

Emergency Management, Twitter, and Social Media Evangelism

Mark Latonero, University of Southern California, USA

Irina Shklovski, IT University of Copenhagen, Denmark

ABSTRACT

This paper considers how emergency response organizations utilize available social media technologies to communicate with the public in emergencies and to potentially collect valuable information using the public as sources of information on the ground. The authors discuss the use of public social media tools from the emergency management professional's viewpoint with a particular focus on the use of Twitter. Limited research has investigated Twitter usage in crisis situations from an organizational perspective. This paper contributes to the understanding of organizational innovation, risk communication, and technology adoption by emergency management. An in-depth longitudinal case study of Public Information Officers (PIO) of the Los Angeles Fire Department highlights the importance of the information evangelist within emergency management organizations and details the challenges those organizations face engaging with social media and Twitter. This article provides insights into practices and challenges of new media implementation for crisis and risk management organizations.

Keywords: *Emergency Management, Evangelism, Fire Department, Organizations, Risk Communication, Social Media, Twitter*

INTRODUCTION

"And the same way I worry most about new media, people will not embrace it. People see it in a monocular focus, they think it's about distribution, it's about talking, it's about yelling. It really is about listening. People see this as one dimensional, and they don't see their need to be part of that community."

Brian Humphrey, PIO, Los Angeles Fire Department.

The use of computer-mediated communication in times of emergency is gaining momentum and is the focus of much existing research. Social media allow users to generate content and to exchange information with groups of individuals and their social networks. First gaining attention in the aftermath of large-scale disasters such as the Banda Aceh Tsunami, networked, online conversations among the affected publics and onlookers offering help have been especially in focus during extreme events (Palen, Vieweg, Liu, & Hughes, 2009; Scaffidi, Myers, & Shaw, 2007; Majchrzak, Jarvenpaa, & Holingshead, 2007; Liu, Iacucci, & Meier, 2010; White, 2011). Twitter, the popular micro-blogging site, has gained particular attention

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due to its increasingly widespread adoption. A recent study by the Pew Internet & American Life Project found that 19% of all Internet users share updates about themselves on Twitter or another similar service (Fox, Zickuhr, & Smith, 2009). While there is much media hype and excitement over the use of Twitter during times of emergency, researchers are just beginning to examine the value and logic behind its usage (Starbird, Palen, Hughes, & Vieweg, 2010).

There are two primary streams of research investigating the use of social media in emergency response. One stream is concerned with how emergency management organizations use such technologies to coordinate in response to disaster as they conduct rescue activities (White, Plotnick, Kushman, Hiltz, & Turoff, 2009; Bharosa, Appelman, & de Bruin, 2007; van de Ven, van Rijk, Essens, & Frinking, 2008). The other stream is concerned with how those affected by disaster and those who volunteer to help utilize social media to locate information and to seek or provide support (Liu, Iacucci, & Meier, 2010; Hughes & Palen, 2009; Starbird & Palen, 2011; Sutton, Palen, & Shklovski, 2008). Few studies have considered how emergency response organizations utilize currently available technologies both to communicate with the public in emergencies and to potentially collect valuable information using the public as sources on the ground. In this paper we describe the use of social media from the emergency management professional's viewpoint with a particular focus on the use of Twitter.

As emergency management professionals add social media to the range of tools they use to communicate with the public in times of crisis, a critical investigation of how and why these tools are adopted is crucial: Adoption and implementation of technology requires allocation of precious time and resources. We argue that the public's usage of Twitter differs from its usage by emergency management professionals in significant ways. We discuss these differences and focus on how and why officials in emergency response organizations responsible for communication with the public implement social media at the organizational

level. We rely on conversations with emergency management professionals in New York City and Los Angeles and elaborate on an in-depth case study of the PIOs at the Los Angeles Fire Department and their use of Twitter and other social media.

BACKGROUND

Micro-blogging is a form of lightweight, mediated communication where users can broadcast short messages to their networks and direct these messages to specific people within networks. Users of Twitter send short (up to 140 characters) messages or "tweet" to their networks of "followers"—people who chose to be updated when the person they "follow" adds a new message to the stream. Twitter users send "tweets" to their followers, and users can also "retweet" or pass along messages originating from others. Twitter includes search functions so users can search the site for prevalence of keywords, phrases, topics, trends, or individuals. Other features of Twitter include options to add website links and geo-location information to tweets.

When Twitter first launched, the tweets were often personal and seemingly inconsequential updates on the goings-on of the everyday life which gained Twitter a reputation in the media for being an inane, narcissistic, whimsical medium with little value outside of mere entertainment (Cohen, 2009). Such opinions overlooked that early adopters in the Twitter community were building worldwide social networks accustomed to sending and receiving short messages in real time. Twitter gave individuals the unprecedented ability to rapidly broadcast and exchange small amounts of information with large audiences regardless of distance. Although Twitter is Internet based, functioning over the World Wide Web, its primary focus is on integration with mobile/cellular devices, which creates the potential of an alternative communications system apart from traditional telephony, radio and television. In retrospect such affordances of Twitter seem obviously useful during times of emergency and

crisis as information changes unexpectedly and needs to be disseminated to the public rapidly.

