

User-generated content on the Facebook pages of emergency management organisations: Perspectives of emergency management administrators

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Abstract

This article examines the benefits and challenges of user-generated content (comments) on the Facebook pages of emergency management organisations (EMOs) that manage natural disasters. Although organisational communication literature acknowledges the use of social networking sites (SNSs) for information dissemination as part of emergency management, less attention has been paid to comments posted by external organisations and members of the public. To address these gaps in the literature, this article presents preliminary findings from a qualitative study of user posts on the Facebook page of two publicly funded EMOs. An information classification framework is adopted to understand the technological, organisational and social implications of these posts. This interpretive research employs a manual thematic analysis of text comments; it is followed by a qualitative semi-structured interview with seven emergency management administrators. Preliminary findings indicate that a study of comments posted by users to EMOs' SNSs can yield valuable lessons for stakeholders from past emergencies.

Keywords: emergency management organisations; Facebook; information classification framework; social networking sites; user-generated content

Introduction

The global disaster statistics released by the United Nations Office for Disaster Risk Reduction indicate that there have been 395 cases of extreme temperatures, 470 droughts, 2689 storms, and 3455 floods (UNISDR, 2017a). Disasters have impacted the global economy as well as human life, resulting in total damage worth \$1.4 trillion, affecting 1.7 billion people, and over half a million people losing their lives (UNISDR, 2017b). Thus the effects on communities of natural disasters have been widespread despite the development in communication technologies.

In recent years, social networking sites have played a significant role in emergency management by disseminating and accessing information from the public (Simon, Goldberg & Adini, 2015). The participation of the public in emergencies is inevitable

and desirable (Leong et al., 2015), and some of the activities in which the public have taken part after an emergency include evacuation, search and rescue, first aid treatment and providing online help for the affected victims (Simon, Goldberg & Adini, 2015). Hence communicating different types of information among stakeholders is one of the integral tasks in successful emergency management. For instance, during the Alexandria H1N1 and seasonal flu, dissemination of vaccination information through social networking sites by the Health Department helped the public to prepare for an imminent emergency (Merchant, Elmer & Lurie, 2011). Challenges in communication can be organisational, technological and social in nature (Fischer, Posegga & Fischbach, 2016). Hence there is an imminent need among stakeholders (organisations and the public) in emergency management to develop a common understanding of the different types of information posted by users during emergencies. A review of the literature suggests that limited studies have attempted to classify user messages posted on Facebook (Lovejoy & Saxton, 2012). With this evolving question in mind, we ask, 'What are the different types of information (user-generated content) that users post on the Facebook pages of emergency management organisations and what are the resultant implications for users?'

To address this question, we conducted a thematic analysis of user-generated content posted on the Facebook pages of two EMOs. The results of this phase were compared with the results of a semi-structured interview conducted with the seven administrators of the EMOs.

Background

Emergencies are defined as a state in which societies are exposed to vulnerable situations leading to disruptions of normal routines (Kreps, 1984). Emergencies can occur in several forms: natural – for instance, a tornado; technological; a chemical leak; or human actions such as a public shooting, which may result in physical, social, economic or political implications (Houston, Pfefferbaum & Rosenholtz, 2012). Emerging technologies such as social media, video and photo-sharing websites have been used by the public to disseminate information in emergencies such as bushfires and other natural hazards (Haworth, Bruce & Middleton, 2015). The practitioners working in emergency management are still considering how to involve communities in risk reduction (Webber et al., 2017). Research is also underway to examine how tools can be used to monitor coordination among team members in an extremely complex environment such as emergency management (Bearman et al., 2016). The adoption of Facebook and Twitter in an emergency (i.e. a hurricane) indicates that Facebook is more popular than Twitter among Fire and Police Departments (Chauhan & Hughes, 2015). The impact of social media on communication effectiveness during the four states of an emergency (Giacobe & Soule, 2014) and general communication (e.g. on safety and services) has been studied using a mixed-methods approach via content analysis of stakeholder communication and interviews (Denis, Palen & Anderson, 2013).

