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Introduction

Early on January 15, 2017, the roiling skies over Hattiesburg, Mississippi, were visible by a constant procession of lightning flashing above waving pine trees. The ominous cacophony was interrupted by blaring weather alert radios announcing a tornado warning. Community sirens sprung to life as push notifications lit cell phone screens and other electronic devices. Social media posts indicated people were scared. Surprisingly, they also hinted that some people did not know what to do. Over the next few minutes, a tornado touched down and tore a path through the small city. Vehicles were tossed, structures were destroyed, and tragically, four lives were lost. Confusion and concern dominated communication as calls for information transitioned to pleas for help. But where was help most urgently needed? What resources were required? Should citizens try to render assistance or stay out of the way?

A community's resilience to tragedies strongly depends on the communication surrounding them before, during, and after crises. Some scholars and practitioners see risk communication as the process of letting people know about hazards that have been identified by experts. Understanding of this process, however, is limited, and efforts to improve public awareness of hazards and removing people from harm's way have proven ineffective. Our chapter explains why the unidirectional, *single-shot* model, or deficit approach, of risk communication is insufficient. Next, the impact social media has had on contemporary conceptualization of risk communication will be articulated as an impetus for change. Finally, a dynamic model of communication that promotes message convergence while supporting community resilience will be presented.

As this book is intended for a diverse audience, some terms should be clarified simply because concepts may be used differently in various fields. Risk can be understood in a number of ways. The most prevalent definition, from a scholarly

perspective, states that risk is equal to the likelihood of a negative event multiplied by that event's consequences (Aven 2007). For a risk to manifest, a threat must be present. A threat must have the capability of adversely affecting a system by changing its state. For example, pandemic influenza is a risk to the health care system because hospitals can quickly become overwhelmed by an influx of patients seeking urgent care. Beyond the technical definition of risk, Slovic and others (2004) describe the role of affect in risk perception. They argue that in addition to employing reason and logic, individuals form perceptions of risk based on their emotions and experiences. In fact, experiences and emotions inevitably affect whether or not people perceive certain situations to be inherently risky.

From a communication perspective, risk communication is the exchange of messages that create or modify the perception of the likelihood of a negative event (Venette 2008). This definition highlights that risk communication is not unidirectional (where one entity sends a message to an audience) but rather is a dynamic, ongoing exchange of thoughts and feelings to promote understanding about a hazard. In times of uncertainty and heightened risk, there is often much incomplete or inconsistent information available. In making sense of the uncertainty, individuals often seek available information and construe risk messages or "infer meaning by assessing the importance and accuracy of the information and the authenticity of the source" (Sellnow et al. 2009). "Listeners construe risk by noting the ways in which the arguments within the greater narrative reinforce or contradict and by comparing this unity or disparity to their previously held belief on the issue" (Perelman and Olbrechts-Tyteca 1969: 348). When facing risk and uncertainty, Mileti (1999) argues that individuals assess and observe the information they can obtain to determine the best course of action for protecting themselves. Therefore, creating dialogue with stakeholders and providing all available information is imperative for an effective crisis response.

Resilience has been defined by U.S. federal agencies as the ability to recover the state of a system after it has been disrupted. This conceptualization is primarily borrowed from science and engineering vocabulary and is parallel to elasticity. An airplane wing is resilient insofar as it can snap back to its original shape after deflection caused by a perturbation, such as air turbulence. Thus, resilience can be seen as "a community's ability to strengthen its response to deal with crises or disruptions" (Veil and Bishop 2014: 723). In fact, a resilient community "is able to bounce back from an event, not necessarily to return to normal, but to return to a new normal in the initial days, weeks, and months depending on the size and scope of the disaster" (Veil and Bishop 2014: 723).

