

Communicating Location and Geography in Emergency Response

Fredrik Bergstrand, Department of Applied IT, Gothenburg University, Gothenburg, Sweden

Jonas Landgren, Department of Applied IT, Chalmers University of Technology, Gothenburg, Sweden

Urban Nuldén, Department of Applied IT, Gothenburg University, Gothenburg, Sweden

ABSTRACT

Response organizations often face serious challenges as a result of communication problems during emergency events. This can to a large extent be traced to the tradition of verbal communication in this context. Issues in communication translate to matters of sensemaking, planning, and collaboration among distributed response teams. This paper reports from an interview study with emergency managers regarding the work conducted during a wildfire. Boundary objects and sensemaking were used as analytical lenses, emphasizing how outcome of sensemaking activities are used at different sites and interpreted differently in different work settings. Challenges of verbally exchanging complex information regarding location and geography, between individuals and groups, make us reconsider the role of technology and its potential to support efficient interactions, which will limit ambiguity and uncertainty, and increase accuracy, articulation, and persistence.

KEYWORDS

Emergency Response, Geography, Location, Maps, Sensemaking

INTRODUCTION

The effectiveness of emergency response “depends upon the ability of its members to communicate with each other to coordinate activities, to share information, and to implement appropriate strategies” ((Caldwell, 1997), cited in (Dunn, Lewandowsky, & Kirsner, 2002)). The ability to make sense of dynamic situations is a key factor in emergency response work, and it is reliant on communication (Dyrks, Deneff, & Ramirez, 2008; Landgren, 2005a; Weick, 1993). Suggestions has been made that current practices based on verbal communication impose barriers to efficient communication on the fireground, due to tiered communications, unsuitable equipment, and lack of proper radio discipline (Kyng, Nielsen, & Kristensen, 2006; Thiel & Stambaugh, 1999). When reviewing the literature on communication in crisis management and emergency response, it is difficult to see how this communication ever could be efficient. Communication in emergency response work is described as a challenge because many communication systems do not support the hierarchical structure of response work (Camp, Hudson, Keldorph et al., 2000), or message priority (Thiel & Stambaugh, 1999). The often dysfunctional on-site organizing and a culture that does not support employees to openly report problems are also causes of communication issues (Thiel & Stambaugh, 1999). Technical issues involve incompatible equipment (Camp et al., 2000; Thiel & Stambaugh, 1999) and radio interoperability (Kyng et al., 2006; Manoj & Baker, 2007). The situation and the work itself are also affecting communications because of stress (Thiel & Stambaugh, 1999), constraining environments, protective clothing and hazardous situations (Deneff, Ramirez, & Dyrks, 2009),

DOI: 10.4018/IJISCRAM.2016010103

Copyright © 2016, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

ever-changing environments (Denef, Ramirez, Dyrks, & Stevens, 2008), situation rarely being fully understood, and information regarding the situation being ambiguous (Landgren, 2005a, 2006). Threat, uncertainty, time-pressure, and limited resources (McLennan, Holgate, Omodei et al., 2006), breakdowns (Weick, 1990), quick and dynamic changes also makes situational overviews extremely difficult to obtain and maintain (Kyng et al., 2006). McLennan et al. (2006) specifically points to information overload as a major problem while a fire is developing, as well that 'need to know' information is often absent, not trustworthy, inaccurate or out of date. These problems often relate to intra-organizational communication, but easily escalate in issues for inter-organizational collaborations (Kyng et al., 2006; Manoj & Baker, 2007; Thiel & Stambaugh, 1999). Emergency communication is still a limited field in information systems and human computer interaction research. Current and ongoing digitization (Brynjolfsson & McAfee, 2014) of established work practices constantly shifts the boundaries where technology is used in emergency response work. Information technology has for instance been adopted in specific practices to improve time-critical communication, such as in smoke diving (Denef, Keyson, & Oppermann, 2011) and for on-site reporting (Bergstrand & Landgren, 2011) to increase efficiency, accuracy and safety.