The literature suggests that there are four states in emergency management: mitigation, preparedness (the pre-emergency states), response and recovery (the post-

emergency states) (Fischer, Posegga, & Fischbach, 2016; Lettieri, Masella & Radaelli, 2009). In the mitigation state (which occurs before and after an emergency), measures are taken to reduce the impact of future disasters. For instance, building a floodway, earthquake resilient buildings, or buying house insurance (FEMA, 2016) are the best practices that can be communicated by the government to the public through social networking sites (ADPC, 2016). In the preparedness phase (which occurs before an emergency), appropriate capacity-building measures (e.g. emergency training drills) should be acquired by organisations and the public to handle and respond to upcoming and future emergencies. Participating in earthquake drills and keeping stock of food and other medical supplies in the emergency shelter are some of the relevant activities in this stage (FEMA, 2016). Such information on best practices accomplished in the preparedness stage can be shared through social networking sites (ADPC, 2016). In the response phase (which occurs during an emergency), immediate assistance should be provided to the public or affected community by the emergency-management stakeholders. Activities in this stage could be getting into a tornado shelter along with family and pets or switching off the power supply to protect electrical equipment (FEMA, 2016), which could be tagged and shared to the public through social networking sites (ADPC, 2016). In the recovery phase (which occurs after an emergency), the affected resources will be rebuilt and restored. The activities in the recovery phase include rehabilitation of the affected public and recording the best practices employed in the recovery phase of disasters for handling future emergencies (ADPC, 2016).

The literature indicates that three types of social support (informational, material and emotional) are critical in emergencies, especially in the response state (Orford, 1992). Informational support refers to communicating updates on an emergency; material support refers to resources provided in an emergency; and emotional support is offered to those victims who are psychologically disturbed in an emergency. Since such support must be delivered to the public in the least amount of time during emergencies (Leong et al., 2015), it is vital to accomplish the communication between stakeholders (organisations and the public) through contemporary emergency-management systems (e.g. social networking sites). Researchers have also identified the communication barriers (technological, organisational and social) in emergency management (Fischer, Posegga & Fischbach, 2016). Further, the social support required in the mitigation, preparedness and recovery states is yet to be explored in terms of the types of user-generated content communicated in emergency management. Hence identifying the types of user-generated content on social networking sites and a systematic way to classify such content to generate a common understanding among stakeholders are vital for effective online communication and to provide social support in emergencies.

The literature indicates that communities and individuals play a significant role in emergencies, since they are the first responders (Palen et al., 2007) in a majority of unpredictable emergencies (Yates & Paquette, 2011). In some of major emergencies, citizens have communicated warnings, requested help, shared images from the ground and established connection with family members through social networking sites (Skarda, 2011). Other studies have used social networking sites in emergency

management for gathering collective intelligence (Gao, Barbier & Goolsby, 2011) and disseminating information (Cheng et al., 2011; Hui et al., 2012). Hence it is evident that social networking sites play a significant role in disseminating information in emergencies. In our view, these studies have examined information from a general communication perspective, but have not examined the types of information posted by users on social networking sites that lead to benefits and challenges to users. In a study of microblogging social networking sites used in emergency management, rumour management was addressed by users either denying or questioning false information, but affirming correct information most of the time (Bruns et al., 2012). By examining the types of information (especially negative information such as criticism or rumour), the potential of Facebook as a self-correcting platform could also be explored. Further, the significance of Facebook remains under-explored in terms of examining the majority of user-generated content in each of the emergency management phases and its implications (benefits and challenges) to users; this is the area addressed by the present study through the following research questions:

RQ1: What are the different types of user-generated content on the Facebook pages of emergency management organisations?

RQ2: What are the implications (benefits and challenges) of user-generated content to emergency management stakeholders?