Resilience is also a function of efficacy. Three major types of efficacy help explain people's understanding of the existence and viability of responses to negative events. Self-efficacy is a person's perception that she has some course of action to mitigate a risk to protect herself or her loved ones (Witte, Meyer, and Martell 2001). Telling a person to *stop, drop, and roll* if his clothing catches on fire promotes self-efficacy. System efficacy is a person's belief that a solution exists within the system that will protect that person or his interests (Macpherson et al. 2014). Most citizens do not know how to fight house fires or battle organized

crime; knowledge that fire departments and law enforcement agencies exist to protect people is sufficient for most to perceive system efficacy. Finally, response efficacy is the degree to which a person views a particular response as likely to solve the problem or reduce damage (Witte, Meyer, and Martell 2001). A person might recognize that law enforcement exists to protect people from home invasion (system efficacy), but he might not believe that the policy will be able to respond in time to save him and his family from a criminal attack (indicating a lack of response efficacy). That person therefore might purchase a weapon for home defense (self-efficacy).

Organizations respond to hazards in much the same way that individuals do. Human-based systems, such as organizations and networks, strongly depend on communication as a means of promoting resilience. Actors cannot respond to a negative event without accurate information processing and effective coordination of activities, both of which are impossible without information exchange. In fact, one theoretical perspective, the communicative constitution of organizations (Putnam and Mcphee 2009), explains that communication is the substance of organizations. In other words, organizations cannot exist without the exchange of ideas. Through this exchange of ideas, priorities and goals are established, resources are identified, rules and norms are negotiated, and activities are conducted. Both individuals and organizations rely on communication to identify valuable parts of a system that ought to be preserved, to establish strategies for mitigating threats to those valued elements, and to respond to important system disruptions when they manifest. Thus, coordinated action to create and maintain resilience cannot occur without effective communication.

Additionally, to promote an efficient response and recovery during and after a disaster, organizations and agencies tasked with responding must be prepared to communicate with key stakeholders and manage a variety of potentially conflicting needs and goals. And because of that, risk communicators should ensure that they are providing messages that not only address the informational needs of a community but must also address the efficacy needs of the community. The following section will detail the various approaches to risk communication message design, including *one-shot* and dialogic approaches.

Risk communication models

Traditional notions of disseminating risk messages to the public were predicated on the practice of merely transmitting information from expert to layperson. This model is referred to as the "deficit" model, in which experts communicate in a "one-way, top-down" approach in an attempt to fill the public's knowledge gap concerning risk (Trench 2008: 119). In this model, message designers created risk messages for the public based scientifically on what they believed the public needed to hear and not necessarily what community members perceived their needs to be (Sauer 2003). This approach, however, has routinely proved to be unsuccessful in effectively reaching stakeholders (Trench 2008). The deficit model has continued because scientists are rarely trained to communicate

effectively with diverse publics, and as a result, the practice persists (Simis et al. 2016).

Additionally, risk message design according to this approach does not usually yield the dissemination of useful information people need. For instance, simply telling citizens that they must evacuate does not necessarily answer the specifics of the concerns or needs they may have. Emergency managers must focus on improving both the awareness and understanding of the public of terminologies and procedures in the wake of an impending disaster (Rowan et al. 2009). Unfortunately, organizations that engaged in this early *top-down* type of risk communication tended to cite their efforts as successful or unsuccessful based on the sheer number of people who encountered them, regardless of whether or not those messages resonated with the actual needs of the community members or their cultural understandings of risk.

The far more accepted model for risk message design is a participatory, two-way model for communicating with the public. Emergency managers and organizations responding to a crisis must plan in advance to engage members of the public both in the precrisis and crisis stage (Coombs 2014). Emergency managers must engage in dialogue with publics before disaster strikes to understand more fully the specific material and communicative needs of the communities they serve (Rowan et al. 2009). Similarly, Houston and others (2015) argue that dialogue between publics and government organizations during and after a disaster enables individuals to obtain the help necessary for recovery. Similarly, Veil and Anthony (2017) argue that if an organization does not have established lines of communication between practitioners and stakeholders before a disaster, they must strive to create a way for practitioners and the members of the public to communicate.

Much literature reveals the importance of promoting dialogue between practitioners and stakeholders. And given the rise of social media, the ability to promote communication between all parties has become increasingly common. The following section will consider the ways in which social media can enhance risk communication between practitioners and affected publics.

