Use of Social Media by U.S. Public Sector Emergency Managers: Barriers and Wish Lists

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ABSTRACT

Semi-structured interviews were conducted with U.S. public sector emergency managers to probe barriers to use of social media and reactions to possible software enhancements to support such use. The three most frequently described barriers were lack of personnel time to work on use of social media, lack of policies and guidelines for its use, and concern about the trustworthiness of pulled data. The most popular of the possible technological enhancements described for Twitter are filtering by category of user/contributor, and display of posts on a GIS system with a map-based display.

Keywords

Social media, emergency management, Twitter, Facebook

INTRODUCTION

Social media such as Twitter and Facebook are used by hundreds of millions of people for their everyday communications. It is natural that people should turn to them to share information in times of natural disasters and other emergencies. However, these media can pose problems for emergency managers (EMs), and are not structured currently in a manner that makes it easy for government and private agencies to actually use the information that the public posts for emergency management. Among these problems are issues of trustworthiness of the information, of information overload from the tens to hundreds of thousands of potentially relevant posts that occur during a large scale emergency, plus ethical issues related to the privacy of users (Hiltz and Gonzalez, 2012; Hiltz and Plotnick, 2013).

In dealing with the first two problems, there have been several potential tools developed and described in the literature (e.g., Meier, Castillo, Imran, Elbassouoini, and Diaz, 2013), but they have yet to be incorporated into government emergency management platforms. In 2011,Tapia, Bajpai, Jansen and Yen, reported on the results of semi-structured depth interviews with 21 emergency managers from international NGOs. They found that microblogged data produced by citizens was analogous to a food that responding organizations could not eat. However, a second round of the study (Tapia, Moore and Johnson, 2013) found "pockets of use" by the responding organizations.

In an exploratory study of social media use by government, Kavanaugh and her colleagues (2012) found that social media use by government was not generally employed in a particularly thoughtful or systematic way, e.g., knowledge of benefits and costs, target audience(s), and potential impacts. However, informal contacts with emergency managers in U.S. government agencies suggested to us that the proverbial "red tape" and resistance to change in government bureaucracies might make adoption and use of social media somewhat different for these settings. Bertot, Jaeger, and Hansen (2012) propose that the existing regulatory framework for government information policy and practice has not kept pace with social media use. In this paper we report the

results of semi-structured interviews with eleven government emergency managers in the U.S. to gain insights into their perceptions and use of social media.

While our interviews were in process, a report was issued by the National Emergency Management Association (NEMA), based on a survey sent in 2012 to Public Information Officers (PIOs) in all 50 state emergency management agencies. These agencies were encouraged to pass the survey on to local jurisdictions, resulting in over 500 respondents (Su, Wardell, and Thorkildsen, 2013). The researchers found that on the average, respondents at all levels considered themselves at least "moderately familiar" with social media. Moreover, all state emergency management PIOs reported using social media in some capacity, as did 68% of county emergency managers and 85% of local response agencies. However, most use was only by PIOs to convey information to the public. There was little use of social media to extract information for response decisions, and what little there was relied on manual methods. While the NEMA study offers a more representative sample than the small number of managers that we interviewed, there are some limitations to their study. Although useful in understanding the broad scope of the use of social media in government agencies, the frequency distributions of answers to questions that are presented in the report do not delve into the actual experiences and opinions and problems that such managers face, in any detail. Therefore, it is valuable to supplement such large scale general surveys with qualitative data that do describe the specifics of problems and preferences, and with quantitative surveys that explore more specific areas for possible action, such as reactions to possible new tools that could be provided.

Our research questions are:

1. What problems or barriers do these managers perceive in terms of using social media, particularly for gathering and acting upon real-time disaster posts in them?

2. What is their reaction to several potential types of tools that might enhance their use of social media?

METHOD

An interview guide was developed, consisting of mostly open-ended questions. Many of the items, particularly those related to possible software tools, were adapted with permission from an interview guide used by Tapia et al (2013) in their study of humanitarian agency emergency managers' use of social media. The interview guide and all procedures were approved by an Institutional Review Board. Portions of the interview guide are included as Appendix A. Note that in asking about current use of social media vs. other types of communication media, the participants were instructed to think back to the most recent disaster incident, in which they were involved, and to describe media use for that incident, rather than answer "in general." However, in asking about their opinions about barriers to social media use and reactions to possible software enhancements to better support the use of social media in their jobs in the future, we asked "in general" rather than about a specific incident.