Methodology

The focus of this study is on the types of content that users post on the public social networking sites (i.e. Facebook) of EMOs. This is a qualitative research project (Bloomberg & Volpe, 2012), which explores an activity (posting content on social networking sites) in a social setting and establishes its implications (benefits and challenges) to users. This study employs thematic analysis (Braun & Clarke, 2006) to collect and analyse data using an information classification framework (Kurian, 2015, 2016). The coded data were analysed following the six steps of thematic analysis (familiarising data, generating codes, searching for themes, reviewing themes, defining and naming themes, and generating a report) to establish prominent themes in emergency management. The steps followed in the research design are outlined below.

- *Step 1:* Emergency management was selected as the domain for this study since effective management of emergencies – which includes successful recovery planning – is a crucial step in the long-term sustainability of societies.
- *Step 2:* Forty-five EMOs were shortlisted based on their focus on natural disasters such as floods, earthquakes or storms. Out of 45 EMOs, only two organisations (one in the United States and one in Australia) satisfied the criterion of communications among users that were regular and recent. These two organisations were selected for data collection in this study. Data posted during the period from January to June 2015 (first organisation) and January to June 2016 (second organisation) were collected, irrespective of any emergency periods. The number of posts coded after cleaning was 944 from the first organisation, while 333 posts were coded from the second organisation.

- *Step 3:* The information-classification framework (Kurian, 2015, 2016) was used to classify user-generated content on organisations' Facebook pages, including all the content posted during a six-month period. The posts were read and analysed using thematic analysis to determine the over-arching themes evident across the entire collection of user posts. Major user-generated content identified among these themes included status updates, criticism, requests, announcements and praise. In this study, media-rich information (photos and videos) constituted only 10 per cent of the total posts and these posts had either text descriptions or captions attached to them. This facilitated the coding process of media-rich information and was classified under one of the five themes described in the findings section.
- *Step 4:* An interview was conducted to compare the types of user-generated posted by users on the Facebook page of EMOs and to establish themes found in the earlier step. Based on the findings established in Step 3, an interview was prepared (Appendix A) and conducted with the strategist/administrators of seven different emergency-management organisations (one in Thailand, two in the Philippines, one in the United States, one in Japan and two in Switzerland). The participants of this interview were responsible for managing the Facebook pages of their organisations. The seven organisations were selected from the 45 EMOs that were shortlisted in Step 2 and who responded to the request to participate in an interview. Before participating in the interview, administrators were given a project briefing that included details on the human research ethics approval received for this project. Participant information and consent forms were emailed to the interview participants and signed consent forms were received before the interview. The seven interviews were conducted between August and December 2016, irrespective of any emergency periods. The administrators of two organisations selected in Step 2 did not indicate their interest in participating in the interview and hence they were not interviewed.

Findings

Phase 1: Analysis of user-generated content

The findings from the classification of user-generated content indicate that status updates, criticism, requests, announcements and praise were the major content posted by users on the social networking sites of EMOs. They also indicate that one of the ways to reduce criticism from the public was to make relevant and timely announcements on EMO Facebook pages, as shown in Table 1 based on an analysis of two datasets. Examples of the relevant types of user-generated content are listed below. To ensure consistency in coding, inter-coder reliability was calculated on a random sample of 14 per cent (dataset 1) using NVivo 10 (Table 1). Thematic analysis (Braun & Clarke, 2006) was used to establish the implications eventuating from user-generated content. The five prominent themes that eventuated from the user-generated content were self-preparedness, emergency signalling solutions, unsurpassable companion, aftermath of an emergency and gratitude towards emergency management staff.