Social media in risk communication

According to the Federal Emergency Management Agency (FEMA), disaster events have been on the rise over the past few decades (FEMA 2017). This is supported by NASA research suggesting a recent increase in natural disasters, including catastrophic weather events (Reibeek 2005). As disaster events become more common, social media usage is also becoming more prevalent. Whereas in the past, individuals may have solely relied on radio or television reports during and after a disaster, individuals now have the option to seek (and share) disaster information online.

Social media platforms such as Facebook, Twitter, and Instagram allow users to develop personalized profiles, create and manage a list of users with whom they interact, and explore interconnected relationships in a networked system. Of the

86 percent of Americans who are Internet users, more than 80 percent use at least one social media platform (Greenwood, Perrin, and Duggan 2016). A majority of Americans (62 percent) get at least some news from social media (Gottfried and Shearer 2016). In fact, disaster events drive publics to online sources for information seeking, and in some instances, audiences view social media as more credible than traditional mass media (Procopio and Procopio 2007). Procopio and Procopio (2007) found that during Hurricane Katrina, 75 percent of respondents utilized social media platforms to both seek and share information. This study was conducted before the boom in social media platforms we have seen over the past decade, suggesting that – with an increase in social media presence – people may be more likely today than in the past to seek out these platforms for information during and after a disaster.

According to a 2009 study of more than 400 management, marketing, and human resources executives, however, only 13 percent of companies represented have any sort of reference to social media in their crisis communication plans (Russell and Ethos Business 2009). Additionally, according to Liu, Faustino, and Jin (2015), while 75 percent of Americans surveyed in a 2010 study by the American Red Cross expect to have a response within one hour of posting to a social media page, few emergency managers have personnel tasked with the responsibility of engaging with publics on social media during a disaster. This is a clear and troubling gap between apparent social media expectations of the general public and actual social media practice of corporations and agencies.

Scholars have only recently begun to study the use of social media platforms during and after disaster events (see Freberg, Palenchar, and Veil 2013; Lachlan et al. 2016). These studies have provided valuable insight into how publics engage with social media messages during and after a crisis. Veil, Buehner, and Palenchar (2011) argued that the National Center for Food Protection and Defense (NCFPD) best practices in risk and crisis communication (Seeger 2006; Venette 2006, 2007), ranging from "establish risk and crisis management policies and process approaches" to "acknowledge and account for cultural differences" (Sellnow and Vidoloff 2009), must also be considered when facilitating participation and dialogue with stakeholders through social media platforms. The scholars suggest "using social media to educate the public regarding risks, encourage visible support of an organization or cause, and establish a venue for open dialogue online . . . all approaches to incorporating social media in risk and crisis communication" (Veil, Buehner, and Palenchar 2011: 113).

As technologically advanced audiences increasingly rely on social media for the exchange of information, a significant opportunity exists for risk communicators. Traditional, unidirectional models of risk communication prove ineffective in this environment (Trench 2008; Simis et al. 2016); however, when new strategies and tactics are enacted, the positive influence of communication efforts become multiplied. Beyond actively dialoguing with stakeholders, this multiplicative impact is realized through the use of artistically coordinated multi-messages (Sellnow et al. 2009). Because single messages are likely to be ineffective, message designers should construct multiple messages that are tied together artistically. Geico

advertising perfectly exemplifies this approach. For just a few examples, one message uses cave people ("so easy a caveman can do it"); another uses a gecko as a spokesperson; yet another says that if you do not know about Geico's services, then you must have been living under a rock. Each message is tied together through the use of a common logo and a consistent slogan (15 minutes will save you 15 percent). A viewer may not like cave dwellers or lizards, but may like the humor of people living under rocks. With a multi-message approach, members of the audience are allowed the freedom to select the message that most appeals to them. We argue, however, that in a multi-message approach, each variation in the presentation should reflect the same core message. Geico's marketing is effective only if the various advertisements are in fact reiterating the same message. Attentiveness to any of the messages means that the information campaign was successful for that audience. Organizations should ensure that the messages they develop are coordinated, both in terms of their content and their design. The more similarities in information people encounter, the more likely they are to follow the suggested recommendations (Anthony, Sellnow, and Millner 2013). Social media is a channel that encourages brutal honesty about what audiences think are strengths and weaknesses of the different messages. The organizations, in turn, must be attentive to that feedback.