Today Twitter has clearly captured the public imagination, particularly in light of Twitter usage to mobilize and inform political opposition in countries with regimes that have curtailed public communications infrastructure. During the Iranian student protests of 2009, the US Department of State reportedly asked Twitter management to delay a scheduled maintenance so users of Twitter in Iran could continue their mobilizing of protests via the site. According to Gilad Lotan (2011), "Twitter served as an incredibly engaging mechanism to disseminate information on the riots and protests that were taking place around the world. Its real-time qualities enables information to rapidly spread between users, while its personal style drives a sense of emotional involvement to the events." During the revolutionary protests in Egypt in spring of 2011, users reportedly employed Twitter (and Google) as an ad hoc distributed communication system, until the government shut down Internet access country wide (Idle & Nunns, 2011).

Despite an increasing number of high profile uses of Twitter, what is rarely discussed is the use of Twitter by official organizations during crisis events. Thus the question remains – to what extent can Twitter be repurposed successfully to meet the needs of crisis response organizations? We are also interested in the extent to which Twitter is used by organizations not only for broadcasting information, but also for information gathering during crisis situations.

There is a small but growing research literature focused on how the public uses Twitter in times of emergency. Palen et al. (2010) have been conducting extensive studies of Twitter use during mass convergence or emergency events such as the Southern California Wildfires (Sutton et al., 2008), the Democratic and the Republican National Conventions (Hughes & Palen, 2009), and the recent flooding of the Red River Valley (Starbird et al., 2010). These authors report a large volume of conversations and substantial information exchange on Twitter during crisis and mass convergence

events. Information exchange relied on extensive self-organizing and information vetting as well as on the emergence of personalities that became information hubs to the rapidly growing legions of their followers. Moreover, Starbird et al. (2010) clearly show that people seek out and even privilege official information, augmenting, rather than discounting statements issued by emergency services and mass media outlets (Starbird et al., 2010). This consistently observed privileging of information ostensibly gleaned from official sources on Twitter suggests that traditional broadcast media are not only retaining their importance for disseminating emergency information, but also that this information now can be given extra weight and legitimization through the word-of-mouth nature of Twitter communication. Yet Twitter-based communication comes with affordances of interactivity and audience choice in ways that traditional risk communication channels never did.

Members of the public sending and receiving messages are only one part of Twitter's communicative dynamic. Based on the literature briefly reviewed above, we propose that Twitter communication during times of emergency and crisis falls into four broad categories:

1. Twitter users posting self-generated messages about the crisis to their social networks.
2. Twitter users retweeting messages received from members of their social networks, traditional media, unofficial, and official sources.
3. Emergency management professionals using Twitter in either official or unofficial capacities to send messages to the public in affected communities or the public at large.
4. Emergency management professionals monitoring Twitter feeds from the public to gather information during times of emergency.

The first two categories represent the bulk of the existing research, which focuses on the

public's use of Twitter during emergencies. In their paper on Twitter use in the Red River Valley, Starbird et al. (2010) openly acknowledge that although it is clear that the public will use Twitter for communication and information exchange in extreme events, the question is what does this mean for emergency management? Starbird et al. (2010) state: "One of the challenges for emergency management today is to know "what to do" with social media applications. The new digital world provides both an opportunity but also a real and understandable dilemma for emergency management: How can they make sure that the information that is "out there" is accurate during an emergency event?" (p. 9). We address this question by examining the latter two categories of Twitter usage. We focus on what one fire department in a large metropolitan area *does* with social media applications for official purposes. As officials these professionals represent an organizational perspective on the utility and functions of Twitter during crisis. We ask what the logic is behind emergency management professional's adoption of Twitter as a channel to communicate with the public. In addition, we ask to what extent does emergency management utilize Twitter to monitor and use self-generated information from the public.

Organizational Innovation

The majority of research on technology use within crisis response organizations considers technologies that such organizations might use for collaboration and information exchange with other organizations involved in crisis response (Boersma, Groenewegen, & Wagenaar, 2009; van de Ven et al., 2008). Research that focuses on crisis communication with the public tends to implicitly expect full organizational support for technology adoption as part of the organizational stance toward risk communication (Gomez & Turoff, 2007; White et al., 2009). Improvisation is an important aspect of successful organizational response to emergencies and members of organizations often improvise by using available technologies (Kendra &

Watchtendorf, 2003; Mendonca, Jefferson, & Harrald, 2007). Ad hoc usage of social media and mixing of media for situational purposes can lead to innovation, adoption, and repurposing of communication technologies (Yun, Park, & Avvari, 2011). Yet major emergency response organizations such as state or city fire and police departments are encumbered when it comes to large-scale adoption of technologies as they are part of government structures and much of the decision-making is dependent on political will. For example, Boersma et al. (2009) provide a good overview of the role of political will in technology adoption in their ethnographic study of emergency management organizations in Amsterdam.