Table 1: Sample quotes and inter-coder reliability

| User-generated content | % (dataset 1) | % (dataset 2) | Example 1 (dataset 1) | Example 2 (dataset 2) |
|------------------------|---------------|---------------|--|--|
| Status update | 42 | 41 | Counties use wheel-driven track system on their rescue trucks. | Getting ready for heavy rain and probable flooding on this side. |
| Criticism | 35 | < 1 | Alerts go crazy. I receive alerts for normal thunderstorms. | Often, we get asked if our rescue boats have fishing rods. (The above comments indicate actions of staff during a flood instead of helping the public.) |
| Request | 12 | 4 | I need a warning for dangerous natural disasters. | Please send any photos from storms or floods since we don't get the best ones during a disaster. |
| Self-Experience | 4 | 2 | My experience is that those who are not able to receive disaster assistance are the complainers. | We struggle to make the public understand the substantial risk of storms and floods. |
| Greetings | 2 | < 1 | Wazup | Hey |
| Praise | 2 | 15 | Community Emergency Response Team training gives a wonderful learning experience to take care of family and the community. | The unit has been doing some amazing work during the recent storms and floods, a big well done for the wide spread emergency response |
| Recommendation | 2 | 6 | Pleased to associate and endorse this agency. | Check and clear gutters and drains around your house. |
| Opinion | 1 | 1 | Most dog tests are conducted off-leash. | Leave that to the emergency unit to make a decision. |
| Announcement | < 1 | 26 | National preparedness day is today, millions across the nation will take part | A flood watch issued to the QB region in the state. |

Phase 2: Interviews with EMO administrators

To compare the findings of the first phase that resulted in classifying and identifying the types of user-generated content on the social networking sites of EMOs, a semi-structured interview was conducted with the administrators of seven EMOs. The types of user-generated content identified by the administrators are discussed below.

Types of user-generated content

The major types of user-generated content identified by the administrators were praise, announcement, self-experience, request and status update. Each of these is explained below with relevant examples provided.

- *Praise.* All seven administrators agreed that praise was posted on the Facebook pages of their organisations. Only a few administrators considered praise in terms of feedback received for emergency preparedness training lessons, which was related to the education side of disaster control. Some administrators considered praise to be the amount of traffic or number of likes seen on a post or a story posted on the Facebook page of EMOs. Praise was also received for those posts that indicated the improvements made in handling current emergencies compared with past emergency situations.
- *Announcements.* All seven administrators agreed that announcements were posted on the Facebook pages of their organisations. Users posted announcements as a result of an emergency situation. Announcements were posted in the form of emergency management training advertisements and a few administrators took this as an opportunity to promote an emergency management learning task before the training advertisements were displayed to users.
- *Self-experience.* All seven administrators agreed that self-experience was posted on the Facebook pages of their organisations. Two administrators shared that other emergency management teams across the region watched their Facebook page to learn strategies that were implemented successfully in emergencies.
- *Status updates.* Five administrators agreed that status updates were posted on the Facebook pages of their organisations. An update includes frequent posts on the details of weather analysis received from radars. Live updates were continuously posted until the recovery of emergency situations. The updates posted by users during an emergency situation (e.g. Cyclone Pam) were verified and approved by emergency management administrators to stop the spread of false information.
- *Request.* Five administrators agreed that requests were posted on the Facebook pages of their organisations. Some requests were for voluntary event participation by EMO staff, whereas other requests were for Disaster Risk Reduction (DRR) training. Requests were also posted for emergency management advocacy or public support, training communities or users in preparation for future emergencies.
- *Criticism.* Two administrators agreed that criticism was posted on the Facebook pages of their organisations. One administrator suggested that organisations should be prepared to receive criticisms from users, and that this had to be taken positively in terms of the power of social media.
- *Recommendation.* Four administrators agreed that recommendations were posted on the Facebook pages of their organisations. Recommendations were about new technologies useful in emergency management, survival tips in the event of floods, articles on how to use fire protection equipment such as fire extinguishers,

tips on how to prepare for emergencies including an emergency preparedness kit, and the type of insurance to undertake for emergency assistance.

