

Reusing social media information in government

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A B S T R A C T

Across policy domains, government agencies evaluate social media content produced by third parties, identify valuable information, and at times reuse information to inform the public. This has the potential to permit a diversity of social media users to be heard in the resulting information networks, but to what extent are agencies relying on private citizens or others outside of the policy domain for message content? In order to examine that question, we analyze the online practices of state level government agencies. Findings demonstrate that agencies emulate offline content reuse strategies by relying predominately on trusted institutional sources rather than new voices, such as private citizens. Those institutional sources predominantly include other government agencies and nonprofit organizations, and their messages focus mostly on informing and educating the public.

Keywords:

Reuse of public sector information
Social media content analysis
Social media sharing practices
Twitter
Emergency management

1. Introduction

Government agencies increasingly monitor, analyze, and interpret social media content produced by other users to understand the public's mood (Zavattaro, French, & Mohanty, 2015), gain insights from other users (Sutton et al., 2013), and monitor the reach of government curated content. Some of that social media content is then reused and reshared with the public (Mergel, 2013a). This latter practice is important because resharing is oftentimes seen as a tacit endorsement of an online actor and a confirmation of the trustworthiness of its content, which potentially raises the profile of the account from which information is shared. It also has implications on the diversity of actors and ideas in circulation and on who is considered to be relevant within these virtual conversations (Bruns & Stieglitz, 2012; Sutton, League, Sellnow, & Sellnow, 2015).

The existing literature on social media use offers scant evidence, however, regarding what types of accounts and what types of message content government agencies reshare with their followers. This gap is relevant to broader research on social media's effects on public participation and interagency collaboration. On the one hand, research demonstrates that certain government agencies have incorporated tactics to engage citizens (Meijer & Thaens, 2013; Linders, 2012) as well as other agencies (Sutton et al., 2013). On the other hand, some research highlights the propensity of many agencies to repurpose offline practices that are not inclusive of online actors with potentially relevant

information (Bryer & Nelson, 2013; Mergel, 2012; Reddick & Norris, 2013).

Resharing content represents one interactive tactic and warrants attention. This article examines what social media sources government agencies decide to share, asking whether these actors are new voices such as private citizens and organizations not normally engaged in the policy domain or whether they are established actors (e.g., other institutions engaged in the policy domain). In order to understand the online practices of government agencies, we chose a specific subset of public managers—emergency managers in all U.S. states who are working in incident driven environments and who have to constantly rely on external information. Findings demonstrate that agencies emulate offline content curating strategies by selecting predominately trusted institutional sources rather than new voices. Yet at the same time those selected institutions represent a cross section of agencies working in the policy domain and provide critical pieces of information that if acted upon could empower the public to coproduce household and community safety.

2. Social media practices in the public sector

Social media platforms such as the microblogging service Twitter facilitate information exchange across a broad array of users (Bruns & Stieglitz, 2012; Southwell, 2013). Government agencies can use those tools to promote public participation and interagency collaboration; however, their practices differ widely and range from those inclusive of new voices to simple adaptations of offline behavior that fail to generate meaningful interaction with others (Mergel, 2012).

Some government agencies implement purposefully inclusive tactics (Linders, 2012; Meijer & Thaens, 2013), especially agencies such

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as NASA with their fan based approach to engage diverse audiences in the space sciences or the U.S. Department of Interior with their positive messages about public lands and the emotional appeal of their Instagram photographs. Furthermore, through social media, some government agencies employ crowdsourcing where an institution “proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task” (see *Estellés Arolas & González Ladrón de Guevara, 2012, p. 197*). These tasks can be related to solving specific problems and/or coproducing a specific good or service (*Brabham, 2013*). *Mergel and DeSouza (2013)*, for example, detailed how some federal managers in the U.S. employed social media to promote open innovation initiatives. *Meijer (2011)* pointed out how social media platforms in the Netherlands facilitated coproduction by allowing for citizens to provide experiential information and social emotional support to others.

Not all government agencies implement inclusive strategies, however. *Mergel (2012)* found that instead of interacting with constituents, many agencies in the U.S. federal government repurposed existing press release content and relied on preexisting routines in the form of one way communication strategies. *Reddick and Norris (2013)* as well as *Bryer and Nelson (2013)* demonstrated that local government agencies were not necessarily social via social media either; that is, they did not seek to engage the public in two way conversations but rather posted one way message content.

March (1991) theorized that public sector personnel regularly weigh the costs of exploring and implementing new ideas against the certainty of maintaining existing standard operating procedures. In deed, this tension between exploration and exploitation is present in public administration and has manifested in the past during the implementation of various types of information and communication technologies (*Fountain, 2001; Norris & Reddick, 2013*). Understanding the extent to which agencies implement new ideas as opposed to repurposing existing strategies contributes to our knowledge of social media adoption and use. To differentiate sources of information, we must first, though, identify which sources government personnel consider to be established and trusted and which are considered to be new voices.

