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Author(s): Vos, Marita; Sullivan, Helen T.

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Guest Editors' Introduction**COMMUNITY RESILIENCE IN CRISES:
TECHNOLOGY AND SOCIAL MEDIA ENABLERS**

Marita Vos

*Organizational Communication and PR
Department of Communication
University of Jyväskylä, Finland*

Helen T. Sullivan

*Department of Psychology
Rider University
Lawrenceville, NJ, USA*

Technology can contribute greatly to disaster resilience, especially by enhancing the interconnectedness between the authorities and the public and by facilitating the rapid exchange of information. This special issue of *Human Technology: An Interdisciplinary Journal on Humans in ICT Environments* is focused on technology and social media enablers of community resilience. Crises take on a variety of shapes and forms—natural or health disasters, terroristic and criminal acts, technology malfunctions, and large-scale accidents—at the local, regional, national, and global levels. Crisis management plans, created and implemented at the organizational level, typically involve public service and institutional authorities overseeing emergency response. However, contemporary crises, because of scale, complexity, or immediacy, are more likely to require collaboration with citizen responders to deal quickly with evolving situations.

TRENDS IN DISASTER MANAGEMENT

Margaretha Wahlström, the United Nations' Assistant Secretary-General for Disaster Risk Reduction, recently emphasized that nowadays disasters are not seen as a single event but rather as a longer process requiring the attention of multiple actors (Wahlström, 2014). This means that, after an initial emphasis on warning and first response, disaster-supporting technology can be employed more fully in supporting resilience in other crisis phases, including preparedness and recovery. In addition, technology can facilitate cooperation within response organizations or the response network, but also can enable wider cooperation among multiple stakeholders and affected parties, such as other organizations, companies, and civil society. To achieve these ends, crisis practitioners and crisis managers are calling for human–technology applications that are developed from a user perspective, which, by extension, takes into account the perceptions, needs, and practices of multiple users.

Modern-day disasters are complex and often transboundary in nature, meaning they may cross geographic and functional boundaries (Boin & Rhinard, 2008). This complexity calls for a more comprehensive approach to achieve resilience at the individual, community, and societal levels. Resilience means having the capability to adapt in the face of a disturbance (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008) and, in a crisis situation, resilience includes being able to self-organize and mobilize available resources (Heath, Palenchar, & O'Hair, 2009). The adaptive behavior of citizens and responders is emphasized in resilience, including developing partnerships (Boin & McConnell, 2007), also known as a whole community approach (Federal Emergency Management Agency [United States of America], 2011). In this way, resilience currently is seen as a coproduction by response organizations and citizens (Palttala & Vos, 2011). Cooperation is facilitated by ongoing communication within a complex networked environment consisting of multiple stakeholders with varying intentions and interests (Roloff, 2008).

The development of technology should take into account its use by multiple stakeholders to whom different motives may be important. Developers should look beyond single solutions and check for unintended effects. For example, creating open platforms that make potential threats visible might unintentionally reinforce feelings of vulnerability or insecurity. Such matters require interdisciplinary collaboration, including technical knowledge, insights and practical skills from the social, psychological, and communication fields.

Inclusion of all members of a population at risk is a key requirement in effective crisis communication planning and technology application (Sullivan & Häkkinen, 2011). The specific needs of population segments, such as persons with disabilities, may be overlooked, or deferred in favor of reaching a mainstream audience at the outset of a crisis, even though the information-seeking needs of residents with and without disabilities can be similar in disaster situations (Spence, Lachlan, Burke, & Seeger, 2007). Failing to address those needs, specifically by deferring or ignoring the accessibility of information and communication technologies (ICTs), in effect can prevent those with sensory or cognitive impairments from receiving potentially lifesaving information. Accessibility standards—such as those of the World Wide Web Consortium (W3C) Web Accessibility Initiative,¹—and government legislation, in the form of Section 508² in the United States and the European Union's [EU] forthcoming Mandate 376,³ provide specific requirements and guidance for the implementation and procurement of accessible ICTs.