Researchers have considered organizational technology adoption issues in the emergency management area. For example, Bharosa et al. (2007) examined the role of the information manager who brought IT expertise and technological innovation into a crisis response context. Their results suggest that such information managers or brokers are necessary to serve as the human experts who mediate between the technological system, information, organization, and audience. These information integrators often double as early adopters and innovators within organizations that may not understand the technological capabilities of the systems being implemented. In a survey of non-emergency management organizations that are nonetheless involved in crisis response and mitigation of effects, Milis and van de Walle (2007) showed that the presence of crisis management personnel with IT backgrounds is imperative for organizations that use IT for crisis management.

Organizational innovation has been extensively investigated in the organizational literature. More recent ideas on organizational innovation conceptualize it as a continuous process (Brown & Esienhardt, 1997). These studies show that while adoption of large-scale organizational and management IT systems requires top-down decision making, the majority of smaller-scale technology-use innovations are led by innovators or 'evangelists' from within the or-

ganization (Lawrence, Dyck, Maitlis, & Mauws, 2006). From our initial informal conversations with emergency management professionals, it became clear that such evangelists are key to IT adoption, innovation, and use in crisis response and management. Traditionally, risk and crisis communication has been conceptualized as a one-way stream of information from emergency management organizations to the public. New media technologies, however, offer opportunities to change that dynamic toward a greater level of interactivity between emergency management professionals and the public. We investigate how the interactivity affordances of new media play out in innovative uses of these technologies in emergency management organizations.

Risk and Crisis Communication

Emergency management work with disasters, emergencies, crises and mass convergence events has always included some form of communication with the public and with mass media outlets (Sorenson & Sorenson, 2006). Risk communication is an extensive research area. In an overview, Reynolds and Seeger (2005) present several definitions of risk communication and conclude that "in practice, risk communication most often involves the production of public messages regarding health risks and environmental hazards" (p. 45). In the event of a crisis or an emergency, according to Reynolds and Seeger (2005), "crisis communication seeks to explain the specific event, identify likely consequences and outcomes, and provide specific harm-reducing information to affected communities" (p. 46). The general goal of risk and crisis communication then is to inform the public of potential or current events and to persuade the public to adapt their behavior in ways that would improve health and safety.

Traditionally in crisis communication, the news media serves as the intermediary between emergency managers and the public at large. Generally, radio, television, and print messages reach the largest audience over the greatest distance. Thus emergency management organizations need these intermediary news

organizations to disseminate information, and conversely, news organizations need emergency management for official information to report. The news organizations, in turn, capitalize on emergency information as news reports of disasters generate high appeal and maintain rapt audience attention. Media personnel often see their reporting as providing valuable service to people affected by the disaster, and crisis events tend to receive a lot of attention from news media, capturing the airwaves and newspaper space. At the same time, much of the reporting can focus on sensationalizing the news and repetitive use of striking imagery at the expense of provision of more mundane risk communication (Sood, Stockdale, & Rogers, 1987).

Despite information dissemination via news media outlets, and no matter the disaster, the people affected experience severe information dearth and take steps to alleviate it (Mileti & Darlington, 1997). Current research on public response to disasters or emergencies often ends with a call to action directed toward emergency management organizations for organizing and deploying their crisis and risk communication better, more up-to-date and more interactively (Sutton et al., 2008; Palen et al., 2009; Jennex, 2010). Many emergency organizations have indeed made efforts in this direction. For example, in the aftermath of Hurricane Katrina, the American Red Cross developed a centralized system helping people find each other (Scaffidi et al., 2007; Murphy & Jennex, 2006). More recently, the Department of Homeland Security approached Myspace with a request to develop a notification and communication widget during Hurricane Gustav (White et al., 2009). Sutton (2009) detailed the issues emergency management PIOs encountered during the DNC in Denver in their attempts to integrate the myriad of online news sources and conversations. In the study, however, PIOs did not use interactive means of data collection through social media but instead relied on more traditional methods of one-way information dissemination employed on blogs and alternative news sources.

Yet as emergency management organizations adopt technologies they have to contend

with the nuances and dynamics of new technologies that may not fit the traditional organizational conception of risk communication. We identify the nuances of one such dynamic: that of managing an official and less official, more interactive voice in communication with the public. We explore this in considering the nature of Twitter which often involves a single individual in an organization sending messages in an official and sometimes unofficial capacity. This blurring of intentions and communications between the individual and organization is a central problematic in social media where private and public spheres often collide.

Interactivity and Participation

Media and communication technologies play a large role in managing emergency and crisis situations and managing community perceptions of risk and preparedness. The major differences between traditional channels of communication and social media are the capabilities for one-way, two-way, or interactive exchange of information.

Today, the primary means for emergency management organizations to communicate with the public remains the traditional media: one-way broadcast radio, television, and newspapers. Social media provides the potential for interactive, participatory, synchronic, two-way communication. Dissatisfaction with traditional media is one of the more frequent reasons cited for why people affected by crisis situations turn to social media in search of information (Shklovski, Burke, Kiesler, & Kraut, 2010; Sutton et al., 2008). The ability to augment existing media channels and to engage in more interactive and real-time communication might explain why emergency management innovators decide to implement social media. The possibility of interactive communication between emergency management organizations and large audiences would essentially remove the “middle-man” or reduce the reliance on the news media.

