

Service-Based Crisis Management: Local and Global Community Roles and Communication Options

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Abstract- Health-related crises impact each community differently depending on the geographical dimensions of the crisis. Both local efforts and the efforts of global communities sharing the same relief goals are needed to prepare for and respond to emergencies. In this paper, local and global communities providing relief services for prevention and response are described. A specific attention is paid to service-based organizations in a local community that are essential for crisis management. These organizations respond locally to the individual needs of citizens faced with large scale disasters. To achieve an effective response, these organizations must play multiple roles. A high degree of collaboration among the responders of these organizations who serve on the front-line of a crisis is needed. This paper reviews the varying roles of these responders and how information and communication technology (ICT) device usage relevant to their respective roles can help. Increased ICT training and device usage is proposed for timely coordination when responding to a crisis. Focusing on examples from two organizational settings in communities - small grassroots organizations and philanthropic organizations - we discuss communication issues and options for the practitioners associated with these organizations. The contribution of this research is to identify methods and tools to increase device usage and collaboration effectiveness among service-based responders in local communities.

Index Terms— Public health, service-based organizations, crisis management, grassroots organizations, philanthropies, mobile technology, media richness, information and communication technologies (ICT), SMS text-messaging.

1. INTRODUCTION

Planning and preparedness can reduce the impact of adverse events. To minimize the loss of life, it is increasingly important to leverage both local and global resources to prepare for a crisis. The individual “roles” associated with crisis mitigation vary based on the nature of the emergency and the availability of responders, thus adding another level of complexity to the crisis response effort. A “role” is defined as “the actions and activities assigned to or required or expected of a person or group [9]”. Turoff [31] notes that “In a crisis it is never certain who will take on which role or which combination of roles. It is expected that people will be trained to be qualified in a number of different roles”. Role-based applications show promise in assisting responders to leverage information and communication technologies during a crisis. When

carefully deployed, information and communication technology (ICT) can fit multiple roles and support actions and activities between responders. Zhu discusses opportunities for role-based agents being applicable for many fields [40] and the privileges assigned for each role [39].

Zhu and Zhou [39] also define the importance of roles in a system’s treatment of output and user input in electronic information exchange. Additionally mentioned are the use of SMS text-messaging that, for example, does not use an application system for information exchange, but rather a telecommunication architecture causing the information exchange dependency to fall directly on the user. Standard operating procedures/protocols are one method to achieve the needs of information exchange during collaboration for an assigned role. Dynamic roles could also be managed in a similar manner. For example, Zhu and Zhou [39] propose a five step procedure. In the example of text-messaging use for local community responders in service-based roles, emphasis should be placed on “Check incoming messages”, and “Issue outgoing messages” as part of the training and practice protocol and the basis to improve productivity, performance [39] and to increase usage of the communication devices that are described in this manuscript. Protocols offer the potential to parallel information exchange functions of application systems for consistency while maintaining the mobile device flexibility needed in the field when responding to a crisis.

Organizations also play specific roles in crisis prevention. For example, service-based organizations - local and global organizations of volunteers, non-governmental organizations (NGOs), hospital and clinics, private and public coalitions, and philanthropies - focus on providing services to the people. Philanthropic organizations are one invaluable resource that aids crisis response. For example, Pfizer Inc offers training programs and partners with local organizations to act as a resource in aiding health needs of local communities through a dedicated foundation and philanthropy unit [25]. Philanthropic organizations often deploy supplies and services to communities during a crisis, but key to their success is the partnership and hand-off that occurs between them and the field organizations servicing the people in crisis. ICT can complement the hand-off process.

The focus of this research is to highlight the multiple roles associated with service-based organizations that focus on human well-being, and instances where ICT can improve communication. In this paper, we concentrate on two specific subsets of organizations within global and local communities: 1) small grassroots organizations; and 2)

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Gerencser, Napolitano and Van Lee illustrated the concept of global organizations for public health and emergency preparedness by introducing the term “megacommunity.” A megacommunity is “a larger ongoing sphere of interest, where governments, corporations, NGOs, and others intersect over time. The participants remain interdependent because their common interest compels them to work together, even so they might not see or describe their mutual problem or situation in the same way [10]”. Examples of such megacommunities are found in the coalitions for the prevention of several emergencies. These include communities focused on fighting the spread of HIV/AIDS in India (initiated by the

Global Business Coalition on HIV/AIDS, Booz Allen Hamilton and the Confederation of Indian Industry); the small business vitality program in Harlem (William J. Clinton Foundation); the rain forest conservation project (World Wide Fund and Goldman Sachs); and the energy availability and environmental quality program (Enel SpA) [10]. Table 1 illustrates some of the activities, clusters and players around selected disaster prevention, wealth and well-being initiatives.

