Introduction

by Chris Hagar, Guest Editor

Crisis Informatics

The world seems to be facing crises on an unprecedented scale. A crisis – "an interruption in the reproduction of economic, cultural, social and/or political life" – encompasses a whole range of situations [1. 123-125]. This year we have witnessed major natural disasters in Haiti, Chile and China that have claimed thousands of lives. As well as coping with such natural disasters, the world has faced other types of crises, for example, human-made crises such as terrorism attacks (9/11, Mumbai bombings), the spread of human and animal viral disease (H1N1, foot-and-mouth disease), nuclear and chemical crises (Bhupal, Chernobyl, Three Mile Island), war and many more. With advances in information and communication technologies, every crisis is more likely to be seen widely throughout the world [2, p. 9].

Crisis situations have been studied from a risk communication perspective, from a management perspective, from a systems perspective and more recently from an information perspective. Crises usually present complex information environments. The management of information before, during and after a disaster is critical. It can have a direct influence on how well the crisis is managed [3].

Events such as Hurricane Katrina, 9/11 and the Haiti earthquake have demonstrated that there is a great need to understand how individuals and government and non-government agencies collect, organize, manage, access, share, coordinate and disseminate information within communities during crisis situations. Information management problems and information technology failures have been cited as significant factors in the failed responses to many crises. In 2002 the U.S. National Commission on Libraries and Information Science *Trust and Terror* report [4] highlighted new demands for crisis information dissemination and management. Post-crisis reports have devoted sections to information and communication lessons learned (Katrina; foot and mouth disease) [5, 6]

Information challenges in a crisis include:

- Information overload or, conversely, lack of information
- Changing information needs at various stages of a crisis: preparedness, warning, impact, response, recovery and reconstruction
- The many diverse actors and agencies involved who increase the amount of information produced
- Integration and coordination of information by these actors and agencies
- The connection of informal and formal channels of information creation and dissemination
- Information uncertainty
- Trustworthy sources of information
- Conflicting information
- Getting the right information to the right person at the right time

Crisis informatics is an emerging, interdisciplinary area of study. The term was first coined by Hagar, 2006 [7] and is broadly defined as the interconnectedness of people, organizations, information and technology during crises. Informatics often relates to the development of new uses for information technology and focuses on how people transform technology and how technology transforms people [8]. This definition of crisis informatics also includes the important human ways of communicating and disseminating information that play a key role when technology infrastructure breaks down during a crisis. Crisis informatics strives for

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socially and behaviorally informed development of ICT for crisis situations [9]. To pursue work in this area, researchers at the Natural Hazards Center at the University of Colorado at Boulder have formed a crisis informatics research group.

This growing interdisciplinary field is not only of interest to a variety of practitioners, researchers and academics in information science, knowledge management and information systems, but also to other fields, such as government, state and local emergency management and planning; non-government organizations; risk management; communications; community planners; and public health.

The papers in this special issue give a snapshot of some of the ongoing research and practice in crisis informatics and emergency response work in various parts of the world: Indonesia, the Netherlands, Sweden and the United States. Contributors are from departments of communications, information management, applied IT, computer science and a U.S. state office of security and emergency preparedness.

The first paper, written by Leysia Palen, Kate Starbird, Sarah Vieweg and Amanda Hughes, "Twitter-based Information Distribution during the 2009 Red River Valley Flood Threat," discusses social media usage during a crisis and assesses the credibility of citizen journalism and user-generated media. It reports on Twitter communications that took place during the flooding of the Red River Valley in the United States and Canada in March and April 2009. An analysis of tens of thousands of tweets sent during the flood threat period identifies mechanisms for information production, distribution and organization in use in the otherwise unwieldy information space of microblogging.

From a traditional technology perspective in "The Use of Community Radio in Managing Natural Disasters in Indonesia," Mario Antonius Birowo discusses the various roles of community radio in disseminating and coordinating information in natural disaster management in Indonesia. Radio stations have played key roles in crisis information management in sharing information between NGOs, distributing information about health and safety, and connecting missing people. The Indonesian community radios' responses to the natural disasters are unique in that their volunteer reporters, unlike journalists from the mainstream media, are directly involved in the community.

Libraries and information centers can play important roles in crises by directing the many stakeholders in crises, such as citizens, experts and policy-makers, to trustworthy sources of information. In this new role, libraries have responded to hurricanes and other disasters by taking steps to better prepare for the information needs of their communities arising from emergency situations. Lauren H. Mandel, Charles R. McClure, John Brobst and Elena C. Lanz report in "Helping Libraries Prepare for the Storm with Web Portal Technology" on the web portal developed as part of the *Improving Florida Public Libraries Hurricane/Disaster Preparedness and Response* project carried out by the Information Institute, Florida State University. The portal organizes and disseminates a range of information on how public libraries can assist local communities in preparing for and recovering from hurricanes and other disasters.

Two of the papers in this special issue address emergency response work. Jonas Landgren and Fredrik Bergstrand in "Mobile Live Video in Emergency Response: Its Use and Consequences" discuss the emergence of consumer-oriented mobile live video technology and how this technology will change how response workers will stay informed. Results from field tests in Sweden of using such consumer-oriented technologies in professional response settings suggest that the relationship between the general public and professional responders will evolve and over time a closer collaboration across these distinct groups will form. They argue that a combination of grassroots-generated information (as created and retrieved by different forms of social media) with official information is the way forward in emergency management.

In a second paper on emergency response, "Sense-making and Information Management in Emergency Response," Willem Muhren and Bartel Van de Walle investigate the way people (humanitarian actors working in the Democratic Republic of Congo) manage and process information and how it helps them make sense of what is going on. The authors explore how actors can be supported in coping with ambiguity and equivocality in information processing problems.

Finally, Gaston Armour in "Communities Communicating with Formal and Informal Systems: Being More Resilient in Times of Need" discusses using traditional and non-traditional methods in communicating information in times of crises. Armour describes emergency preparedness and response initiatives in the state of Illinois and emphasizes the importance of communicating across informal and formal systems and how local communities can potentially act as command centers for disaster response and coordinate efforts between the formal and informal systems.

A trend identified in many of the papers is the redefinition of the top-down control and command approach to crisis information management towards community-based grass-roots strategies whereby access to information and knowledge is created and disseminated by citizens using a mix of methods: social media tools (for example, photo and video sharing, text messaging); traditional technologies (e.g., radio), and person-to-person interaction at a local community level. Citizen information seekers become information providers. It is critical that information from informal and formal channels is coordinated, integrated and aligned into the official crisis response.

These papers cover a snapshot of some of the information perspectives concerning crises. It is important that we do the following:

- Understand the importance of information in the various stages of crisis, preparation response and recovery
- Develop the capability to analyze complex information needs and information-seeking in a crisis
- Gain an understanding of the factors that impact the integration and coordination of information in a crisis and investigate how technologies and human-centered approaches can support communities in a crisis.

One thing is certain: The world will face more crises, and we need to be prepared for a variety of scenarios.

My sincere thanks to each contributing author for sharing your time and expertise with the wider community – a lot of valuable work that can make a difference in times of crisis and emergency needs to be done. ■

Resources Mentioned in the Article

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