Media and communication technologies play a large role in managing emergency and crisis situations and managing community per-

ceptions of risk and preparedness. The major differences between traditional channels of communication and social media are whether there exist capabilities for one-way, two-way, or interactive exchange of information. Traditional media has made concerted attempts to increase audience interactivity. For example, radio stations are now routinely asking listeners to call not only with responses to trivia questions but also with current actionable traffic information, while many news stations ask audiences to send in their cell phone videos and pictures of crisis events or other newsworthy moments. Many news organizations also seek relevant information produced by the public on various social media sites and use it in their reporting, such as, for example, BBC using photos of the London bombings that people posted on the Flickr photo-sharing service. In a similar fashion social media give Emergency Management the means not only to communicate with the public directly but also to collect real-time actionable information from a myriad of on-location eyewitnesses.

As our earlier categorization illustrates, Twitter can be used as a one-way asynchronous medium, but it can also be used to update one’s status in real-time, follow other’s tweets, respond to tweets, retweet original posts, act based on the tweets of others, and organize calls to action based on posts from the Twitter community. Thus official emergency management use of Twitter is likely to span this spectrum, from disseminating one-way messages to monitoring Twitter messages during a crisis and acting to allocate resources based on that information. The perception of Internet users as smart mobs with collective intelligence (Rheingold, 2002) may be what can drive effective use of Twitter and other social media by emergency management organizations. In this paper we explore how one fire department manages this process.

Fire Departments and the Role of the Public Information Officer (PIO)

Much of disaster and emergency research focuses on major crises and sudden emergencies

that activate various organizations involved in first-response activities. Yet certain emergency management organizations such as police and fire departments are maintained and trained to contend with a multitude of disturbances and small emergencies in everyday life along with emergency response in major events. These organizations are in a constant state of alert and the kinds of organizational improvisation lauded in times of major disasters, would likely be an ongoing process of innovation to accommodate frequent potentially dangerous situations. The work of Lawrence et al. (2006) suggests that we are likely to find individual innovators and evangelists in such organizations bringing in and advocating for communicative solutions that involve social media.

We focus on a specific kind of innovation, that of risk and crisis communication and interaction with the public. Risk and crisis communication is an important part of the function of state and city fire departments. Public information officers (PIOs) are usually charged with coordinating communication activities and performing as spokespersons (for an in-depth description of PIO duties see Sutton, 2009). Typically, PIOs provided information to the public through mass media. In fire departments, the role of the PIO is performed by firefighters as part of their tour of duty, often for two years at a time. PIO is a specialist position but they are the rank of Firefighter. If a PIO is to be promoted to Captain, they leave their job as a PIO and go on to other duties. From our informal conversations with emergency management professionals, however, it seems that some PIOs remain on the job for years, gaining both experience and the social connections necessary to successfully manage crisis and risk communication. These specialists are positioned to become technological evangelists promoting the use of new forms of media and technology. We focus this investigation, asking questions based on the review of the extant literature. First, what is the logic behind innovation, adoption, and implementation of interactive and social media? Second, if emergency management is to talk and to listen to the citizens using social

media, how do they go about verification of information they receive when taxpayer dollars are at stake both in unnecessary action and in action not taken when necessary? Third, what is the role of the organization as a whole in supporting innovative risk and crisis communication to the public through social media? Fourth, is the traditional role of information officers in emergency management changing as social media is implemented?

METHODOLOGY

From January through May of 2009, the first author conducted a series of informal visits and meetings with emergency management professionals in New York City and in Los Angeles County, exploring the use of social media in their work. In the course of these conversations it became clear that while social media certainly was a point of concern, use of these technologies was intimately tied to individuals pushing the envelope, to the organizational structures within which these individuals are positioned and to political will to change modes of crisis response. In order to get an in-depth view of the way emergency management is already using new media for communication with the public, we decided on a case study of an emergency management organization known for their extensive use of Twitter, blogs, email lists, discussion groups and a range of other communication modalities available through the Internet. In the course of our investigation one particular person emerged as the main innovator in the organization. We do not anonymize his quotes as the person in question is a public persona due to his innovative uses of social media and has explicitly given permission to use his name.

Case Study: Brian Humphrey, LAFD

We used an exploratory case study method to investigate the processes of social media innovation, adoption, and implementation at the

organizational level following the methodology recommended by Yin (1994).

We identified the key personnel at the LAFD, Brian Humphrey, who is a paramedic-trained firefighter, a 24-year veteran of the LAFD, serving as a public information officer (PIO) for 17 years. Humphrey has received a lot of attention as an innovator in social media. Wired Magazine writes that Humphrey is “single-handedly hauling the city’s fire department into the Web 2.0 era” (Tabor, 2008). The article quotes Humphrey saying “Short of motorized fire apparatuses, this technology is the best thing that’s happened to our department in 122 years... It holds more potential to save lives than any other civic tool.”