Additionally, social media messages should not only be designed to ensure that content is consistent across multiple messages but that messages should also be disseminated across multiple social media channels (Anthony, Sellnow, and Millner 2013). For instance, in the midst of a food contamination crisis, parents responsible for making nutritional decisions for their families felt more confident managing their uncertainty in the midst of heightened risk if they perceived that the Centers for Disease Control and Prevention's (CDC) Facebook page and the Food and Drug Administration's (FDA) home page were reporting similar things (Anthony, Sellnow, and Millner 2013). Organizations more fully understand the messages' reception and influence when audiences exchange information with each other and with the senders of the messages dynamically, which is the inherent strength of social media. Organizations must be willing to engage in active dialogue with stakeholders through social media (Lin et al. 2016). Specifically, social media enables community members to pose questions and concerns to public health experts on digital platforms, and this technology facilitates the capability for response organizations to directly reply to their stakeholders.

Social media, location information, and hazard response

Social media outlets such as Facebook, Snapchat, YouTube, and Twitter have altered how information is accessed and shared. To construct an effective crisis communication response, practitioners need to integrate best social media practices within the precrisis, crisis, and postcrisis phases of a crisis management plan (Coombs 2014). During the precrisis stage, social media helps practitioners conduct environmental monitoring for crisis signals, identify target audiences, and build community partnerships. Once a crisis occurs, social media can create

an opportunity for sharing information between organizations and stakeholders (Briones et al. 2011; Veil, Buehner, and Palenchar 2011). For example, to manage crisis events, stakeholders and practitioners can share pictures, stories, and videos of their experiences and crowdsource for additional help or information. Finally, social media helps practitioners and stakeholders co-construct postcrisis narratives (e.g., Facebook memorial pages, YouTube videos), facilitate coordinate/rebuilding efforts, and build trust (Coombs 2014). Therefore, at all stages of the crisis cycle, social media can assist in communication between organizations and their stakeholders. A September 2013 report published by Pew Research revealed that the role of *location* among online platforms is changing "as growing numbers of Internet users are adding a new layer of location information to their posts, and a majority of smartphone users opt in to their phones' location-based services" (Zickuhr 2013: 2). This finding underscores the premise that social data can influence communication and action during a crisis scenario. Not only are people able to share their thoughts and observations through online platforms, but also their physical locations – information that is critical when facing disasters. Location-based services of social media also promote community resilience following a disaster event. The ability to engage in community mapping, whereby responders are able to assess more clearly the areas of the community most negatively affected by a disaster, is of paramount importance for promoting community resilience following a disaster (Wells et al. 2013). Social media platforms can assist responders in this endeavor, particularly in risk management, emergency management, and disaster response (Palen et al. 2009).

The increasing prevalence and versatility of social media platforms such as Twitter and Instagram have allowed for emergency responders, community members, and organizational leaders to have a greater sense of how crises unfold in real time (Liu et al. 2008; Palen and Liu 2007). Additionally, social media platforms are necessary for disaster response plans because "risk communication and other public health messages are most effective when they are delivered through trusted channels that are understandable and culturally appropriate" (Chandra et al. 2011: 22). The advent of social media platforms and the potential for messages, images, or videos to become viral, or to rapidly gain widespread viewership, has created both opportunities and risks for organizations and communities. Specifically, hashtags (keywords preceded by "#") serve as potential focal points for support, encouragement, and recovery during and after a crisis event. For example, after the 2011 London riots, hashtags related to cleaning up the city and seeking recovery were focal points, and they lasted longer than hashtags with emotional reactions to the event (Glasgow and Fink 2013). After the 2015 shooting of a professor at the University of South Carolina, the hashtag #PrayforUSC became a hub for information seeking, information sharing, and social support (Boatwright and Pyle 2015). By engaging with the hashtag, community members were able to establish or reestablish connections with friends and family and to look for ways to promote community recovery. Concerning disasters, Lin and others (2016) argue that response organizations should be vigilant to employ disaster-related hashtags to continually update the public on what is occurring in the midst of a