It should be noted that the technologies that enable citizen engagement in crisis communication depend upon a complex technical infrastructure that itself is vulnerable to disruption during disasters. Communication networks and mobile devices are dependent upon electricity and, although batteries can provide a finite, extended operating period for both, once main power sources are disrupted, the electricity-dependent ICTs used by citizens may begin to fail within hours (Kwasinski, 2013). In such periods, preparedness pays off, because knowledge and skills gained in the pre-event phase provide an important basis for decisions and activities when one cannot consult online resources or persons with information who are located elsewhere. Such periods also demonstrate that authorities will need to augment current technology-based approaches with traditional media, such as delivering a printed version of online announcements to people's homes, as was done in some communities in the aftermath of Hurricane Sandy in the United States. This multichannel approach aligns with the diversity requirements found across

many regions and communities that take people's different needs, digital awareness and enablement, and media habits into account (Vihalemm, Kiisel, & Harro-Loit, 2012).

Although every week brings news of another disaster or crisis affecting a community somewhere in the world, with failures (and successes) in planning and preparedness identified and with many practical lessons to be learned, there remains a significant gap in research that, if addressed, could serve to better inform those developing and using ICTs to enhance public preparedness and resilience. Some of the gaps involving the challenges and opportunities to meet various human needs and activities in crisis and emergency management are addressed in this thematic issue.

PREVIEW OF THIS SPECIAL ISSUE

This issue of *Human Technology* presents four papers that, in different ways, address community approaches and ICTs. Through them, trends in the crisis and emergency planning and response research are discussed.

Linnell looks into emerging sociotechnical approaches in initiatives aimed at increasing community resilience and citizen involvement in Sweden. The paper is based on a literature review, combining the metasynthesis and systematic literature review approaches, and on empirical work in the form of an extensive interview study. Linnell concludes that Swedish initiatives in citizen involvement in crisis resilience focus mainly on the pre-event phase. He notes various types of communities that change over time and may be involved to a greater or lesser extent in crisis preparedness. These communities range from traditional volunteer organizations with trained individuals to people without organizational affiliation who spontaneously offer help in a crisis by contributing their own available skills and resources. The ways in which citizens are involved also differs in the literature cited. According to Linnell, one example of citizen-motivated response that has received much attention in the literature is crisis mapping, whereby digital input of the event is represented geographically online.

Wetzstein, Grubmüller-Régent, Götsch, and Rainer focus on crises and social media in a metastudy based on literature, EU-funded projects, and some practical crisis management situations. This work leads to conclusions on related challenges and research gaps. The authors note that attention to crisis-related topics is growing within the literature, although research dealing with crises and social media from a citizen- or user-centered perspective remains scarce. A focus on the crisis response by the public sector is much more common in research than is a focus on community resilience and empowering citizen responders. In addition, the related social media limitations and potentials are considered a research gap, according to the authors. Wetzstein et al. also looked into what public grant providers seem to value. In EU-funded research, the topics of security and ICTs are found frequently within funding calls. However, most funded projects focus on first responders; the role and needs of the public were introduced as a topic only in 2012. The authors conclude that the emphasis in both the literature and the preponderance of funded projects is on gathering citizen input for decision making by authorities, rather than on a citizen-centric approach.

Although technology is fundamental to modern crisis communications, the public's motivation to adopt and use these technologies in the context of preparedness and response to crisis is important to understand. The paper by **Wall** examines situational motivation in

preparing for everyday risks in Sweden, making novel use of the Situational Motivation Scale (Guay, Vallerand, & Blanchard, 2000) for this purpose. In the study, data were gathered from a national poll, Society and Risk 2011, and the author reports upon a significant link between two factors, motivation and amotivation, and the extent to which the sample population prepared for everyday risks. The author highlights the need for further research, specifically to examine individual incentives to prevent and/or prepare for accidents and crises and to explore the potential for tools to draw upon the nuances of an individual's motivation to prepare.

Haataja, Hyvärinen, and Laajalahti focus on the resilience perspective of citizens' communication habits and use of technology during crises and emergencies. Although information typically is distributed to the citizenry by authorities, the reverse can be important as well. Information from those experiencing emergencies or who are at risk can be provided to authorities. In focus groups conducted by the authors, the information needs, information sharing, and deployment of ICTs in crisis and emergency situations were examined. During an emergency situation, the need to receive information as soon as possible was stressed by the informants, as well as the need to know the status of family and friends. The authors suggest that authorities and crisis and emergency management organizations should adjust their communication strategies so as to be seen as reliable information sources. The data revealed a need on the part of the citizens to be able to contact authorities to ask for help in and advice on various situations, which was usually done by phone. A lack of awareness of the active presence of local police on social media was identified, as well as the need for parallel lines of communication, such as radio providing an information channel as an alternative to social media.