We conducted an in-depth interview with Humphrey together with one former PIO and one PIO in training in their office in a decommissioned bunker underneath the Los Angeles City Hall complex during one of the regular 24-hour tours of duty. Although other PIOs chimed in, the majority of the conversation was with Humphrey. The interview was transcribed and coded using an open coding scheme for emergent themes. We monitored LAFD associated Twitter feeds for a two year period (June 2009 – June 2011). We coded both collections of Twitter feeds by hand, using the themes that emerged from the interview, explicitly drawing parallels over time and monitoring the data for developments and changes. Below is the description of the Twitter feeds we followed.

The Twitter account @LAFD sends official short messages of emergency dispatches and updates of calls throughout the City of Los Angeles; @LAFDtalk is for discussion and queries about the LAFD managed by the three LAFD PIO officers; @BrianHumphrey is Humphrey’s personal twitter feed; @LAFDFIRECHIEF is Chief Peaks Twitter account. In September 2009 we observe @LAFD is following 3, has 7,399 followers, and has 3,700 recorded Tweets; @LAFDtalk is following 4317, has 3926 Followers, and 2583 Tweets; @BrianHumphrey is following 9, with 997 Followers, and 1045 Tweets 2/28/10). From the number of followers one can infer the size of the audience receiving

messages. The number of members the user is following references the amount of potential interactivity or ability to receive messages. From these numbers we can already see that LAFD is mainly used for one-way communication where LAFDtalk can potentially receive messages from more accounts than it sends to. Observing these Twitter feeds over the two year period, we find a pattern of increasing Twitter usage and a notable addition of the LAFD Fire Chief (activated in Dec 2009). Two snapshots of our findings over time are seen in Table 1.

FINDINGS

Innovation Evangelism

Early in our interview it became clear that Humphrey is the driving force behind the technological innovations at LAFD. He was active since the days of “Telnet, Archie, and Veronica,” and with the advent of the WWW he and another firefighter had learned HTML to create one of the first webpages for LAFD of any major Fire Department in the U.S. This do-it-yourself ethos reflects the findings by Mendonca et al. (2007) as the PIOs at LAFD innovated in an ad hoc way to meet specific practical needs. As Humphrey explains:

“I have no formal education in any of this ... So we’ve used a variety of things, starting with Yahoo e-mail lists, evolving into displaying the same content on Blogger ... And we ultimately became the first agency to have a blog listed in Google, for example, as a news agency ... at the time, it was unheard of, that not only a blog, but a Blogspot blog would be indexed.”

In joining the online conversation early on, Humphrey exhibited a prescient understanding of the power of search terms and online audiences by signing all of his messages with “Respectfully Yours in Safety and Service.” A Google search for this signature signoff results in tens of thousands of his messages posted (and reposted) on various blogs and sites. Such consistency allowed

Table 1. Observation of Twitter feeds over time

September 2009				June 2011		
Twitter	Following	Followers	Tweets	Following	Followers	Tweets
@LAFD	3	7,399	3,700	4	10,542	6,039
@LAFD talk	4317	3926	3185	6,731	6,447	8,657
@BrianHumphrey	9	997	1045	9	1,792	1,524
@LAFDFIRECHIEF	-	-	-	1	701	48

In the presentation of our findings, Twitter users are denoted with @username.

him to develop a reputation and to maintain source credibility, crucial for giving weight to his voice in a networked conversation. Source credibility is essential during crisis communications as evidenced by Starbird and Palen's (2010) research that demonstrates that Twitter users overwhelmingly retweet messages from official information sources such as emergency management or news media organizations. For Humphrey, the explicit purpose for conveying credible information online is to benefit the community the LAFD serves:

"Our online presence has this very simple purpose: to help people lead safer, healthier, and more productive lives. That's it. And that's the only reason we're out there, and we try to be very transparent in that."

This sentiment is very much within the ethos of risk communication described. Following the LAFD Twitter activity makes it patently clear that the PIOs of the LAFD are the embodiment of this purpose for large and small "crises." For example:

@faboomama: "Hot liquid burn like fire. Just burnt the crap out of both hands with 250 degree oil. PAIN," 2:08 PM Sep 22

@LAFDtalk posts this public response: "@faboomama Please continue to cool your burned hands in water (no ice!) for at least 15 minutes. No home remedies, seek MD or 911 if doubt" 2:11 PM Sep 22nd from web in reply to faboomama.