3. Traditional Information sources and patterns of exchange

Traditional bureaucratic patterns of information exchange in public administration have long been criticized for their fragmented structures in which information is restricted to a few select actors (*Churchman, 1968; Fountain, 2001; Roberts, 2011*). This problem is particularly germane to emergency management because risk and disasters affect a range of people, organizations, and jurisdictions, and, therefore, requires information from disparate actors in order to meet the public's needs (*Comfort, 2005; Kapucu, 2006*).

As a profession, emergency managers have consequently promoted the importance of not just relying on each other for information; they also draw from a variety of other sources. *Comfort (2005)* illustrated a communication infrastructure in emergency management in which multiple organizations including utility companies, public safety departments, and others contribute information to a central command center, particularly during large scale incidents. Other sources important to practitioners include meteorologists and seismologists who offer alerts and warnings (*Mileti, 1999*), engineers and planners (*Knowles, 2012*) who develop evidence based mitigation strategies, and psychologists and sociologists who illuminate the tendencies of individuals during extreme events (*McEntire, 2007*). There are consequently an array of information providers that are considered to be trusted sources for government emergency managers.

Public information officers are asked to use those information sources to develop their agency's external message strategies. Their desired outcome is to create and maintain an accurate set of messages that leads to more informed and effective decision making by other

individuals and organizations (*Comfort, 2007; Kapucu, 2006; Haddow & Haddow, 2014*). Public information officers have been trained to carefully vet information before they pass it along to the public (*Hughes & Palen, 2012*). Inaccurate information (e.g., underestimating the impact of a storm, disseminating incorrect evacuation routes, or promulgating reports regarding incidents that have not actually occurred) can lead people to make suboptimal risk reduction decisions (*Lindell & Perry, 2012*). Consequently, emergency managers must be careful not to propagate unsubstantiated rumors and information.

Still, public information officers and other personnel have the responsibility to assess and communicate vital pieces of information. Organizations in the field may or may not be in communication with each other (*Robinson, Eller, Gall, & Gerber, 2013*) or with members of their own organizations (*Butts, Petrescu Prahova, & Cross, 2007*); they may or may not have access to the intelligence created by those coordinating the emergency operations center (*Comfort, 2005; Kapucu, 2006*). This creates the problem of information asymmetry in which valuable information exists but is unavailable to all those who need it (*Comfort, 2007*). To solve this problem, *Comfort (2005, 2007)* and others (*Kapucu, 2006; Hu & Kapucu, 2014; Mendonça, 2007*) have advocated for expanded access to information and communication technologies. *Reddick (2011)* reported that most state emergency managers considered both Internet based and wireless based technologies to be effective. What those designs do not necessarily account for, however, is access for citizens, emergent groups, and organizations outside of the policy domain. Citizens have traditionally contributed information formally through 911 call centers and a structured interview protocol that creates a record of interaction with other agencies. However, their access to the resulting intelligence is relegated by intermediaries such as the traditional news media or the formal press release style information sharing model of government agencies (*Tierney, Lindell, & Perry, 2001*). The emergence of social media channels such as Twitter or Facebook, however, offers a means to expand communication and interaction with those actors (*Hughes, St. Denis, Palen, & Anderson, 2014; St. Denis, Hughes, & Palen, 2012*).

4. Social media and emergency management

Many emergency management agencies use social media to send out information during all phases of the emergency management cycle (e.g., prevention, mitigation, preparedness, response, and recovery) (*Wukich & Mergel, 2015*). This practice was established by the Federal Emergency Management Agency (FEMA) as part of their whole community approach to use social media as a linking mechanism to enable a two way dialog between government personnel and the people served (*Fugate, 2011*). So far, however, empirical evidence shows that government actors' practice is to simply disseminate information and less frequently interact with citizens to advance dialog, diffuse rumors, and/or respond to direct requests (*Hughes et al., 2014; Wukich & Mergel, 2015*). Furthermore, *Su, Wardell, and Thorkildsen (2013)* reported that most state emergency management agencies fail to systematically monitor citizen information and thereby miss the opportunity to use citizens' knowledge who are considered by FEMA to be the ‘first responders’ and possess first hand information from their observations of an incident. Consequently, government agencies fail to achieve significant levels of public participation, a frequently espoused goal during the adoption of social media programs (*Bryer & Nelson, 2013; Mergel, 2012*). Notable exceptions include certain large scale response operations in which responders directly engaged with constituents (*Chatfield, Scholl, & Brajawidagda, 2013; St. Denis et al., 2012*) and the U.S. Geological Survey's “Did You Feel It?” campaign that elicits feedback following seismic activity (*Atkinson & Wald, 2007*).