A "snowball" sampling technique was used, starting with a list of practicing emergency managers who were known by practitioners in the Emergency Management graduate programs at Jacksonville State University and other names obtained through contacts of the researchers. The interviews generally took between 30 minutes and an hour. We completed a total of 11 interviews for this qualitative study. Most were conducted via Skype or telephone, though one occurred through email. Although this may seem like a small number of interviews, the guideline for exploratory qualitative research of this type is to interview until 'theoretical saturation" is reached; that is, until no new themes are emerging. For the last several interviews, we heard no new themes.

Following "best practice" guidelines (e.g., Rubin and Rubin, 2005) , the interviewers were oriented and trained by the authors of this paper, all experienced researchers; the interviews were transcribed by the interviewers shortly after conducting them to assure a complete and accurate transcript; and the transcripts were coded in a manner that validated the coding. The Skype and telephone interviews were recorded using Audacity, and then transcribed. Doctoral (DSc) students at Jacksonville State who participated in conducting and transcribing some of the interviews   were given two Skype-based training sessions on how to conduct semi-structured interviews, emphasizing the importance of probing; and how to transcribe the interviews.

The next step was to code the interviews, for which the coding software QDA Miner4 was used. Coding categories were initially developed by looking at the questions, and then expanded during coding to include the range of observed answers. This is referred to as "grounded" coding, since the final set of coding categories comes from the words of the subjects themselves, from the "ground up." The unit of coding was agreed upon to be "a thought." Thus, it could be as short as a brief phrase or as long as a paragraph. Also note that one person might have expressed several "thoughts" on the same topic. The first interview was coded jointly by the first and third author, working together as coding categories were established, and discussing any disagreements on

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coding units and coding categorization. To establish reliability of the coding categories and procedures, the second interview was then coded separately and compared. Well over 90% agreement was achieved measured by both Krippendorf's alpha and Scott's Pi where at least 80% overlap was considered a match, and most of the disagreements that existed were due simply to a somewhat different length of the text fragments selected as the coding unit in an answer. Those differences were resolved by discussion and then the rest of the interviews were completed by a single coder.

FINDINGS

In reporting findings, we will not use any percentages or "statistics" since this would be inappropriate for the size and nature of the sample studied. Rather, we will describe the main themes and tendencies in the data, based on counts of coding categories, and then give examples of descriptions of these themes in the words of the managers themselves.

Participant Characteristics

Given the mode of recruitment, the participants were mainly on the East Coast, though they came from several states. Most were directors of their part of the organization, at the county level, though we had one at the federal level and several at the state level. The primary role of most participants was coordination of emergency management (EM) with other organizations at the state and local level and with non-governmental organizations such as the Red Cross, but seven were also involved in response and four described planning roles, in addition to their coordination roles. The incidents chosen for reporting on media use were mainly natural disasters (hurricanes, winter storms, floods, tornadoes) but also included a terrorist incident.

Media Used

With a small and non-representative sample, the frequencies of mentions of various media use and problems are included here only to provide a general context for the evaluations of social media offered by the participants. Many different modes of communication were mentioned by each of the respondents as sources of information for their most recent incident, with weather warnings, official government communications, a formal EMIS system (e.g., official state EMIS such as "DisasterLan" and "Esponder"), some sort of social media, and mass media (including television and radio) among the sources frequently mentioned. There were a number of mentions of keeping multiple channels on at one time to gather mass media information. One respondent noted that they kept on "7 or 8 channels" at one time. In terms of receiving official communications of information, examples of sources mentioned were incident commanders and other agencies. Information dissemination to other agencies or officials (e.g. emergency dispatchers) was accomplished by email, 800MHZ radios, telephones, as well as EMIS systems. To disseminate information to the public, a variety of modes were used including traditional media, press releases, flyers, reverse 911, and even electronic smart boards. Social media figured more prominently for information dissemination to the public than it did for gathering information, with five mentions of social media in general, six for Facebook, and 10 for Twitter. Overall, in terms of current use of social media, there were eight mentions of formal use and six of informal use, but most of the uses were for dissemination to the public rather than for gathering information. The most important results of the study, however, are the descriptions of barriers to the use of social media and reactions to various possible technical tools that might enhance their use of social media in the future.