A three-minute response-time represents a level of interactivity between a member of the public and emergency management far surpassing any traditional broadcast medium. This kind of interactivity, however, implies constant vigilance and a level of attention that is unheard of from large government organizations. This kind of focus is impossible to keep up given the simple human and logistical limitations: there is only one PIO per 24-hour shift regardless of how many incidents are in progress and how large these incidents are. This ability to respond and examples of such quick response becomes a double-edged sword. On one hand, this builds rapport and a feeling of community among the followers of @LAFD, yet this can also create expectations that such rapid response is always possible. Humphrey is well aware of this as he expresses an overwhelming sense of exasperation in this post:

@BrianHumphrey: "270 voice mails and 2000+ non-spam emails expecting a reply. Dunno how or when I'll get back to you all." 6:47 AM Sep 28th from TweetDeck

While Humphrey might respond to individual tweets he monitors, he directs those on Twitter to use the traditional 911 mechanism to report emergencies:

@LAFDtalk: @StaceyWong Yes, @LAFD is on Twitter, but we ask that emergencies be reported to 9-1-1 and official business matters to [phone number] 8:00 PM Aug 25th from web.

Clearly LAFD's PIOs cannot monitor social media all the time. Despite Humphrey's enthusiasm and determination to integrate social media into firefighting and increasing communication with the public via Twitter, we surmise that LAFD's official stance is more traditional in scope.

OLD V. NEW MEDIA

Part of the impetus to interact more with citizens directly derives from an explicit dissatisfaction with traditional media. According to Humphrey, the position of the PIO was created in 1968 to "keep reporters from bothering the dispatchers." In addition to protecting the dispatchers, the PIO would interact with the reporters in order to communicate with the public. Humphreys explicitly states:

"You don't talk to the media, you talk through them"

LAFD was at the forefront of using IT when they began sending text messages to reporters' pagers telling them fire locations in hopes of getting a news team out to report on an incident. The media enjoyed this inside information, but Humphrey states that the public would be better served if it received the information directly rather than through the media.

"We began to realize, this is not media information, this is public information. We were already sending it out. And we went from using a special terminal to send it, to where we had an e-mail gateway where we could send e-mail and it would show up on the text pager. I could show you these big clunky things, and eventually it continued to evolve, where we had SMS on cell phones, and we began to realize we wanted to get it to the public."

Bypassing mass media as traditional intermediaries emerged as an overarching motivator behind innovation and adoption of new media. Old media, or legacy and traditional

media like television, is what Humphrey calls "appointment media" – one had to make an appointment at 6pm to watch the 6 o'clock news. Humphrey states, "the appointment media is dead and dying, depending on the market, and the media has gone to be really be a real time media. We are, and our department has tried to evolve with that." He states "that shift between the appointment media and the real time media have brought us some great opportunities."

Despite a clear dissatisfaction with the old media intermediaries, for now the strategy seems to be augmentation not replacement of other media for communication. The ability to get legitimate and verified information out to the public in as many ways as possible meant that LAFD PIOs did not simply leave behind traditional media channels of information dissemination but augmented them with social media. Twitter and other social media were deemed extraordinarily useful by the PIOs for disseminating information to the public rapidly, yet these same PIOs clearly understand that only some portion of their intended audience was on twitter.

Listening: Legitimizing and Validating User-Based Information

In addition to dissemination of information, we heard of instances where LAFD leveraged Twitter to monitor and collect information. Humphrey explained:

"We're using the new media to monitor, not just send our stuff out via Twitter, but monitor what other people are sending via micro-messaging services, what other people are sending pictures of, what their queries, what their questions are in real time."

This monitoring raises the question: how does an emergency management official validate information from a citizen communicating via a social media platform? As described, Humphrey still refers citizens to traditional LAFD communication channels to report an emergency. Yet there is evidence that LAFD

PIOs not only monitor and evaluate Twitter for reports of fire but also reward and encourage reporting by citizens:

@LAFD: @Leafstalk: @ChristineNia @DeighvydQahztio Thank you for reporting the grass fire alongside the freeway.– Brian 8:45 PM Sep 22nd from web

Humphrey explained one method he uses to validate information with search and sorting technologies to personally monitor key words related to crises:

“I don’t have any training, but I use Yahoo Pipes ... I dump all my stuff in there, Feed Rinse, all those tools, grind them up and spit them out, and if enough people inside a 20 kilometer area are saying, OMG, or OMFG, that draws my attention. If then I have a traditional media RSS source that says the word, death, explosion, I have a whole algorithm. And then, if it gets good enough, it will make my phone beep. It has to be really--I had a lot of false alarms. My wife wasn’t too happy ... the phone would buzz all night long, because somebody said something. But people will do certain things, and it lends some degree of credence as to where you want to look closer.”

Although the quote suggests a substantial level of technical expertise, Brian and his PIO colleagues stressed being self-taught and largely unsophisticated in their use of these kinds of technologies throughout the interview. Yet the types of solutions they described were not ad hoc. The “algorithms” these PIOs mentioned came less from formal technological expertise and more from intuition based on many years of experience that enabled them to conceptualize the right levels of analysis and sensitivity with the kinds of keywords and potential applications of findings. These PIOs assumed the roles of both information managers (Bharosa et al., 2007) and technological evangelists (Lawrence et al., 2006), wherein their promotion of social media for use within the organization depended on their ability to utilize social media effectively.