An important problem experienced by emergency managers is that much of the information posted on social media is erroneous (*Hughes & Palen, 2012; Starbird, Maddock, Orand, Achterman, & Mason, 2014*). Unlike traditional communication systems such as 911, social media

networks facilitate viral rumor spreading and false information (Starbird et al., 2014). Identifying and correcting false rumors represent key tasks for emergency management personnel (Hughes & Palen, 2012; Starbird et al., 2014) and can be done manually or through machine assisted tactics (Latonero & Shklovski, 2011). The concern regarding veracity, therefore, might make personnel reluctant to amplify messages from unknown and untrusted sources.

While agencies may not be aggressively promoting public participation, there is some evidence of increased communication with other agencies. For example, Tapia and Moore (2014) reported that agencies tend to use social media “only within their known community and extended network” (p. 483). Sutton et al. (2013) illustrated patterns of interagency communication following the BP Oil Spill in 2010 as many agencies tried to make sense of recovery operations.

Generally, it has become relatively common for government organizations to passively monitor their colleagues' updates for situational awareness (Kavanaugh et al., 2012; Su et al., 2013; Wukich, 2015) and then forward those messages deemed most valuable to their followers (Hughes et al., 2014). This type of communication supports the maintenance of a common operating picture in which multiple actors draw relevant information to inform decision making (see Comfort, 2007). However, little research has been conducted regarding who these content providers are, and what type of content they generate via social media.

Based on the existing literature, we assume that emergency management agencies likely reshare information via social media on a regular basis. Moreover, we assume that that information is derived from traditional government channels as opposed to new voices because public information officers cannot quickly vet the credibility of unknown users and the veracity of their messages. To examine these assumptions, we empirically analyze a collection of social media messages by emergency managers operating at the state level in the U.S.

5. Research design

5.1. Data collection

For this research, we collected and analyzed the 8671 tweets from state emergency management agencies over a three month period. In all, agencies retweeted 2986 messages, which accounted for 34.4% of their entire message content. Our assumption was that the state emergency management agencies forwarded content they felt to be valuable or interesting enough to share publicly. This can be accomplished through retweeting, a Twitter convention that allows users to forward existing content posted by other users to their followers. This decision to share content represents a validation of sorts and helped us to identify content as well as the knowledge producers that government organizations deemed as valuable within their network.

State level agencies represent a prudent source of data because generally, unlike local governments, they dedicate a number of personnel, as well as resources, to develop their social media capabilities (Su et al., 2013). These capabilities provide the basis for careful monitoring and message development practices.

Our data consist of all Twitter content disseminated by state emergency management agencies in August, September, and October 2013. During this time, a range of large scale incidents occurred including catastrophic flooding in Colorado, blizzards in North and South Dakota, and the Navy Yard shooting in Washington, DC. Whereas most research on the use of social media in emergency management focuses on a single large scale disaster (Hughes et al., 2014; Sutton et al., 2013), our data allows us to examine government behavior that spans smaller scale incidents, periods of calm, as well as large scale incidents. Because of the breadth of the data, we are able to investigate all phases of emergency management (e.g., prevention, mitigation, preparedness, response, and recovery) and all geographic regions in the U.S. This enables us to identify a large information network with a diverse set of actors.

To identify state emergency management agencies' Twitter accounts, we reviewed each organization's website, which reduced the likelihood of selecting unofficial accounts (see Sutton et al., 2014; Wukich & Mergel, 2015). Three states, Colorado, Delaware, and Missouri, advertised two accounts each. For unadvertised accounts, we conducted Google and Twitter searches. In all, we identified 48 states that maintained a presence on Twitter.¹

Using those account names as a seed list, we used a scraping program designed by our team to collect all messages from Twitter's application programming interface (API) during our period of observation. Along with timestamps and message content, we collected data on whether the message had been retweeted and, if so, from what account the message originated. Out of the 8671 messages, 2986 were retweets (34.4%). Forty states retweeted content (mean 74.65; median 20.50; SD 151.88; max 663; min 1). This evidence facilitates the identification of information sources as well as types of message content.

5.2. Data analysis

In order to detect who produced valuable content and in what context they provided that content, we manually assigned attributes to both the accounts retweeted as well as the messages themselves. We identified a total of 725 retweeted accounts and determined whether those accounts belonged to a government agency, a nonprofit organization, a for profit organization, a media outlet, or a private citizen. We broke those categories down further for additional analysis and identified different types of government and nonprofit organizations based on organizational mission (e.g., general government, public safety, and others) and geographic scale (e.g., the municipal, county, regional, state, national, and international levels).