Barriers to Social Media Use

The two most frequently described barriers were lack of personnel/ time to work on use of social media (13 mentions), and lack of policies and guidelines for its use (11 mentions). However, there were also seven mentions of official agency prohibitions on social media use and several mentions of barriers related to lack of appropriate technology, lack of training, and trustworthiness.

Descriptions of problems with lack of time and personnel included:

> "We don't have a social media person."

> "We're really a small team, and trying to set aside time is hard."

> "We just don't have the staff or resources to dedicate somebody to do it all the time; we don't have a personal PIO."

> "I think we all recognize that you know its going to be the same thing as Web EOC, its going to have to be big enough where we are able to bring in additional staff and get it going."

> "They did not tweet – there was nobody available to monitor their twitter account."

One interviewee most succinctly stated the problem of finding time to incorporate this new way for EMs to communicate during crises when s/he said, "Life gets in the way."

Even when use of social media has been tried or piloted and the advantages are recognized, the lack of personnel and time can be a problem:

> "We saw a lot of benefits with our pilot. It has to happen, the information is there, and just limiting the constraints – if you know what you want to look for, and you have somebody do the analytical piece and keep the personal information out, you can get a lot of good stuff."

Formal policies and procedures related to the use of social media emerge as a very much evolving phenomenon. For instance:

> "We started with our social media page very early on and…the county just actually released a social media policy beyond that. So, it is a little bit retroactive for our use of social media. We have looked at different practices in how to use it in our preparedness portion of our four cycles of emergency management. So, I think we've seen some of the social media trends and we are trying to inject them into our preparedness and mitigation strategies."

> "We need to take our SOPs and go to talk to our attorney's office about what we can and cannot do."

> "We struggle with the legal issues. We don't want to be liable for anything."

> "I don't know if social media has ever really been addressed. As a government agency I'm not sure where that fits in."

> "We are currently updating a lot of our standard operating procedures. Some of them contain call lists, for instance to get all of the agencies in for a major briefing. Some of our SOPS still have these outdated lists. Now we would use Twitter or Nixle and say 'Y'all come'   So we are updating our SOPs."

> "Somebody's got to make a decision. Before you do social media approach, you need to have a systematic approach to ensuring the ability of sharing public sector information in real time across the spectrum, not just limited by geographic areas using a different system. As much information as you can get in social media, if you are not able to regionalize it … you can almost add more confusion."

Related to the issue of policies and guidelines are these mentions of prohibitions:

> "It prohibits access period. If I put up on Internet Explorer that I want to look at a certain site like Facebook it automatically comes up, "You are not allowed." This answer was probed and further expanded on as follows. "So you would say that the main barriers to using those are really policy level. As a policy, your organization has decided not to utilize those?".   [respondent]- "That is correct. If we went outside that and we used personal devices that would be our other way but certainly that would not be within our scope. "

> "It's because you cannot, our computers are blocked from using it. You know, isn't that ironic. So I can't, even as the agency emergency management coordinator, I can't access Facebook, Twitter, I can't, it's blocked on my computer."

> "I think the problem is the state government moves really slow and, I guess, just don't want employees to be on Facebook all day."

> "The federal government needs to decide what is going to be the single platform for sharing information. Between (ESM?) XMDL, and everything that's out there."

> "… but if we had access to something like that we could set up a place, a Facebook account or some type of a twitter, I'm not familiar with this kind of thing, or blog perhaps. This might be a positive thing to get real time information from the field."

Problems with lack of training or familiarity with social media were mentioned mainly as a generational issue, as reflected in the statement about the main barrier being: "Probably a bunch of old people like me who are not used to that environment. Probably that will change and it will be the wave of the future."

