementation could make CRGs a reality within 3 to 5 years.

References

1. Y. Kajitani, N. Okada, H. Tatano, *Nat. Hazards Rev.* **6**, 41 (2005).
2. 107th U.S. Congress, House Resolution 3353.
3. DHS Information Network, www.dhs.gov/xinfo/share/.
4. European Union, Community Research and Development Information Service, Emergency Response Grid, http://cordis.europa.eu/ist/grids/emergency_response_grid.htm.
5. Grid-Enabled Disaster Prediction and Emergency Response, www.gridatasia.net/content/view/44/70/.
6. J. Cox, "Communicating even when the network's down: Researchers seek disruption-tolerant nets" (2006), www.networkworld.com/news/2006/111606-dtn.html.
7. M. Turoff et al., *J. Inf. Technol. Theory Appl.* **5**, 1 (2004).
8. E. L. Quarantelli, <http://understandingkatrina.ssrc.org/Quarantelli> (2005).
9. R. Shaw, K. Goda, *Disaster* **28**, 16 (2004).
10. C. Hagar, thesis, University of Illinois, Urbana-Champaign, IL (2005).
11. M. Stephenson, *Disasters* **29**, 337 (2005).
12. C. Jones, S. Mitnick (2006), www.firstmonday.org/issues/issue11_5/jones/.
13. National Emergency Number Association, www.nena.org/.
14. D. Maloney-Krichmar, J. Preece, *ACM Trans. Comput.-Hum. Interaction* **12**, 201 (2005).
15. J. Preece, *Online Communities: Designing Usability and Supporting Sociability* (Wiley, New York, 2000).

10.1126/science.1139088