Using established typologies of message content (see Sutton et al., 2014; Wukich, 2015), we manually coded each retweeted message to determine whether it conveyed protective action information including warnings and advice; situational information including but not limited to hazard impact; updates on agency operations; guidance related to preparedness activities; or administration related information such as the schedules of executive officials. We also identified the emergency management phase to which the message pertained. For analysis, we used descriptive statistics in the form of frequency distributions and cross tabulations. Additionally, a social network analysis was conducted to determine the extent to which state emergency management agencies retweeted the same accounts. A one way network was modeled with ties representing state agency retweets. This enabled us to identify a number of accounts that were retweeted by multiple agencies. Our analysis was facilitated using the software package UCINET (Borgatti, Everett, & Freeman, 2002).

6. Findings

6.1. Types of retweeted Twitter accounts

During the period of observation, state emergency management agencies retweeted 2986 messages which originated from 725 individual Twitter accounts. Table 1 illustrates the frequency distribution of retweeted accounts by type. Government agencies (70.6%) were retweeted at much higher rates than nonprofits (10.9%), news media outlets (10.5%), private citizens (5.8%), and private sector commercial interests (2.2%). The sources of information in this network were there fore primarily government agencies.

The preference for other government content is reaffirmed when we examine the frequency distribution of retweets by account type (see Table 2). There was also a preference for nonprofit generated content.

¹ Idaho and Pennsylvania did not possess Twitter accounts during our period of observation. Alaska had an account, but it was inactive from July 26, 2013 to April 23, 2014.

Table 1
Frequency distribution of retweeted accounts.

	N	%
Government	512	70.6
Nonprofit	79	10.9
Media	76	10.5
Private citizens	42	5.8
Commercial	16	2.2
Total	725	100

In all, 93.7% of all retweets originated from a combination of official government and nonprofit sources. Half of those accounts were retweeted more than once. The average government account, for example, was retweeted 4.76 times (median 2; SD 10.46), and the average nonprofit account was retweeted 4.58 times (median 2; SD 13.39). The two most frequently retweeted accounts over our period of observation were The Great Washington Shakeout (118) and FEMA Region 3 (101) which is located in Philadelphia, Pennsylvania.

These findings support our first assumption which suggests that emergency managers tend to retweet mostly other government generated information (81.6%). While they retweeted a notable percentage of nonprofit generated information (12.1%), those sources were from organizations with long histories of emergency management work, such as the American Red Cross. Consequently, there appears to be a reliance on content from trusted, reliable sources in the form of government agencies and credible nonprofits. State emergency management agencies relied less frequently on other types of information providers and rarely shared citizen generated information.

Who were the specific government and nonprofit agencies that state level emergency management agencies relied on for social media content? To better understand the nature of those accounts, we categorized them by organizational mission as well as the geographic scale upon which they operated (e.g., the municipal, county, regional, state, national, and international levels). Table 3 cross tabulates organizational missions by geographic scale for the different types government accounts.

With respect to government accounts, we observed a range of organizational missions. First and most numerous were emergency management agencies (122), which constituted 23.8% of all actors. They represented municipal, county, regional, state, and national levels of government, although retweeted content, overall, tended to originate from state (33.0%) and federal (29.3) sources.

Organizations with a focus on meteorology (71) were the second most retweeted type of government agency (13.9%). These agencies were primarily regional National Weather Service offices that provided alerts and warnings which state emergency management agencies regularly passed along to their own followers. General purpose governments (59), particularly at the municipal and county levels, constituted 11.5% of all government agencies. Those accounts included mainly the official municipal or county Twitter pages for a jurisdiction. Other prevalent types included police, public health, and fire departments all related emergency response organizations.

Not all government accounts were agency accounts. Elected officials (24) and executive level personnel also maintained their own official accounts (19). FEMA director Craig Fugate (@CraigAtFEMA) is one example; he was widely retweeted within our period of observation. The

Table 2
Frequency distribution of retweets by account type.

	Retweets	%	Mean	Median	SD	Max	Min
Government	2436	81.6	4.76	2	10.46	101	1
Nonprofit	362	12.1	4.58	2	13.39	118	1
Media	100	3.4	1.32	1	0.66	3	1
Private Citizens	62	2.1	1.48	1	2.18	15	1
Commercial	26	0.9	1.63	1	0.96	4	1
Total	2986	100	-	-	-	-	-

Table 3
Relationship between type of government and geographic scale.