disaster. Doing so both keeps them informed and allows stakeholders to dialogue with them (Lin et al. 2016). However, hashtags have also served as focal points for self-inflicted social media and public relations crises for organizations and for people who use them inappropriately (Pyle 2016).

A fascinating example of social media platforms being employed to mitigate risk, respond to a crisis, and develop community resilience (both at a micro-level in communities and a macro-level in national contexts) is the Ushahidi platform. Ushahidi, which means "testimony" in Kiswahili, was built as a website that would collect and organize reports of violence, allowing every citizen to become a journalist reporting on the frontlines of a political warzone. Ushahidi has been developed and enhanced as a more versatile platform and has been employed in Haiti, Indonesia, and Nepal, to name a few places (Morrow et al. 2011). This platform has created the capacity for community members to rally together and provide contextual information that has enabled responders to reach people long before official communication channels would have been able to connect responders to those in need. It also promotes the opportunity for community mapping to better understand areas affected by the disaster.

For example, Ushahidi has been employed in Semarang, Indonesia, following a series of devastating floods. The implementation of Ushahidi in Semarang enabled aid organizations to understand more clearly the areas most affected by the flooding. Similarly, following the earthquake in Nepal in 2015, Ushahidi allowed for the open mapping of the area to assess the damage and understand the needs of individuals affected (Roberts 2015). While the initial Ushahidi platform had challenges with establishing credibility and confirmation of sources (Okolloh 2009), it has continued to develop, and the system has become more reliable over time.

Additionally, Facebook has made strides in creating location-based tools to simplify users' seeking and sharing of information following a disaster. In 2014, the company launched Safety Check, a geographical feature that enables individuals to *check in* and let others know they are safe. Facebook has initiated safety check for several disasters, including Hurricane Matthew, wildfires in California and Tennessee, and flooding in Louisiana. Since its inception, the safety check notification has appeared in the feeds of over a billion people worldwide (Metz 2016). Facebook also plans to pair Safety Check with a *Community Help* feature for users' to ask for help or offer aid to those in need (O'Brien 2016). More recently, Facebook announced it is developing *crisis hub*, which will systematically organize information into a single stream, including the identification of false or inaccurate information, to create an accurate portrayal of a disaster event (Metz 2016).

While there are a variety of ways that social media can be employed as a function of risk management to enhance communication efforts and community resilience, it is important to note that social media should be viewed as complementing traditional media, not as operating in opposition to traditional media (Jin and Liu 2010). This partnership becomes more important when working with certain populations, as there are some publics that still do not trust messages from social media sources (Seo, Kim, and Yang 2009). Additionally, it is useful to seek

opportunities for partnerships with bloggers. Many blogs are viewed with a level of credibility today previously reserved for traditional media sources, and it will serve communities and organizations well to seek out bloggers as allies for risk management and crisis mitigation (Veil, Buehner, and Palenchar 2011).

Social media outlets such as Facebook, Snapchat, YouTube, and Twitter have altered how information is accessed and shared. To construct an effective crisis communication response, practitioners should integrate best social media practices within the precrisis, crisis, and postcrisis phases of a crisis management plan (Coombs 2014). During the precrisis stage, social media helps practitioners conduct environmental monitoring for crisis signals, identify target audiences, and build community partnerships. Once a crisis occurs, social media can create an opportunity for sharing a wealth of information between organizations and stakeholders (Briones et al. 2011; Veil, Buehner, and Palenchar 2011). For example, stakeholders and practitioners can share pictures, stories, and videos of their experiences; organizations and individuals can also crowdsource additional help or information. Finally, social media helps practitioners and stakeholders coconstruct postcrisis narratives (e.g., Facebook memorial pages, YouTube videos), facilitate and coordinate rebuilding efforts, and build trust (Coombs 2014). Therefore, at all stages of the crisis cycle, social media should promote communication between organizations and their stakeholders.