As discussed later in the paper, both levels of community (global and local) intervention and coordination are needed to solve some of the complex emergencies the world faces today.

Table 1. Examples of Megacommunities

Driving Issues <i>(Health, Crisis Prevention, Well-being)</i>	Megacommunity	Initiators	Communication and intervention methods
Prevention of the spread of HIV/AIDS in India <i>(health and crisis prevention focus)</i>	Public-, private-, and civil-sector organizations involved in the prevention and treatment of HIV/AIDS, both in India and worldwide	Global Business Coalition on HIV/AIDS (GBC), Booz Allen Hamilton, Confederation of Indian Industry	Cross-sector dialogue, war-gaming and simulation exercises
Rain Forest Conservation <i>(flooding and environmental crises prevention focus)</i>	Providers, distributors, resellers, and consumers of lumber; local communities and NGOs concerned about environmental decay	World Wildlife Fund, Goldman Sachs	Cross-sector dialogue, market methods (certification of approved lumber sources), skilled use of publicity
Small Business Vitality in Harlem <i>(well-being and development focus)</i>	Harlem’s small business, community members, local companies, and interested observers	William J. Clinton Foundation, Booz Allen Hamilton, and community leaders	Cross-sector dialogue, community conversations and volunteer consulting
Energy availability and environmental quality in Italy <i>(environmental focus, crisis prevention)</i>	Local companies, residents, fishing industry, government bodies, NGOs, universities in the Veneto region and Po River Valley	Enel SpA (National Energy Provider)	Cross-sector dialogue, diagnostic matrix

Source: Adapted from Gerencser M., Napolitano F., Van Lee R. [10].

3. CRISIS MANAGEMENT IN LOCAL AND GLOBAL SERVICE-BASED NETWORKS

Crisis management is here defined as a way to prepare and control an emergency. A problem-to-solve becomes a crisis when a time factor impacts the lives of citizens and influences the responders who are called upon. Emergency events, such as hurricane Katrina, place emphasis on the importance of preparation, timing, communication, and coordination. Hurricane Katrina also placed emphasis on the importance of the local public health community. Hooke and Rogers [18] discuss health risks associated with disasters and remind us how important the role of public health is within a community. Timely and accurate health risk information must be communicated to the public to ensure human well-being.

Crisis management implies that communication patterns must be clearly mapped, enabled and coordinated across the multiple boundaries, such as the local and global boundaries listed in Figure 1. Turoff et al. [31] refer to organizational emergencies where implications can have a macro-social effect causing harm to people outside of the organizational jurisdiction or boundary, initiating a concern from local, state and federal agencies.

Figure 1 displays selected ties and threads within the global and local public health networks and one possible level of coordination and interaction that will take place in the event of a crisis or disaster. This level of interaction requires training and coordination of a large number of players. The uncertainty of the crisis and of the response plan (i.e. who is available to respond and the skills of the responder) requires that multiple organizations servicing the community initiate collaboration and coordination in

a stationary location either at the organizations location (primary occupation) or from home (secondary occupation). Daily activities allow access to MIS systems. Once the responder moves towards the field to offer daily assistance to the communities, the need for mobility increases. Daily assistance in the field often calls upon a need to collaborate with other local resources. Moreover, the number of responders increases while timeliness to respond also increases causing a dependency on devices of low-richness (such as pagers and basic cell phones).