	Town	County	Region	State	Nation	Total	%
Emergency management	18	49	5	29	21	122	23.8
Meteorology	0	0	0	1	70	71	13.9
General-purpose	31	14	1	11	2	59	11.5
Police	11	17	4	17	2	51	10
Public health	1	7	0	18	13	39	7.6
Fire	7	5	5	12	3	32	6.3
Parks & land mgmt.	1	0	0	10	15	26	5.1
Elected officials	3	1	0	18	2	24	4.7
Transportation	0	0	4	17	2	23	4.5
Military	0	0	0	6	6	12	2.3
Education	1	1	4	4	0	10	2
Environmental	1	0	0	7	1	9	1.8
Regulatory	0	0	0	6	2	8	1.6
Other	0	0	0	2	5	7	1.4
Earth sciences	0	0	0	1	2	3	0.6
Information tech.	0	0	0	3	0	3	0.6
Utilities	0	1	0	1	1	3	0.6
Agriculture	0	0	0	2	0	2	0.4
Economic development	0	0	0	1	1	2	0.4
Homeland security	0	0	0	1	1	2	0.4
Public works	1	0	0	1	0	2	0.4
Corrections	0	0	0	1	0	1	0.2
Housing	0	0	0	0	1	1	0.2
Total	75	95	23	169	150	512	100

director's popularity is fitting because he has been an active proponent of social media in emergency management (see Fugate, 2011).

While state emergency management agencies retweeted content from a range of public sector organizations, they tended to retweet nonprofits with an emergency management mission (65.8%) such as regional chapters of the American Red Cross. Other less frequently retweeted sources included animal rescue organizations, volunteer fire departments, and community development organizations.

Table 4 lists the most frequently retweeted accounts from all sources. Some accounts owed their rankings to a relationship with one particular state emergency management agency. Others were widely retweeted across the country. Fourteen of the top 15 accounts were public sector organizations; the one nonprofit organization's mission was to coordinate preparedness exercises with government agencies. Four of the top 15 accounts came from Washington State. During our period of observation, their state emergency management division helped to organize a well publicized earthquake drill which was referred to as The Great Washington State Shakeout, and the state agency retweeted a total of 118 shakeout messages. This agency also retweeted the second most content of all other state agencies (628 messages).

Colorado's Division of Homeland Security and Emergency Management retweeted the most content (663 messages). Their focus was in response to catastrophic flooding which occurred throughout much of the state in September 2013. They disseminated content from local

Table 4
Most frequently retweeted accounts.

Agency	Account	State	Retweets
The Great Washington Shakeout	washakeout	WA	118
FEMA Region 3	femaregion3	PA	101
Ready.Gov	readygov	DC	99
Citizens Corps	citizen_corps	DC	92
FEMA Region 8	femaregion8	CO	74
Boulder Office of Emergency Mgmt.	boulderoem	CO	59
WA Dept. of Natural Resources	wadnr_fire	WA	55
FEMA	fema	DC	53
National Hurricane Center	nhc_atlantic	FL	45
Texas Dept. of Public Safety	txdps	TX	37
Craig Fugate	craigatfema	DC	36
WA Health	wa_deptofhealth	WA	34
WA Natl Guard	wa_natl_guard	WA	33
CO Dept. of Public Health & Environment	cdphe	CO	32

level actors (see the Boulder County Office of Emergency Management @boulderoem), state level actors (see the Department of Public Health and Environment @cdphe), and federal level actors (see FEMA Region 8 @femaregion8). Much of Colorado's retweeted content was intended to provide citizens and other responders with an array of response and recovery related information.

Not all accounts were state specific; several top retweeted accounts garnered attention from multiple agencies. Fig. 1 illustrates how state emergency management agencies created a more centralized information network by retweeting the same accounts.

Table 5 presents the most popular accounts. As illustrated in Fig. 1, among the accounts that emergency managers deemed as valuable information providers are FEMA associated accounts which were retweeted by a number of states including: @readygov (17), @fema (14), @citizen_corps (8), @craigatfema (8), @femaregion4 (7), @femaregion8 (6), and @femaregion1 (6). NOAA's account was retweeted by seven states. The National Wildfire Coordinating Group's @inciweb account was retweeted by six state agencies, as was the Center for Disease Control's account (@cdcready). The National Hurricane Center (@nhc_atlantic) also received multistate attention (5) due to their regular hurricane and tropical storm advisories. The fact that these agencies received a notable amount of attention begs the question: what types of content did state emergency management agencies consider valuable enough to retweet?

6.2. Type of retweeted messages

If account attributes give us an idea of who the predominant information sources in the network are, message content analysis offers in sight regarding why those particular accounts were considered to be valuable. During our period of observation, state emergency management agencies experienced a range of incidents. Major events included flooding in Colorado, blizzards in the Dakotas, and the Navy Yard shooting in Washington DC, all of which prompted the dissemination of protective action information. This type of information is designed to

Table 5
Popular Twitter accounts retweeted by state agencies.