Validation of information available on Twitter and via other social media is a persistent and difficult question. Palen et al. (2009) have written extensively on how citizens do a lot of work to validate and correct information in times of crisis (Palen et al., 2009; Starbird et al., 2010; Sutton et al., 2008). The pressure to validate information from unknown sources received from the public is far greater on emergency managers who have to choose whether to commit resources for investigation and response. While Humphrey and his colleagues openly agree that the public is a necessary and important source of information, they have developed their own ways to help validate. Echoing the uncertainty of seeing something in just one medium, Humphrey states:

“We try to validate multiple sources. We would not commit life safety, you know, from one point A, to point B, based upon just what we see on Twitter.”

Yet a question remains: at what point is information validated such that resources are sent to address a fire or a crisis? Humphrey gave a number of examples, but we present one that is most evocative here, that of the Griffith Park fire in Los Angeles, May 8th, 2007. Humphrey was monitoring Twitter for any mention of the fire:

“And they were posting about some smoke and wind conditions and embers going toward homes, and this structure that they said were threatened ... I said, “These people have something, but I don’t want to take it at face value.” So I went to the page they referenced. They had an e-mail there. I sent them an e-mail ... and the message said, “Call me.” So we take in the old media and move into the new media, moving into the old media, the telephone. And they call up, and, “Hello...?” “Hi, I’m Brian.” “You’re the guy on the radio.” “No, I’m the guy on the telephone talking to you.” “I hear you on the radio all the time.” I said, “I appreciate your time. Tell me what you have there.” And in that case, I felt I was able to add reasonable validation of what they were seeing, relayed

that information to our responders in the field, and it turned out that there were people and property in danger in that area, things we couldn't see, that were over the horizon away from us. In effect, this was a moving wildfire. The military has a model that every soldier is a sensor. Every soldier--we like to say that every citizen is a contributor."

This is Humphrey's vision for the future of social media for emergency management – a system where each citizen is enabled with the technological means to transmit information about a fire, crisis, or disaster directly to emergency management professionals. In this perhaps utopian vision, interactivity is a means to a mutual communicative relationship between citizen and emergency management professional with systems of information verification in place to facilitate mutual trust.

Organizational Challenges to Innovation

With respect to social media implementation, we found some disconnect between the activities of Humphrey as innovator and the organization support structure within which he works. Organizationally he is expected to manage both old and new media in an overwhelming capacity. Humphrey states:

"We are drowning in data down here, and we're thirsting for knowledge, just like the people"

Yet the "we" he refers to in his statement is ambiguous – at times Humphrey speaks in line with the LAFD as an organization but not always. Where technology advocates often consider technological innovation synonymous with greater efficiency, we observed that in incorporating social media into their work-practices, PIOs of the LAFD dramatically increased their workload. This happened because social media activity did not replace their other job duties of communicating with mass media and creating informational reports, but augmented these activities with a greater

interaction with the public. Humphrey expressed the sheer workload often both in the interview and on his Twitter stream:

"It's an inhuman--it's an inhuman workload sometimes, it absolutely inhuman. I get 300 phone calls a day, on a busy day. It just goes, goes, goes, goes, goes, goes. We have not changed our staff."

Not only has the LAFD not increased staff for PIO positions to meet the demands of both old and new media, there is a sense that the value of Humphrey's work is insecure. Since Humphrey serves at the pleasure of the administration, a change in management could change his role and thus the entire social media strategy of the LAFD. On Twitter the PIOs explain:

@LAFD: "Since some have asked... @LAFD social media efforts will continue or change at the discretion of our new Fire Chief." 11:11 AM Aug 28th

There is a sense that the LAFD leadership might not fully grasp the value of social media for assisting the daily activities of firefighters in the city. As the new fire chief established in his position, he too started a Twitter account, clearly signaling LAFD's commitment to the use of social media as an invaluable tool. A deeper look at the Fire Chief's feed, however, showcased a more traditional approach to public communication – where all of that communication was limited to broadcast announcements of events and pointers to crisis information resources. Although LAFD is involved in a highly interactive conversation with the public, this conversation remains the purview of PIOs, one to a 24-shift. For Humphrey the ability to leverage the interactive capabilities of social media for risk and crisis communication is at a critical juncture. The move from the traditional broadcast model to interactivity creates real opportunities to manage emergencies, but in creating expectations that citizens will be heard via social media creates risks too. He explains:

“Why the city leaders don’t see -- I call it TLC information. When something comes to us, it’s TLC, either it’s time-life critical or it requires tender loving care. I mean, that’s the fork in the road you’re at. And the time-life critical have expectations, and I’m already starting to get some people who are angry. The recent fire near the Getty Center, I was out of town. We were short on staffing and people wanted more information and they became angry. They have an expectation. But we can’t--I can’t hire people, we have one human being on duty. And the ability to gather and analyze and then disseminate really, you can’t do that [with] one person. You can’t be listening while you’re talking.”

There is evidence that LAFD is moving toward broader support of social media in its daily activities, by establishing more wireless hotspots, increasing the number of people with Twitter accounts up the chain of command and even putting forth a technology initiative as the Fire Chief had announced in his Twitter feed:

@LAFDFIRECHIEF: “Just issued “Technology Initiative 2010 – Phase One” letter. Deploying technology to position the LAFD for the future.”