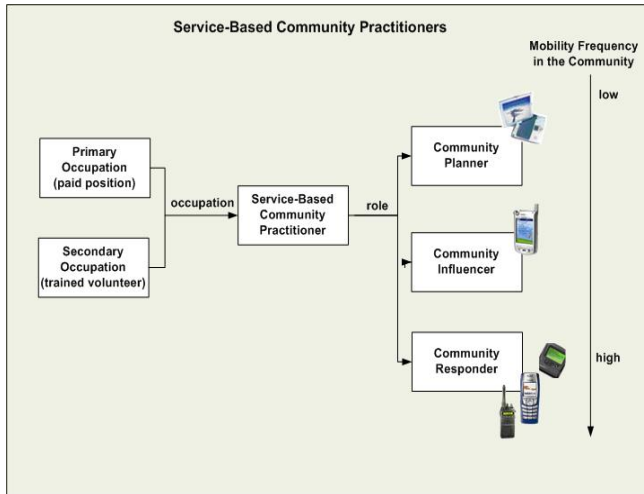


Fig 2. Service-Based Practitioners and Organizations Classifications (adapted from [11]).

4.1 Grassroots Organizations in Emergency Management

Grassroots organizations are comprised of local people working together to find solutions in their communities [12] [19]. These practitioners are trained for their organizational position, but often lack information communication technology training due to limited financial resources as mentioned by the Institute of Medicine [20]. Additionally, these organizations often have a smaller infrastructure limiting organizational roles and reporting hierarchy. As a result, they may rely on larger external organizational structures for guidance (i.e. Center for Disease Control - CDC, state and federal public health offices). These local organizations who step forward in a crisis are invaluable in reaching the citizens and attending to their needs. These responders, who form part of a community crisis response team, do not always report to an office regularly or work with the other practitioners in their organization. However, they are accustomed to changing roles, responsibilities and filling-in for others as-needed, yielding the “on-call” status a crisis warrants.

Self-help groups which are volunteer-based, bring similar qualities to their respective organizations. Self-help groups generate a casual information exchange or assist with resources and provide a source of mutual aid. They are driven by people’s need to find others who have experienced similar problems. These volunteers are motivated by passion and the cause towards the need and the organization. Their informal structure and flexible

nature encourage changing roles and peer-to-peer relationships along a horizontal continuum [12] [38].

4.2 Philanthropic Organizations in Emergency Management

Philanthropies - groups and organizations that collect and allocate financial and human resources to humanitarian causes – also play a fundamental role in emergency management. This role is different to the service-roles that entail frequent “hands-on” assistance with the citizens in need. The volunteers in a philanthropic organization reach out and partner with the organizations closest to the people. They bridge the gap to resources and supplies. For example, philanthropic agencies have volunteers and employed staff working on the needs initiated by a crisis. They prepare for their role by identifying ways to assist by thorough planning. One of such planning activities is the rotation of their employees as field workers. This sense of “knowing” the landscape and observing first hand the needs in a crisis is invaluable to the evolution and advancement towards subsequent relief efforts.

Several foundations, public and private donors, and large corporations are increasingly involved in supporting social causes in transnational environments. Corporations are progressively focusing on promoting social growth through donations [5]. In addition to monetary resources, private involvement also brings intellectual capital (in terms of knowledge and core competencies), in-kind donations (medicines), and can leverage specific business competencies such as logistics, distribution, and technology use. Private involvement in philanthropic initiatives is being driven by a raising awareness that the world is facing complexities that cannot be resolved by independent means.

Examples of such business-led philanthropic efforts are found across industries. For example, Pfizer Inc was granted the 2003 Excellence in Corporate Philanthropy Award by the Committee to Encourage Philanthropy (CECP). Pfizer Inc leads philanthropic initiatives through a specific unit (Pfizer Philanthropy) tasked with managing multiple international and local programs. Such programs include partnerships for the fight against HIV/AIDS worldwide; the International Trachoma Initiative; the Global Health Fellows program that donates Pfizer employees’ time and knowledge for the promotion of training and learning in developing economies; and another large number of community programs for improving health, education, and access to medicines [24].

Pfizer has supported large infrastructure projects such as the building of a hospital in Uganda (the Infectious Disease Institute –IDI- in Kampala). In the IDI project, Pfizers’ employees leveraged their specialists knowledge and business management experiences to take leading roles in the project management (playing **project managers** and **content experts**, as well as **medical educators** roles), and provided resources to help with the strategic, tactical and operational aspects of the center construction. In addition, they provided consultation and other support, including

an important factor in determining whether the use of technology would result in performance improvements [23] [13] [28] [36] [37]. Having the right technology for a task is essential. The communication medium must be suitable for that objective. Mobile communication tools and smart-devices are well positioned to support the communication processes and needs of emergency situations because they support flexibility and fast outreach (provided that back up options are available and part of a continuity strategy). For example, text-messaging is a low-network load option that enables quick outreach without overloading the communication backbone.