Account	States retweeting
readygov	17
fema	14
citizen_corps	8
craigatfema	7
femaregion4	7
femaregion8	7
noaa	7
cdcready	6
femaregion1	6
inciweb	6

inform individuals of the immediate steps they can take to reduce their levels of risk. Examples include alerts and warnings, advisories, and information on closures, openings, and evacuations. State emergency management agencies depended on external content providers for this type of information, including the National Weather Service and local governments. The Colorado Division of Homeland Security and Emergency Management, for example, relied on local governments for information on matters such as evacuations. Boulder, one of the affected communities, provided relevant content:

RT @BoulderOEM: Evacuation ordered: Mouth of Boulder Canyon to Broadway, Pearl to Marine GO TO HIGHER GROUND immediately #boulderflood.

That retweet offered warning and advice with specific information regarding a mandatory flood evacuation. By retweeting the message, the Colorado agency relayed important information to public officials and other followers which, if read, informed those decision makers' situational awareness and ideally drew additional attention to the situation. During other incidents across the country, state emergency management agencies retweeted similar content. Additional content

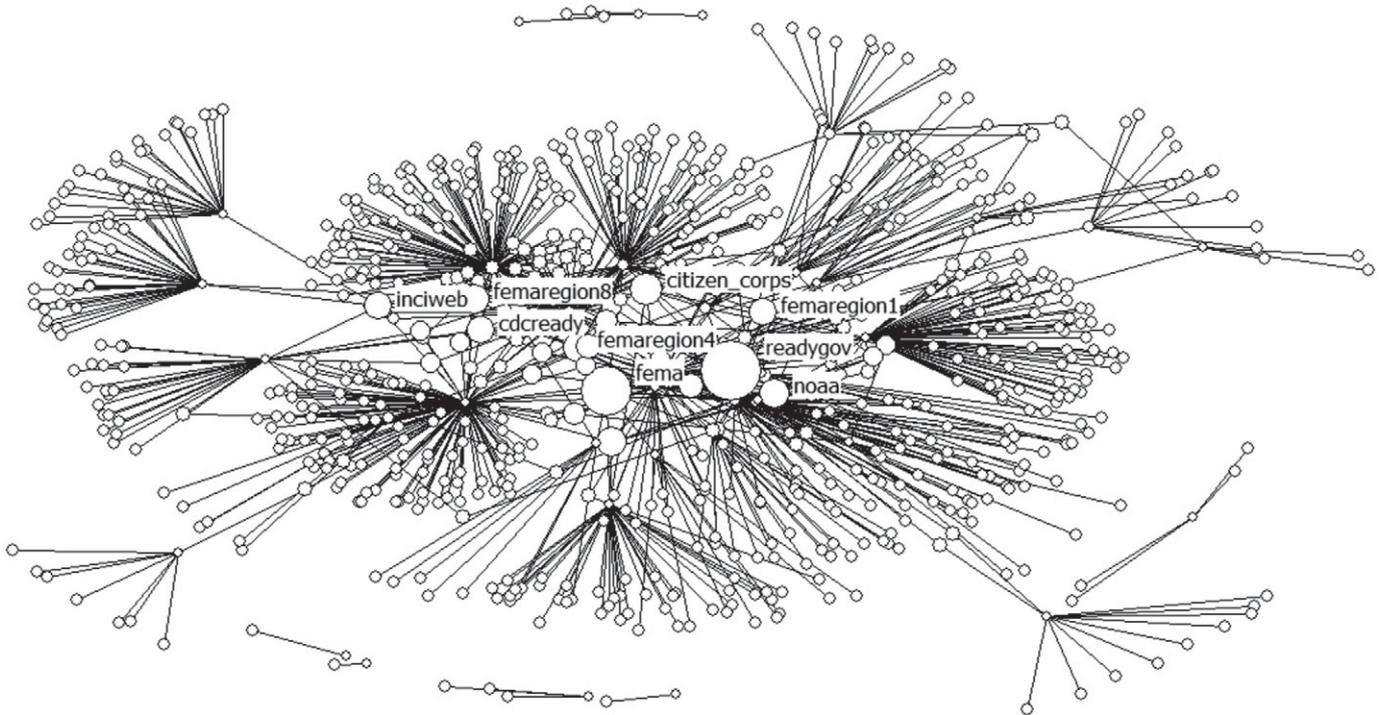


Fig. 1. Network diagram of retweets.

such as hazard impact and situational information contributed to larger common operating pictures. Following a major October blizzard, South Dakota Emergency Management retweeted a county government originated message about Rapid City:

RT @penncoem2: Update: 2 p.m.: With many down trees around the City, citizens have started the process of digging out and...

This message let people know that the town had experienced damage and was now in the response and initial recovery phases. Messages about specific agency operations were retweeted as well. South Dakota retweeted traditional media content regarding state operations to publicize their activities to the public:

RT @NewsCenter1: State Moving Quickly to Assess Blizzard Damage with federal shutdown ending.