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Problems with trustworthiness were described in statements such as:

> "If we wanted to get Twitter accounts for our own division, it's mostly making sure that you have processes in place, you are representing the organization, to make sure it is accurate, timely, relevant…"

> "It is no different than using the telephone or texting – it tends to be inaccurate. There is no way to control. We can just do damage control. They cannot take the time to correct or validate incoming data through social media."

> "I wouldn't say we use social media as far as making other key decisions... We are going to look more to our credible sources we have relationships with…"

> "Although some organizations are using SM this way, it is not accurate. It is no different than using the telephone or texting – it tends to be inaccurate. There is no way to control." (Response to a question about using SM for information gathering.)

Government prohibitions and perceptions of untrustworthiness of gathering data from social media were seen by at least one interviewee as interacting issues. "…. But again, we would need to have government access and they would actually need to prove it and then allow people to have that set up so we would be able to access it."

An issue with information overload from Twitter is reflected in the statement "I almost feel it would be burdensome to be getting this bombardment of information in real time…" Such inadequacies of current social media for real-time emergency management are the reason why many different software enhancements have been suggested and built on at least a prototype basis.

Reactions to Possible Software Enhancements

Most of the participants recognized that the types of software aids described for filtering and displaying information from Twitter that we described could help with problems such as lack of time and personnel, and issues related to trustworthiness and information overload.   For example,

> "If it was weeded and edited, yes, and targeted it would be very useful. But if it's just a free for all, I just think, you know, who has time."

But, as noted above, the need for approval and procedures, and the difficulty of getting that, was noted:

> "If we wanted to get Twitter accounts for our own division, it's mostly making sure that you have processes in place, you are representing the organization, to make sure it is accurate, timely, relevant, that it's not just anybody's personal opinion being put out there."

> "Yes, definitely, we also are talking about records retention too and, you know, anytime the government wants to do anything, you have to kind of go through committee after committee to get approval and that takes a while."

The most popular of the possible technological enhancements described for Twitter are filtering by category of user/ contributor, and display of posts on a GIS system with a map; 10 of the 11 respondents said they would like each of these. Categorization of Tweets by needs or sub-events, and customized folders for categorization were attractive to 7-8 of the managers. Automatic integration of Twitter feeds into existing EMIS received less, but some support.

In commenting on usefulness of being able to view Twitter data as generated by categories of users like– (a) NGOs only, (b) local government representatives only, (c) residents/beneficiaries in the affected area only, one manager expanded on his/her "yes" by saying, "That would be useful, then you can see where your reliable sources are." Another began to envision what this might look like on the screen: "I think that could be helpful, that way we could key in on what our partners are doing and then you know click another tab or whatever and see what the perspective is from the citizens and then, ok this is the official one, yeah I can see how." Still a third expanded with "yes, we would consider that more credible just because we know those organizations already, kind of like we would from our radio report. If we get something from the Red Cross or the health department through their Twitter accounts, we would take that information and utilize it" These comments suggests viewing incoming data by category of users could help overcome the wariness of the trustworthiness of social media data that was expressed so frequently by the interviewees.

As for a tool with GIS map-based display of the origin of tweets, one user observed, "But there are a lot of privacy issues with that. I do think it could be useful." Another concern, albeit with recognition of the

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usefulness of such a tool, was incorporating the GIS data into their existing system. "Yeah, to incorporate into a geo code or be able to track where that information's coming from…we've been able to do that a little but it needs to be developed more to be able to interface with some of our local GIS software."

Other supporting comments volunteered included:

> "We never turn down geographical data, we love that, we take that for what we can get again, it would be from what source can we trust that data on the GIS, but geographical data is a pretty important tool."

> "If you can see it like in Google map or something to see where things are happening in real time, all that information could be fed into the operational picture."

> "…we could use this information to help with efforts along with our current use of Virtual – Google Earth."

When asked "Would being able to view Twitter data as generated by categories of tweets like– (a) related to shelter needs, (b) medical needs, (c) security needs, etc. –be seen as useful to your organization," comments included:

> "Yes – we could use this information to help agency representatives in the Emergency Operations Center in their response efforts."