- *Greetings*. Five administrators agreed that greetings were posted on the Facebook pages of their organisations. Greetings took the form of well wishing, occasionally from the attendees of previous emergency management training camps or those who had attended Disaster Risk Reduction conferences organised by EMOs.
- *Condolence*. Three administrators shared the view that though some staff were injured while on duty, there were only rare incidents of loss of life. It was also amazing to receive messages from the public that indicated how much they cared about emergency management staff. An incident in which EMO staff were hurt was also taken as a learning experience by administrators to carefully handle future emergencies since the administrators shared the view that if organisations could not take care of their staff on duty, then they were more likely to be out of their business.

Table 2 summarises the findings in terms of the majority of user-generated content on the Facebook pages of EMOs. In Table 2, X indicates agreement and NA indicates not applicable.

Table 2: Administrators' responses regarding user-generated content

| | Admin1 | Admin2 | Admin3 | Admin4 | Admin5 | Admin6 | Admin7 |
|-----------------|--------|--------|--------|--------|--------|--------|--------|
| Request | X | X | X | X | NA | X | X |
| Praise | X | X | X | X | X | X | X |
| Status-update | X | X | X | X | NA | X | X |
| Announcement | X | X | X | X | X | X | X |
| Criticism | NA | X | X | X | NA | X | NA |
| Recommendation | NA | X | X | X | NA | X | X |
| Greetings | X | X | X | X | NA | X | NA |
| Condolence | NA | X | NA | X | NA | X | NA |
| Self-experience | X | X | X | X | X | X | X |

Administrators' response on theoretical Implications

According to the administrators, the major theoretical implications of information posted on the Facebook pages of EMOs related to information seeking, information sharing, relationship building and knowledge dissemination. Some administrators agreed on coordination and collaboration, and identity construction, whereas a few others agreed on social provisions and social conflict. The implications are explained below.

- *Information seeking.* All seven administrators agreed that information seeking was evident on the Facebook page of their organisation. Four administrators agreed that users were mostly seeking information rather than posting information. During a disaster, administrators who were members of a group of 30 member countries collected information from the Facebook pages of their emergency management organisations to support affected regions. This implies information seeking among stakeholders in emergencies.
- *Information sharing.* Six administrators agreed that Information sharing was evident on the Facebook page of their organisation. Users expected information posted on the organisations' Facebook pages to be reliable. One of the administrators of an emergency management department (firefighting division) shared information on survival and fire-prevention tips, whereas others believed that by giving online recognition to those users who posted information on the organisations' Facebook pages, the frequency of user postings could be increased tremendously.
- *Relationship building.* Six administrators agreed that relationship building was evident on the Facebook pages of their organisations. Three administrators claimed that conducting emergency management training helped the staff of EMOs to build relationship with attendees. Building trust among the public was vital, as it helped organisations to receive requests on monitoring emergency situations even from international clients.
- *Knowledge dissemination.* Six administrators agreed that knowledge dissemination was evident on the Facebook pages of their organisations. One administrator shared how he responded to users' questions on how to prevent mould in their houses after a flood. This was even followed by administrators writing a detailed blog, which helped to disseminate knowledge to other users.
- *Coordination and collaboration.* Five administrators agreed that coordination and collaboration were evident on the Facebook pages of their organisations. One administrator indicated that participation in public events resulted in collaboration, since members of the public required answers to their queries on emergency management. Organisations also read the posts of other EMOs, leading to information sharing and coordination among themselves (e.g. Zerocasuality project and Agos project).
- *Identity construction.* Five administrators agreed that Identity construction was evident on the Facebook pages of their organisations. One administrator agreed that the public considered EMOs to be an eye in the sky that protected them from

emergencies. This created a good reputation for the EMOs. This was accomplished through resilient community building and working with vulnerable communities to build a sustainable society.

- *Social provisions.* Three administrators agreed that social provisions were evident on the Facebook pages of their organisations. One administrator agreed that whoever was close to the emergency incident scene extended their help since without collaboration between organisations it was hard to accomplish any meaningful results. In terms of social provision (Weiss, 1973), this implies reliable alliance or the assurance that help can be sought from communities during emergencies. One administrator also agreed that networks established through Facebook provided social provision to those affected by disasters.
- *Social conflict.* Three administrators agreed that social conflict was evident on the Facebook pages of their organisations. One administrator agreed that very rarely online discussion on the best emergency management practices led to social conflict. Occasionally, there could be disagreement on the administration of emergency management tasks by different staff members. Such discussions were taken offline if the argument persisted, and were settled through private messaging.