Not all response related messages, however, were focused on large scale disasters. The vast majority of incidents were relatively low impact storms and traffic accidents. The National Weather Service's regional offices provided a large quantity of content related to warnings and advisories. For example, Arizona Emergency Management was one of many agencies that consistently passed along National Weather Service forecasts and advisories:

RT @NWSFlagstaff: Scattered Thunderstorms will impact I 40 between #Winslow and Two guns in the next hour. Slow down for heavy downpours. #....

Surprisingly, though, response related information was not the most frequently retweeted content. State emergency management agencies were more likely to disseminate preparedness related information intended to educate individuals on how to reduce their risk to various hazards prior to an actual emergency occurring. Table 6 reports the frequency of retweets by emergency management phase and the average rate at which state emergency management agencies retweeted related content.

Comparatively less attention was given to recovery efforts (11.8%), although states such as Colorado and South Dakota that experienced large scale incidents relayed important recovery information to citizens, particularly the availability of federal, state, and local resources. Weld County, Colorado provides one such example:

RT @weldgov: Weld County #Disaster Recovery Center will open to the public from 8 a.m. 2 p.m. Tues. #COFlood.

Those types of disaster recovery centers included personnel from federal, state, and local agencies. In addition to recovery messages, many states relayed some administrative oriented messages regarding agency and elected official activities. Fewer states promoted prevention and mitigation activities. Of those messages retweeted, prevention retweets were usually related to structure fires; mitigation retweets promoted flood and other insurance programs.

While an array of organizations and message types were retweeted, the vast majority of messages were derived from government and non profit organizations and pertained to preparedness and response activities.

Table 6
Frequency distribution of retweets by emergency management phase.

	Retweets	%	Mean	Median	SD	Max	Min
Preparedness	1155	38.7	28.88	6	68.617	356	0
Response	1142	38.2	28.55	6	56.802	283	0
Recovery	352	11.8	8.8	0.5	44.572	283	0
Administrative	171	5.7	4.28	1	12.72	78	0
Prevention	129	4.3	3.22	0	8.496	48	0
Mitigation	37	1.2	0.93	0	3.125	19	0
	2986	100	-	-	-	-	-

7. Discussion

Our research examined a specific social media practice of public managers in state emergency management agencies, the resharing of information on the state's official Twitter account from mostly government and nonprofit sector actors. State level agencies served as information curators who identified valuable or interesting content, vetted sources, and relayed content to their followers. While new voices such as citizens' perceptions of the impact of an emergency or their need for support were not emphasized, the expanded information network provided an array of warnings and preparedness tips that if acted upon could empower the public to coproduce household safety and community resilience. These findings contribute to our understanding of how government agencies actually use social media, and reaffirms their reluctance to directly engage new voices (see Bryer & Nelson, 2013; Mergel, 2012; Reddick & Norris, 2013).

The practices we investigate are valuable because they confirm the notion that government agencies tend to rely on formal information available in the hierarchy of government itself (see Mergel, 2012; Tapia & Moore, 2014). Standard operating procedures that were practiced and proven offline are repurposed into online tactics. Hughes and Palen (2012) established that despite the diversity of social media sources, public information officers are still quite careful to ensure the veracity of their agency's posts and are reluctant to promulgate unvetted information. Erroneous information may lead people to make decisions with negative consequences, especially during a disaster. Agencies then are held to account, if not with respect to legal liability (Nicholson, 2007), then in the court of public opinion (Boin, t'Hart, Stern, & Sundelius, 2005). Even simple mistakes that do not lead to the loss of life and property or any citizen inconvenience may still erode the public's confidence in that agency. Emergency managers, therefore, take pains to ensure the validity of the information they disseminate.

If agencies rely predominantly on the organizations with which they interact outside of social media, what makes our findings relevant? Social media platforms expand public accessibility to the online government information sharing dynamic. Everyone with Internet access can obtain the information generated and participate in its consumption and vetting, whereas only a limited group of agencies would have had access to this type of information exchange in the past through official and bounded information networks (see Comfort, 2005; Kapucu, 2006). This creates an interagency platform for information exchange, but also a larger community knowledge commons from which many draw on for situational awareness and protective action information; and this begins to fulfill the expectations of researchers with respect to information and communication technology as a means to break down barriers (see Comfort, Boin, & Demchak, 2010; Fountain, 2001; Ostrom & Hess, 2007; Roberts, 2011). These online practices expand access to critical pieces of information that empower citizens to coproduce household safety, which in turn contributes to the overall resilience of a community (Wukich, 2013). So while the voices of private citizens and other organizations are not amplified in these networks, the public does benefit from expanded access to the knowledge generated.