> "That would be a great format for us to follow and really pick up on because for us we are going to react to the public need and if there is enough public need or people are saying that some of the things that are going on in our community, that's how we start to make some of our decisions because if somebody posts something on Facebook over, you know, you get three or four comments on something, you know, that equates to quite a few people who may have that same question. So that's definitely beneficial for us."

> "That is how I designed my pilot. That's how we did it. I need to get a global picture and that's a quick way to get it. Not only do I concur with that, but that is literally the effort that we want to move forward with."

> "That would be beneficial, specific to the safety and health of our own people going in, as well as, the security of letting our people go in. So yes, that would be beneficial"

Participants were also asked, "Would being able to view Twitter data as generated by sub-events like– (a) rescue issues, (b) recovery issues, (c) mobilization/logistic issues, (d) infrastructure issues –be seen as useful to your organization? " This generated some confusion and only a few positive comments, such as: "Not bad. Never thought of that. Probably useful in some situations."

Similarly, the managers seemed to have trouble visualizing the nature and usefulness of "being able to create a customizable 'folder' for your organization, in which a set of Twitter subscriptions was made to meet your organizations needs for each disaster response." However, one commented, "That would be nice. From the perspective of you now doing an after action meetings just kind of bring that information up or trying to figure out lessons learned and it's there an available, yeah that would be nice."   Another noted that if it could be integrated with the current system, it would be beneficial. "Yes – we could use this in conjunction with current systems we have in place."

Thus, in terms of integration into existing EMIS, the advantage was evident to some of the managers:

> "It would be really good, we have a web EOC, and we want to have it live running, with a board that is like a tab, that you could interact with Facebook. The board lights up if there are messages on Facebook. We would like that for Twitter too, so we don't have to go from site to site."

SUMMARY, LIMITATIONS, AND DISCUSSION

Emergency response information systems are an example of "socio-technical" systems, which recognizes the interaction between people and technology in workplaces. This is especially true of the use of social media as part of an emergency response management system, where the information in question is generated by the public rather than by trusted information systems. Our findings show that as of 2013, the major barriers to use of social media by U.S. government emergency managers are organizational even more than technical. Most important in the mind of the managers is that they lack adequate trained personnel to assign to this job. However, one of the reasons they felt they did not have time is that there is currently inadequate software support for gathering, vetting for trustworthiness, organizing and displaying data from sources such as Twitter

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on a specific disaster as it occurs. When affordances available from current research systems were described to them, the managers were generally enthusiastic about their potential usefulness. In particular, they would like to have software available to them (and supported by their organizations) that would provide filters by category of user/ contributor, and display posts on a GIS system with a map. Categorization of Tweets by needs or sub-events, and customized folders for categorization were also attractive. These system capabilities, plus of course an automated system that would filter out posts that look untrustworthy and list first those from already trusted sources, should be software development priorities.

Tapia et al. (2013) do not report detailed responses to specific possible system features, but they do report, "We now see that the creation of these systems is far more difficult than first imagined and the task has been taken up not by the responding organizations, but by volunteer and technical communities to fill this computational need" (ibid., p. 777).

Information systems designers need to provide structures and features for collecting, validating, and transmitting citizen-generated information during disasters, and government agencies need to adapt these structures, with appropriate policies and standard operating procedures, and train and guide their employees on how to use them. Policy solutions to address barriers to social media use by emergency management agencies fundamentally involve ways of structuring social media use so that it is compatible with the needs and resources of the specific agency and creating the conditions (culture change) to promote effective and efficient use. The policy environment for social media use is complex, comprised of agency, professional, and personal uses with fluid and overlapping boundaries between them (Hrdinová and Helbig, 2011). In a briefing guide for government agencies, they propose the following areas for consideration when designing social media policy: 1) employee access, 2) social media account management, 3) acceptable use, 4) employee conduct, 5) agency content, 6) security, 7) legal issues, and 8) citizen conduct.