This paper analyzes the response work conducted during a wildfire in western Sweden. The wildfire was both routine and out of the ordinary. It was routine since similar events takes place several times each year, and at the same time it was out of the ordinary because the incident was the first major wildfire of that season. Circumstances during the initial stages of the event were unclear, specifically in terms of the lack of an accurate geographic location, and if there was an actual fire. Later, a wildfire taking place approximately 800 meters into the forest was confirmed. Information about the precise location of the fire was lacking, thus caused two crucial communication challenges. This demanded unforeseen additional work when managing the event. Practices based on verbal communication seem to challenge, firstly, the ability to communicate the actual location of the fire, and secondly, the ability to communicate contextual information, i.e., the geography of the specific location. Previous research on forest firefighting has found this setting to add an additional level of complexity, causing key information to often be absent, of doubtful trustworthiness, inaccurate, partial, or out of date (McLennan et al., 2006). Consequently, the research question for this paper is how can the abilities to communicate and convey location and geography be supported through the design of appropriate digital information and communication systems?

COMMUNICATION IN EMERGENCY RESPONSE WORK

Overall, IS research on emergency response and crisis management views information and communication technology as an organizing resource (Calloway & Keen, 1996), and as key component to address design in emergency management information systems (Turoff, Chumer, de Walle, & Yao, 2004). Communication practices in emergency response have received some attention within the IS research community regarding the design of IT as a vital means to support fire crew communication and sensemaking (Landgren, 2005a, 2006), patterns of mobile phone use in crisis situations (Landgren & Nuldén, 2007), the use of live video to improve communication from incident sites (Bergstrand & Landgren, 2011), and indoor navigation of firefighters and the future role of ubiquitous computing (Denef et al., 2011; Denef et al., 2009; Denef et al., 2008). Camp et al. (2000) argues that mediated communication on the fireground require design improvements of the structure and content, due to challenges such as peer-level communication and distress calls. The physical environment for emergency response work is also viewed as a stage for ubiquitous computing to improve accountability and awareness for fire crews (Denef et al., 2011; Jiang et al., 2004). By adding sensors to both firefighters and the physical environment, both peers and the developing situation can be better monitored. Kyng et al. (2006) has however found a number of challenges when working with a broad range of emergency response disciplines. Situational overviews are often remarkably incomplete since overview information only seem to exist in the head of individuals, and the different

16 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the product's webpage:

www.igi-global.com/article/communicating-location-and-geography-in-emergency-response/175673?camid=4v1

This title is available in InfoSci-Journals, InfoSci-Journal Disciplines Business, Administration, and Management, InfoSci-Civic Engagement, Sustainable Planning, and Crisis Response eJournal Collection, InfoSci-Management Science and Organizational Research eJournal Collection, InfoSci-Surveillance, Security, and Defense eJournal Collection, InfoSci-Journal Disciplines Communications and Social Science. Recommend this product to your librarian:

www.igi-global.com/e-resources/library-recommendation/?id=2

Related Content

An Efficient GIS Concept for Disaster Management in Developing Countries Based on Virtual Globes

Gunter Zeug, Dominik Brunner and Marco Scavazzon (2009). *International Journal of Information Systems for Crisis Response and Management* (pp. 15-32).

www.igi-global.com/article/efficient-gis-concept-disaster-management/37524?camid=4v1a

Domain Adaptation for Crisis Data Using Correlation Alignment and Self-Training

Hongmin Li, Oleksandra Sopova, Doina Caragea and Cornelia Caragea (2018). *International Journal of Information Systems for Crisis Response and Management* (pp. 1-20).

www.igi-global.com/article/domain-adaptation-for-crisis-data-using-correlation-alignment-and-self-training/235417?camid=4v1a

Crafting Requirements for Mobile and Pervasive Emergency Response based on Privacy and Security by Design Principles

Stefan G. Weber and Prima Gustiené (2013). *International Journal of Information Systems for Crisis Response and Management* (pp. 1-18).

www.igi-global.com/article/crafting-requirements-for-mobile-and-pervasive-emergency-response-based-on-privacy-and-security-by-design-principles/81271?camid=4v1a

Coalitions: The Future of Healthcare in Public Private Partnerships

Erinn N. Harris (2015). *Emergency Management and Disaster Response Utilizing Public-Private Partnerships* (pp. 240-255).

www.igi-global.com/chapter/coalitions/124661?camid=4v1a