Yet these changes are slow and broader support for the activities of the PIOs is limited by budgeting woes and political will that wanes up the chain of command.

DISCUSSION AND CONCLUSION

The limitations of this case study lie in whether or not other emergency management organizations follow (or perhaps should follow) a similar process of innovation and social media implementation as Brian Humphrey and the LAFD. Clearly we cannot generalize based on one case study and our future research is geared toward addressing this question more comprehensively. At the same time, this case study identifies processes emerging as a variety

of emergency management organizations move to adopt Twitter and other social media.

We find that the LAFD is utilizing Twitter as a tool for emergency management both for sending one-way messages to the public and for monitoring and responding to Twitter posts. Monitoring and evaluating posts from the Twitter community comprise what Humphrey describes as “listening” activities, which leverage the interactive two-way affordances of social media. Yet, not all emergency management organizations share Humphrey’s vision of social media’s implementation for real time interactivity and listening to the public. For example, FEMA states it has been using Twitter “as a means to offer information about the agency’s mission, efforts and perspective.” FEMA’s purpose seems to lean more on the one-way dissemination model of media usage, not “listening.” This is reflected in their Twitter stream @FEMA, which is Following 400 and has 50,360 Followers (6/17/11) compared to @LAFDtalk (Following 7,113 with 6,849 Followers, 6/17/11). For some emergency management organizations realizing the potential of interactivity and participation may not be practical or even ideal for their risk communication strategies. Further research in the area of computer security concerns with regard to interactive communication technologies may offer insights in this area.

This study supports the literature that locates an information evangelist at the heart of technological change within organizations. Although self-taught and often seemingly ad hoc in approach, Humphrey is indeed the main driver for information and communication innovations at the LAFD. Our preliminary conversations with other emergency management organizations also support the idea of a small group of visionaries initiating social media implementation. Speaking with those innovators, we also find that management is often resistant or wary to implement social media, which they might not fully understand. We have respected requests not to quote those innovators, often critical in tone, for fear of reprisals from higher management.

This paper highlights the changing nature of risk and crisis communication in light of the proliferation of Internet-based social media technologies that far outpace the constraints of traditional media. The affordances of Twitter and other interactive social media give emergency managers abilities to communicate, interact with, and respond to the public on a hitherto unseen scale. As we observe PIOs engaging with these technologies, we argue that the PIO's function at the LAFD has exceeded its previous role as primarily sending official messages to the public via traditional media. Indeed, as social media continue to proliferate we might reformulate questions of how emergency management utilizes social media to include questions about how emergency management organizations themselves are changing due to the innovations offered by the emerging communication technologies and the push from broad-scale public adoption of these technologies.

Adding the role of "listener" creates a new orientation for the PIOs who now must manage, filter, and verify incoming information from a host of new social media sites. While we see that resources can at times be allocated based on messages from Twitter and social media, the collective intelligence of the public as a smart mob is not taken for granted. The ad hoc and intuitive manner by which social media messages are vetted indicates a dynamic and flexible evaluation process; however, we find an increasing potential for PIOs to be overwhelmed by the amount and types of information. Information overload for emergency management professionals is not a new or diminishing phenomenon (Hiltz & Turoff, 1985, 2009). One might say that Humphrey's kind of dedication pushes the utmost limits of human capacity and cannot be expected of every PIO. But our purpose here is in considering possibilities. If one PIO with a will, a determination, and a severe lack of resources and organizational backing is capable of conducting this kind of work, then, with sufficient technological support and organizational backing, this kind of service is possible on a broad level. We argue

that while technological innovation is possible in emergency management organizations, it often relies on the limited capacities of individuals, the information evangelists, who might not be supported by the organization as a whole. Organizational support and political will to initiate and to support change is paramount if we are to see these kinds of services provided broadly, but it is also important for such organizations to recognize the function and value of information evangelists in their midst.

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Mark Latonero is the research director at the Annenberg Center on Communication Leadership and Policy at the University of Southern California. Latonero was a post-doctoral research scholar at the London School of Economics and received a PhD from the London School of Economics, and received a PhD from USC Annenberg School for Communication. Dr. Latonero's research investigates emerging technology and social change – from the application of social media to crisis and emergency management to the intersection of information and communication technologies and human rights. The Haynes Foundation awarded Latonero a Faculty Fellowship, which provided the funding for this study. He is also a member of the resiliency task force at the Center for National Policy.

Irina Shklovski is assistant professor at the IT University of Copenhagen. Her work concerns the way information technologies are used by emergency response professionals and affected public in response to disaster events and during recovery. She has collaborated broadly with colleagues from Cal State Fullerton, CU Boulder and Carnegie Mellon University, to analyze how use of information and communication technologies changes emergency management practices and public-side disaster response and recovery. Irina's work is highly interdisciplinary, oriented toward future design and development of relevant supporting technologies for disaster response activities. Previously, Irina was a postdoctoral researcher in Informatics at the University of California, Irvine. She earned her PhD from Carnegie Mellon University.