Social media analytics as a risk communication tool

Data analytics are beneficial before, during, and after a crisis. Qadir and others found that big data analytics can be used to "respond in emergencies in ways that can mitigate or even avoid a crisis" (Qadir et al. 2016: 2). Social analytics can afford communities additional avenues for building resilience following a disaster. Identifiers afford insight into how information is processed, disseminated, and received by communities engulfed in crises. MacEachren and others, for instance, examined how social media (particularly Twitter) can be used to "leverage explicit and implicit geographic information for tweets . . . to enable understanding of place, time, and theme components of evolving situations" (MacEachren et al. 2011: 1).

Further, location data and mapping programs can assist scholars in understanding what people are discussing and the accuracy of that information. Active monitoring of social media allows response organizations to make inferences about the informational needs of the public, and it allows them to assist the public with emergent message-need incongruities. Additionally, monitoring social media also allows organizational leaders and response agencies to identify incorrect information while disseminating credible information through recognizable social media accounts (Lin et al. 2016).

Given the wide range of platforms that contribute to what constitutes *big data*, a wide array of analytic tools are available to provide insight into data during crises. Many programs are able to measure and identify variables such as volume, sentiment, trends, key influencers, and key words or phrases. Free, open-source

analytics tools are available (Hootsuite, Tweetdeck, and Quintly, to name a few) that primarily focus on measuring social media conversation from users' managed profiles. Paid platforms generally provide more robust social analytic services. SocialStudio, Crimson Hexagon, and Geofeedia are all platforms that provide rich, archivable data that can be used to examine the crisis life-cycle in greater depth. However, no analytic tools are exhaustive, as they cannot capture *all* of the conversations around a particular topic. The volume of data gathered is often contingent on characteristics of the data being gathered such as privacy settings, location services, and other variables.

Nevertheless, social analytic platforms can provide practitioners unique avenues for data analysis. For example, in researching the murder of the University of South Carolina professor, two of the authors of this chapter began tracking the #PrayforUSC tag that was trending on social media through Radian6 software. By measuring the volume of data using that hashtag, the authors identified several characteristics of emergent digital citizen groups that formed to provide information and social support to users affected by the crisis.

Social media and mobile technology have fundamentally altered the communicative landscape associated with crisis events. There are hundreds of smartphone applications that users simply download to predict, monitor, and respond to crisis events ranging from natural disasters to active shooters. Many of those applications also incorporate social media functions that allow users to mark themselves safe during a crisis or provide real-time developments as the crisis unfolds. Additionally, visually-based social media platforms (such as Instagram and Snapchat) provide avenues for eyewitnesses of disasters to transmit firsthand accounts of events as they transpire.

Conclusion

Ultimately, risk planning and message design before, during, and after a disaster is paramount for promoting an effective community response and engendering community resilience. Social media have proven to be incredibly effective in not only providing community members with the opportunity to dialogue with government agencies and response organizations, helping correct and clarify misinformation in real time during a disaster, but also in helping responders understand the location-based areas of greatest need, which is critical for distributing aid. Additionally, social media have facilitated recovery and resilience efforts by connecting concerned citizens to rally around a common cause through hashtags that not only bring awareness to recovery efforts but also facilitate grouping and ordering messages connected to the same concern.

Given the potential for social media to facilitate response and resilience, emergency managers must abandon any notions of a *top-down* approach as their sole strategy of disaster and risk communication and incorporate social media into their response plan to encourage dialogue with stakeholders. Response organizations should employ social media strategists who are actively scanning platforms, with the assistance of software listed above, in an effort to keep the public informed.

Additionally, the creation of messages that complement one another, both in content and in design, are necessary when attempting to promote convergence for stakeholders following a crisis. Doing these things may allow practitioners to promote an improved community response and resilience following a disaster event.

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