5.3 Richness, Reach and Roles Supported

Mobile devices can play a pivotal role in emergency situations as they can serve multiple purposes: to be reachable anywhere and at anytime, to obtain information while in an outreach situation; and, to be 'visible' and traceable through a device enabled with global positioning systems (GPS) capabilities. A mobile device maximizes flexibility, increases timeliness to reach community partners, and increases readiness for a crisis related health alert. Recognizing the limitations of obtaining extensive information across a mobile device, protocols and standards for communicating with an individual who has access to limited display size with a limited connection speed can be created to ease interactions during emergencies. Although data transfer capabilities are increasing through wireless-wide area cellular network third generation channels, the need to shrink data and content of 'what' is communicated is vital for mobile devices in emergency scenarios. In addition to connectivity options on the mobile device, it is important to identify codes and alter messages that may quickly trigger

responses, for example through a specific set of pre-loaded icons or tools (such as the already famous 'emojicons' used in chat rooms).

Overall, the importance of low-richness, low-cost technology and communication practices should not be compromised to the numerous preferred options noted in Table 2, but rather complement the potential of these tools and capabilities. As witnessed in the Indonesian earthquake of 2004, SMS text-messages were exchanged when cell-phone circuits were overloaded with phone calls. Basic messages, such as "I am not injured but lost some climbing gear, my camera and [my Thai] mobile phone. Please tell family am safe." [8] provide essential information exchange when preferred modes of communication are unavailable.

There are a number of mobile devices, connectivity options, and communication needs that may be suitable to manage response in an emergency situation. Each communication medium enables different levels of message richness (through multiple media such as voice, text, graphic and videos) that may in turn offer higher or lower rich capabilities (as presented in Table 2). Some of these communication tools may not be easily managed in an emergency context due to electrical and connectivity requirements (the same being true for most communication tools). Therefore, while we can plan for their deployment, we always need to consider back up options, such as the possibility to roam on satellite links should the cellular towers become unavailable. For example, Iridium low-orbit satellites (LEO) that offer world-wide coverage when no other landline or wireless service is available, can provide a back up solution for computer, cellular and pager communications through a variety of satellite-compatible devices [35].

Table 2. Mobile Media Communication Options (adapted from [11])

Mobile Tool	Connection Details	Communication Options	Richness /Reach	Roles Supported
Pager (text and voice pagers)	<i>Throughput: 512/1200/2400 bps Coverage: varies by area</i>	Text – one-way Voice pagers (already used in EMS, police, fire departments, hospitals)	Low → Medium <i>High - Push-to-all software</i>	Community Responder
Walkie-Talkie (and walkie-watch)	<i>Throughput: up to 1Mbps Coverage: up to 1,000 feet</i>	Voice – one way (half duplex)	Medium (cannot display images)	Community Responder
Cell Phone (basic)	GSM (2G). Global System for Mobile telecommunications <i>Throughput: Voice 13Kbps (full voice) and up to 115 Kbps for data rate Coverage: 1-5 miles</i>	Text-messaging (SMS)– Voice – Localization (one-way)	High <i>Pull and push options – high reach through SMS</i>	Community Responder, Community Influencer
Smart Phones (multimedia)	GPRS (2.5G) and 3G (Ev-DO and W-CDMA cellular broadband) <i>Throughput: 384Kbps- 2.4 Mbps Coverage: 1-5 miles</i>	Text-messaging (SMS)– Voice – Localization (two-way?); email and instant messaging; Internet browsing	High <i>Pull and push options – high reach through SMS; MMS</i>	Community Responder, Influencer, Planner
PDA Phones (also connected through Wi-Fi cards)	See Smart-Phones and Tablet PCs	Text-messaging – Voice – Localization (two-way?), Map Tools; email and instant messaging; Internet browsing; picture taking; video recording	High <i>Pull and push options – high reach through SMS; MMS</i>	Community Responder, Community Influencer