The technical issues have begun to be addressed by a number of innovative systems (Hiltz and Gonzalez, 2012; Hiltz and Plotnick, 2013), as well as the use of "voluntweeters" (St. Denis, Hughes, and Palen, 2012). For example, Cameron, Power, Robinson, and Yin (2012; see also Yin et al., 2012) describe ongoing work with the Australian Government Crisis Coordination Center (CCC) to detect, assess, summarize, and report messages of interest for crisis coordination published by Twitter. They developed a platform and client tools, collectively termed the Emergency Situation Awareness – Automated Web Text Mining (ESA-AWTM) system, to demonstrate how relevant Twitter messages can be identified and utilized to inform the situation awareness of an emergency incident as it unfolds. Related work and systems for automatic extraction and classification of tweets has been conducted by a group of researchers at the Quatar Computing Research Institute (Imran, Elbassoumi, Castillo, Diaz, and Meier, 2013). Their objective is to build and test a system that will automatically extract and classify valuable (useful) "information nuggets" (brief, self-contained information items relevant to disaster response) from microblog posts, to provide actionable information that will accelerate disaster response. Their system is referred to as a "Twitter dashboard for disaster response." These systems include the types of features that were most popular with our interviewees. Of course, in order to become government systems, such systems would have to be ramped up to allow for very large numbers of users (note the problems with rollout of the U.S. government system for health insurance), policy and SOP changes would be needed, and security would probably need to be improved.

Mergel and Bretschneider (2013) have proposed a three-stage model for examining social media use in government. The first stage (Stage 1: Decentralized, Informal Early Experimentation by Social Media Mavericks) is characterized by unauthorized, but within the professional context, use of social media. The second stage (Stage 2: Coordinated Chaos: Making the Business Case for Social Media) is characterized by an increased awareness of the use of social media in the organization and the emergence of informal standards for use. Finally, in the third stage (Stage 3: Institutionalization and Consolidation of Behavior and Norms), standards are set for both the technology used and the permissible behaviors of the users. Our findings suggest that the use of social media for pushing data to the public is more likely to be in Stage 3 (in terms of Mergel and Bretschneider's 2013 model) than is the use for pulling data, because of barriers such as lack of trust in pulled data and limited policies and procedures for using social media to pull data.

Mergel and Bretchneider (2013) note that "Some authors have argued that the effects of new technology are typically mitigated by preexisting rules and regulations and therefore do not necessarily lead to wholesale change (p. 390)." Our research supports that by our finding that a significant barrier to the use of social media is the lack of policies and procedures to permit it. The need is clearly there to assure the policy makers and the EMs that the data pulled is both manageable and trustworthy in order for use of it to be institutionalized, resources allocated for its use, and policies and procedures to be developed, thus moving social media use in EMAs to Stage 3 of Mergel and Bretschneider's model. Thus, another contribution of our work is to raise the awareness of technologists that the needs of the EMAs and the ability to reassure the EMs and policy makers of

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the feasibility (in terms of such factors as trustworthiness and information overload management) are crucial to the effective use of the innovations that social media technology can bring.

The major limitations of semi-structured interviews are the amount of time needed per subject, and thus the small number and unrepresentative sample of subjects that inevitably results. In our study, we followed the "best practices" standards for conducting and analyzing semi-structured interviews that result in qualitative data. The amount of time expended to schedule the interviews with busy managers, then conduct, transcribe, and code them ranged from about four to eight hours per subject. Given the limitation of the small number of subjects included, our results nevertheless suggest several actions that can be taken in U.S. government agencies to encourage and support the use of social media in disaster response.

Another limitation, of course, is that this study is limited to the U.S. It would be useful to compare these results to those for other countries. Thus, a new study based on a large scale structured survey with a more representative sample of respondents in the U.S., ideally accompanied by a replication in other nations, would be advisable to validate our findings and their generalizability.

Despite these limitations, the results of this study provide a deeper understanding of the concerns of those employed at a variety of levels of public agencies in the U.S. as Emergency Managers' (EMs) in terms of their perceptions and uses of social media. We noted that while there is more acceptance of using social media to disseminate information to the public than to collect information from them, there is enthusiasm for technological advancements that can make the collection of data more feasible. The major concerns were noted to be the trustworthiness of crowdsourced data and the lack of personnel and training within the EMA to handle social media data. Additional concerns of note were the lack of policy, procedures, and access to social media.