DISCUSSION

The research presented in this special issue of *Human Technology* confirms that community approaches typically focus on the pre-event phase, as both Linnell and Wetzstein et al. found. The pre-event phase focuses on educative activities, often with an all-hazard approach that invests in preparedness for various risks, with emphasis on those that have a high likelihood to occur in the region. Focuses for this approach could include, for example, schools, health care institutions, and various volunteer and publicly funded associations. In the response phase, so far as the literature suggests, less attention has been provided for bottom-up approaches. However, according to Wetzstein et al., several recent research projects have aimed at developing technological means to facilitate the collaborative contributions of citizens in later crisis phases.

Many articles mention initiatives or projects that aim at improving collaboration between authority response organizations and citizens. This dichotomous approach in research is useful but is, at the same time, a simplification because crisis communication is actually co-created in a multiactor arena (Vos, Schoemaker, & Luoma-aho, 2014). Research could acknowledge the diversity of individuals and groups involved, on the one hand, and the diversity of public and private organizations and companies, on the other hand. To date, public-private initiatives have received little attention in disaster and crises literature. Moreover, the diversity of groups identified by Linnell in this special issue indicates a gray area regarding organizational and semi- and nonorganized actors. This reality could be investigated better from the perspective of multiactor communication.

In addition, the definition of the concept *response network* could be extended. A response network usually is seen to represent formal response organizations, but the concept could be expanded to include all actors involved in risk mitigation. This latter conceptualization would be a logical choice when looking at a multiactor network exchange. Many ICT platforms aim at bringing together diverse input in the social media and crisis management domains. Linnell also provides an example of facilitating the coordination of diverse voluntary input via mobile phone applications.

Two regions, Asia and Africa, have seen development of indigenous technical solutions for citizen-focused crisis management and communication. The Sahana⁴ open source platform emerged from Sri Lanka in the aftermath of the 2004 Indian Ocean tsunami and has been used in multiple international disasters. Ushahidi,⁵ also an open source platform, was developed in response to the 2008 postelection violence in Kenya. Using mobile phones and text messaging, Ushahidi enabled individual citizens to report on the crisis and to contribute to the creation of crowd mapping.

The research literature surveyed by Wetzstein et al. is dominated by Western research teams. Accordingly, these authors plead for increased international collaboration among more regions and continents. They also suggest that more attention be paid to the research agenda for the role and participation of individual citizens and local communities, not only as providers of information but also as actors therein. Along the same lines, Linnell suggests looking into how nonorganized individuals can be engaged during crises and emergencies and their efforts included in the response activities.

Any technological solution will need to demonstrate, across a range of devices, the ability to support a diverse population, including those with cultural and linguistic differences, aging citizens, and those with disabilities. Further, these solutions themselves, if they are to be effective, must be resilient during and after disasters. Already we are seeing innovative solutions for network resiliency (e.g., BRCK,⁶ which was developed in Kenya to support services such as Ushahidi), and Internet/social media giants, such as Google,⁷ Facebook,⁸ and Twitter,⁹ have introduced crisis communications features for use by the public. While these are steps in the right direction, there remains a lack of empirical research to help validate and inform the development of these technologies that have the potential for significant impact on human safety and well-being.

ENDNOTES

1. More information on the Web Accessibility Initiative is available at <http://www.w3.org/WAI>
2. The Web site <http://www.section508.gov> provides further information about the US Section 508 legislation.
3. Information on the EU's forthcoming Mandate 376 can be found at <http://www.mandate376.eu>
4. Consult <http://sahanafoundation.org/> for information on the Sahana Foundation.
5. More information on the Ushahidi platform is available at <http://www.ushahidi.com/>
6. The Web site <http://www.brck.com/> provides more information on this technology.
7. Google's crisis communication Web site is available at <https://www.google.org/crisisresponse/>
8. An introduction to Facebook's crisis communication service is available at <http://newsroom.fb.com/news/2014/10/introducing-safety-check/>

9. Consult <https://blog.twitter.com/2013/introducing-twitter-alerts> for more information on Twitter's alert service.

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Authors' Note

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All correspondence should be addressed to
Marita Vos
Department of Communication
P.O. Box 35
40014 University of Jyväskylä, Finland
marita.vos@jyu.fi

or

Helen T. Sullivan
Department of Psychology
Rider University
2883 Lawrenceville Road
Lawrenceville, NJ, 08648-3099 USA
hsullivanphd@gmail.com

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