8. Recommendations for practitioners and future research

Government agencies operating in different policy domains may be more or less inclined to retweet external content. One point for consideration is the level of risk in which these agencies operate. Agencies operating in high risk environments may be more apt to incorporate social media into their standard operating procedures; the opportunities to triangulate social media updates from a wide variety of different sources can lead to increased intelligence and support the mission of these organizations. Relatedly, differences in organizational culture and the value that organizations place on assessing new information are factors to consider. Agencies that view themselves as the sole information authority may be less likely to include external information or disseminate

information from other sources. This might be true for regulatory agencies that have enforcement functions. Conversely, agencies that offer popular services such as state parks systems may be more inclined to adopt the kind of fan based approach used by NASA and the U.S. Department of the Interior, which actively seeks out and amplifies external content that supports agency operations.

Public managers outside of emergency management are under similar pressure to ensure information veracity may also choose to rely on established, institutional sources. Based on the common characteristics of the source types that we analyze, we would surmise that the following information signals whether a source can be trusted: (a) official account status from known public or nonprofit organizations; (b) no known history of posting erroneous information; (c) the demonstration of professional language as opposed to informal commentary; and (d) information relevant to the operations at hand or hazards germane to a relevant jurisdiction.

Our findings are couched in the context that agencies are still developing standard operating procedures on how to monitor and release information on social media. This article tells an early adopter story. Social media platforms such as Twitter offer non traditional tools with the potential to increase levels of transparency, public participation and collaboration in government operations (Mergel, 2012). Emergency managers must reconcile these new capabilities with the command and control culture pervasive within their field (Hughes & Palen, 2012). While we observed some very interactive agencies such as Washington State and Colorado, we also noted that ten states either retweeted nothing or in the case of Alaska, Idaho, and Pennsylvania, actually generated no original content whatsoever. All other states' actions ranged in between. This variation, along with the fact that policies governing social media implementation are inchoate across the country (see Mergel, 2013b), justifies further investigation.

We see the need to conduct further research to better understand the operational as well as strategic decisions state emergency management agencies make, or their perceptions about the importance of online interactions that lead to their online practices observable on social media. For example, we also assume that online retweeting practices depend on who is in the drivers' seat, so to speak. Those public information officers with more experience in using social media as part of their official information sharing strategy might be more prone to retweet content they previously identified as accountable and trustworthy. Other agencies might be lagging behind in their practices or simply do not experience statewide emergencies, so that a need for immediate information sharing and monitoring is not a priority.

Another related area ripe for research is how public information officers might integrate volunteers or crowdsourcing tactics to collect, vet, confirm, or even create valuable information during incidences since their responses may oftentimes be faster than those of the emergency management agencies. Agencies may not be retweeting content created by private citizens, but that does not mean that they do not have the means to evaluate the information being posted. As an example, virtual operation support teams have emerged who support information collection and vetting procedures and provide the final results to emergency managers. A few outstanding examples are @OregonVOST or @CanVOST in Canada.

It is important to conduct additional research to understand how virtual monitoring happens, how the vetted information from social media can be moved into formal decision making processes, and how big data interpretation is then used to deploy resources to the scene. This type of research would also address the (potentially low budget) infrastructure needed to effectively incorporate social media data into existing standard operating procedures.

9. Conclusion

Social media technologies and especially the public newsfeed on Twitter provide government agencies access to information generated

by a range of sources. Government agencies reuse and share some of that information with their own followers. Our analysis demonstrates that government agencies relied on formal information available in the hierarchy of government itself as opposed to new and alternative voices. While government agencies shied away from amplifying private citizens and organizations not regularly involved in the policy domain, they did promote a range of other institutional accounts. The result was the creation of a larger knowledge commons that broke down institutional silos and provided organizations and citizens alike with critical pieces of information to coproduce household and community safety. In addition, the retweeted accounts articulated the online network to which government agencies paid attention, and researchers as well as practitioners are able to identify which other organizations government considers as reliable information sources.

Practitioners may be disinclined to retweet content from unknown sources, fearing the promulgation of erroneous information or associating their agencies with potentially disreputable individuals. However, the amplification of supportive messages from minimally vetted sources provides a lower risk approach that may engender increased public participation. NASA and the U.S. Department of the Interior have demonstrated those tactics via their fan based approach. All agencies, however, especially those operating in high risk environments must ensure the veracity of the messages they choose to share; therefore, the reliance on trusted, institutional sources appears to be safe practice in including external information.

Acknowledgements

The authors thank Professors Louise K. Comfort, Naim Kapucu, Scott Robinson, and Todd R. La Porte for their helpful feedback at the Public Management Research Conference (PMRC), Minneapolis, Minnesota, June 13, 2015. We are also obliged to the journal's reviewers for their substantive critiques. We thank Dr. Alan Steinberg and Mr. Johnny Nguyen for their work in developing our data collection tool. This project was supported by SHSU's College of Humanities and Social Sciences, the Department of Political Science, and the Center for the Study of Disasters and Emergency Management.

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