This contribution can inform technologists and EMs considering how to better support social media use in the future. We have seen that it is not only a matter of better technological tools, but also of needed changes in organizational policies and procedures. This study provides a foundation for further research on the technologies that EMs want, need, and will use, and for EM agencies to update their policies concerning the use of social media in emergency management.

FUTURE RESEARCH

The results of this research have identified a number of barriers to use of social media and possible remedies to overcome these barriers. Through continued research we intend to further explore this, with an intention to ultimately bring together the EM and technology communities in a dialog that can inform the technologists of what is needed, inform the EMs of what is possible, and promote collaboration and communication between the two groups. Through such efforts we believe that we can develop best practices for use of all types of social media, create a synergy between technologists and EMs that will make social media use and development more effective, and promote research that can guide and create enthusiasm for changes in policies and procedures that currently limit the use of social media in crises.

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REFERENCES

1. Bertot, J.C., Jaeger, P.T. and Hansen, D. (2012) The Impact of Policies on Government Social Media Usage: Issues, Challenges, and Recommendations, *Government Information Quarterly,* 29, 30-40.

2. Cameron, M.A., Power, R., Robinson, B and Yin, J. (2012) Emergency Situation Awareness from Twitter for crisis Management, *Proceedings of the WWW 2012- SWDM '12 Workshop*, Lyon, France, ACM, 695-698.

3. Hiltz, S.R. and Gonzalez, J.J. (2012) Assessing and Improving the Trustworthiness of Social Media for Emergency Management: A Literature Review, in: V.A. Oleshchuk (Ed.) *Proceedings, NISK*, Akademika Forlag, Trondheim, Norway, 135-145.

4. Hiltz, S.R. and Plotnick, L. (2013) Dealing with Information Overload When Using Social Media for Emergency Management: Emerging Solutions, *Proceedings of ISCRAM 2013*, Baden- Baden, Germany.

Proceedings of the 11th International ISCRAM Conference – University Park, Pennsylvania, USA, May 2014
S.R. Hiltz, M.S. Pfaff, L. Plotnick, and P.C. Shih, eds.

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5. Hrdinová, J. and Helbig, N. (2011) Designing Social Media Policy for Government, *Issues in Technology Innovation*, Number 4, Brookings Center for Technology Innovation, January, 1-9.

6. Imran, M., Elbassuomi, S., Castillo, C., Diaz, F. and Meier, P. (2013) Extracting Information Nuggets from Disaster- Related Messages in Social Media. Proceedings, *Proceedings of ISCRAM 2013*, Baden-Baden, Germany.

7. Kavanaugh, A.L, Fox, E.A., Sheetz, S.D., Yang, S., Li, L.T., Shoemaker, D.J., Natsev, A. and Xie, L. (2012) Social Media Use by Government: From the Routine to the Critical, *Government Information Quarterly,* 29, 480-491.

8. Meier, P.P., Castillo, C., Imran, M., Elbassuoini, S.M. and Diaz, F. (2013) Extracting Information Nuggets from Disaster-Related Messages in Social Media, *Proceedings of ISCRAM 2013*, Baden Baden, Germany.

9. Mergel, I. and Bretshneider, S.I. (2013) A Three-Stage Adoption Process for Social Media Use in Government, *Public Administration Review,* May/June.

10. Rubin, H.J. and Rubin, I.S. (2005) Qualitative Interviewing: The Art of Hearing Data (2nd Ed)*,* Sage, California.

11. St. Denis, L.A., Hughes, A. L. and Palen, L. (2012) Trial by Fire: The Deployment of Trusted Digital Volunteers in the 2011 Shadow Lake Fire, *Proceedings of ISCRAM 2012*, Vancouver, Canada.

12. Su, Y.S., Wardell III, C. and Thorkildsen, Z. (2013) Social Media in the Emergency Management Field: 2012 Survey Results. *IPP-2013-U-004984/Final report, CNA*, June 2013.

13. Tapia, A. H., Bajpai, K., Jansen, B. J., and Yen, J. (2011) Seeking the Trustworthy Tweet: Can Microblogged Data Fit the Information Needs of Disaster Response and Humanitarian Relief Organizations. *Proceedings of the 8th International ISCRAM Conference,* Lisbon, Portugal.

