

# Crisis Informatics

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## INTRODUCTION

The world is facing crises on an unprecedented scale. Natural disasters over the last decade including major earthquakes in Haiti, New Zealand, Chile, China and one of the worst natural disasters to hit Japan, a 9.0 magnitude earthquake, resultant tsunami, and the explosions occurring at the Fukushima Daiichi nuclear complex, Hurricane Sandy, have claimed thousands of lives. As well as coping with such natural disasters, the world has faced other types of crises: political disruption in North Africa and the Middle East, human-made crises such as terrorist attacks (9/11, Mumbai bombings), the spread of human and animal viral disease (H1N1, foot-and-mouth disease), nuclear and chemical crises (Bhopal, Chernobyl, Three Mile Island), war and many more. Gathering, organizing, and disseminating information to those who need it is critical in the management of a crisis. Information is needed in crisis preparedness, response, and recovery, and by many diverse actors, networks and agencies involved in a crisis: by officials, victims, members of the public, and the media. Government and non-governmental officials need information to be able to respond to a crisis; victims need information to know where to go to for support; the public need information about what is happening, and the media need information to broadcast news about the crisis. This article highlights the key challenges in the management of information in crisis situations, referred to as crisis informatics.

## BACKGROUND

Crisis informatics is an emerging, interdisciplinary area of study. The term was first coined in a paper by Hagar (2006) entitled “*Using research to aid the design of a crisis information management course*” presented at the Association of Library & Information Science Educators (ALISE) conference Special Interest

Group Multicultural, Ethnic & Humanistic Concerns, San Antonio. It is broadly defined as the interconnectedness of people, organizations, information and technology during crises. Crisis informatics examines the intersecting trajectories of social, technical and information perspectives during the full life cycle of a crisis: preparation, response, and recovery.

The field of crisis/disaster research was largely owned by sociologists. Disaster researchers investigated a wide range of social phenomenon during pre- and post-phases of natural, human-induced, and technological hazard events (Perry, 2006). The Disaster Research Project at the University of Chicago in the 1950s was the first organization to systematically study human behavior in disasters (Solnit, 2009). Since then, crises/disasters have been studied from a risk management perspective, from a management perspective, systems perspective, and only more recently from an information science perspective.

Crisis informatics is a growing field of inquiry and requires integrative and collaborative efforts from many disciplines in order to achieve effective and efficient crisis/disaster preparedness and response. It strives for socially and behaviorally informed development of ICT for crisis situations (Palen, 2012). It 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; nongovernment organizations; risk management; computer science; communications; community planners, public health, psychology, sociology.

## MAIN FOCUS OF THE ARTICLE

Information management and technology problems have been cited as significant factors in the failed responses to many crises. Post crises reports have

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devoted sections to information and communication lessons learned (Anderson, 2009; FEMA, 2012a). Crises usually precipitate an increase in communication and present complex information environments. 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, access, share, coordinate and disseminate information within communities during crisis situations. Many of the challenges faced by crisis response organizations are often the results of organizational changes involving a move to more sophisticated technological platforms intended to improve existing work practices. The key information challenges addressed in this article include: information overload, information vacuum, Integration and coordination of information, use of social media, trusted information sources, role of digital volunteers, and issues concerning digital and cultural heritage.

### Information Overload

The many diverse actors and agencies involved in a crisis: citizens, victims, government and non-government agencies, increase the amount of information produced in a crisis. Individuals must deal with information overload, from official and multiple unofficial sources. Increasingly, rapidly emerging technologies enable the capture of information during a crisis situation. The combination of a vast amount of official sources of information, and the citizen generated content created and disseminated via social media (see below), adds to information overload in crises.

### Information Vacuum

Crises can present information overload; conversely there is often a lack of information often referred to as an information vacuum. Operating in an information vacuum may exacerbate and increase the severity of a crisis. Factors which contribute to an information vacuum include: the lack of integration and coordination of information by various actors and agencies; the need to connect informal and formal channels of information; the changing information needs at different stages of a crisis; the uncertainty in crises which often creates conflicting information, and identifying trustworthy sources of information. In political disruptions

such as the Arab Spring, government bans on media and self-censorship within mainstream media created information vacuums. With the advent of social media bloggers fill and attempt to fill information vacuums which may induce rumor and gossip.

## Integration and Coordination of Information

The integration and coordination of information created and disseminated through informal and formal channels is a key challenge in crisis informatics. The pervasiveness of social media tools and the subsequent increase in informal communication have heightened this problem. One of the challenges for centralized authorities and for the emergency management community is how to coordinate and aggregate the vast amounts of unofficial citizen generated information into their official sites, and what to include. Crisis responders need to be able to filter and process volumes of crisis data and navigate through the “noise” on social media sites (Starbird et al., 2012).

Relief agencies, such as the Red Cross, and local, state, and federal emergency management organizations are increasingly using social media as an alternative way to communicate with the public, and with each other (White, 2012). Official and unofficial sources of information are present and shared on the same social platforms. During Hurricane Sandy, for example, information was posted on Twitter by city departments, by public transit authorities, by news organizations, and by citizens conveying information about the state of their neighbourhoods, and exchanging information about the safety of family and friends. A key question is:

how do those connected by social media act to organize the vast amounts of data on these platforms into useful information resources? While there is value in aggregating information for centralized emergency authorities, authoritative organizations are not always prepared to mobilize quickly enough.

## Social Media

Social media has become an important platform to generate and disseminate information in crises. Recent global disasters, have clearly demonstrated the power of social media to communicate and share critical information that can be used to improve emergency

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