14. Tapia, A., Moore, K. and Johnson, N. (2013) Beyond the Trustworthy Tweet: A Deeper Understanding of Microblogged Data Use by Disaster Response and Humanitarian Relief Organizations, *Proceedings of ISCRAM 2013*, Baden-Baden, Germany.

15. Yin, J., Karimi, S., Robinson, B. and Cameron, M. (2012) ESA: Emergency situation awareness via microbloggers. *CIKM '12*, 2701-2703.

APPENIDIX A

Excerpts from the INTERVIEW GUIDE FOR EMERGENCY MANAGERS: USE OF MEDIA

We are conducting a study of how government agencies involved in emergency management currently use social media and other sources of information, and how their use of social media might change in the future

A. YOU AND YOUR ORGANIZATION

1. Your organization- (Is it at the local, county, state, or federal level?   In a sentence or two, please briefly describe the mission and role of your organization in disaster management. About how many paid employees and volunteers work on a regular basis?)

2. Your job- (What is your role in your organization?   Are you currently a full time practitioner, part time, a volunteer, a student, or some combination?   How long have you worked for this organization? What other organizations or offices do you report to or cooperate with during disasters?)

B. DECISIONS AND INFORMATION SOURCES

Please think of a specific type of sudden onset disaster with which you have recent experience, such as a tornado or hurricane, and let's review your information needs and sources currently: We would like to address, specifically, the warning/preparedness phase and/or the response phase. That is, at this time, we are not including the planning and mitigation phases of the disaster.

Which disaster have you chosen and when did it occur? .

1. What was the major source of the information required for this decision to be made?   How fast was information from (this source) delivered? Did you have a procedure in place to assess the quality and accuracy of the information? If so, how was quality and accuracy determined? What information was missing from this source, that you needed?

2. What other major sources of information did you use for this incident? (repeat followups for each)

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Now please think about the whole set of actions and decisions that you typically make in all stages of disaster management. . I'm going to start asking some questions about your organization's use of social media, currently and then how your organization might use it in the future.

1. Is social media data (e.g., from Twitter or Facebook or similar systems) already influencing the key decisions? –

    a. Formally through policies and procedures for information gathering and channels?

    b. Informally through use by individuals who then share what they find?

C. CURRENT USE OF SOCIAL MEDIA

1. Does your organization formally or informally make use of Twitter, or any Twitter-like services, or Facebook or similar systems, to disseminate data? If so, please explain.

2. Does your organization formally or informally make use of [these systems] to gather data/learn about emergency situations? If so, please explain.

3. What are the main barriers to your organization's current use of Twitter services and data?

D. FUTURE

1. What about your organization, its policies and its practices will have to change in order for social media data to become more useful to decision-making?

2. What about the social media data itself will have to change in order for it to become more useful to decision-making?

3. Please give your reactions to specific tailoring that might be done for Twitter messages to better support your organization's needs and policies. [options presented were:]

    a. Would you like some way to automatically integrate Twitter feeds into any major information system you currently use for information management?

    b. Would being able to view Twitter data as generated by **categories of users** like— (a) NGOs only, (b) local government representatives only, (c) residents/beneficiaries in the affected area only—be seen as useful to your organization?

    c. Would being able to view Twitter data as generated by **categories of tweets** like— (a) related to shelter needs, (b) medical needs, (c) security needs, etc. —be seen as useful to your organization?

    d. Would being able to view Twitter data as generated by **geographic location,** and some form of customizable GIS display of this data—be seen as useful to your organization?

    e. Would being able to view Twitter data as generated by **sub-events** like— (a) rescue issues, (b) recovery issues, (c) mobilization/logistic issues, (d) infrastructure issues —be seen as useful to your organization?

    f. Would being able to create a customizable **"folder"** for your organization, in which a set of Twitter subscriptions was made to meet your organizations needs for each disaster response-- be seen as useful to your organization?

4. Do you have any other observations or thoughts about the future use of social media by your organization to manage disasters?

E. ADDITIONAL COMMENTS

Is there anything else you would like to tell us about your organization's use and/or perceptions of use of Social Media?

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