Table 3 summarises the findings in terms of theoretical implications to users. In Table 3, X indicates agreement and NA indicates not applicable.

Table 3: Administrators' responses regarding theoretical Implications

| | Admin1 | Admin2 | Admin3 | Admin4 | Admin5 | Admin6 | Admin7 |
|--------------------------------|--------|--------|--------|--------|--------|--------|--------|
| Information seeking | X | X | X | X | X | X | X |
| Information sharing | X | X | X | X | NA | X | X |
| Relationship Building | X | X | X | X | NA | X | X |
| Knowledge dissemination | X | X | X | X | NA | X | X |
| Coordination and collaboration | NA | X | X | X | X | X | NA |
| Identity Construction | NA | X | X | X | NA | X | X |
| Social Provisions | NA | X | NA | X | NA | X | NA |
| Social Conflict | X | X | NA | X | NA | X | NA |

Administrators' response on practical implications

According to the administrators, major practical implications of information posted on the Facebook page of EMOs are pre-disaster recovery planning, unity of effort, partnership/inclusiveness and public information messaging, whereas only a few administrators agreed on psychological recovery, and timeliness and flexibility. The implications are explained below.

- *Pre-disaster recovery planning.* All seven EMO administrators agreed that posts on pre-disaster recovery planning were evident on the Facebook pages of their organisations. Administrators agreed that users requested training courses in pre-disaster recovery planning and other types of courses offered by EMOs that could prepare them to handle future emergencies. It was also suggested by administrators that, due to the implementation of pre-disaster recovery planning strategies and effective dissemination of such information to the public, the number of lives lost had been reduced drastically in comparison with earlier times. It was also anticipated by administrators that while today's natural disasters were more devastating than earlier occurrences, the number of casualties was limited due to the implementation of pre-disaster recovery-planning strategies. The administrators also communicated information on the natural disasters that had happened in their area of responsibility that were based on the information received from other weather-forecasting agencies (e.g. National Oceanic and Atmospheric Administration) and disaster-management organisations (e.g. Pacific Disaster Centre).
- *Unity of effort.* All administrators agreed that posts on unity of effort were evident on the Facebook pages of their organisations. For some administrators, unity of effort included the participation of members of the public from remote areas in emergency preparedness tasks (e.g. earthquake shake drills) by collaborating with other EMOs. This also added to the public popularity of the organisations.
- *Partnership/inclusiveness.* Six administrators agreed that posts on partnership and inclusiveness were evident on the Facebook pages of their organisations. By partnering with other organisations, administrators received help from emergency management experts without incurring financial costs. Through inclusiveness, EMOs took care of vulnerable communities (e.g. people with disabilities) by identifying those groups with the help of other stakeholders in emergency management.
- *Public information messaging.* Six administrators agreed that posts on public information messaging and the use of technology were evident on the Facebook pages of their organisations. One administrator agreed that posts on new types of technologies (e.g. personal tornado-detection device or smartphone messaging using Bluetooth) that could be used during disasters were communicated on their organisations' Facebook pages. The drawbacks of public information messaging systems were also discussed, including the limited accessibility of the messaging systems in remote areas and a lack of knowledge about how to use the system for some stakeholders.

- *Psychological recovery.* Four administrators agreed that posts on psychological recovery were evident on the Facebook pages of their organisations. One administrator was successful in receiving accreditation for offering courses on post-traumatic stress disorder (PTSD), suicide prevention and suicide awareness. Support for psychological recovery was also offered by posting videos and online content, and sharing of the experience of other communities (e.g. flood victims and rehabilitation tasks) on social networking sites by government agencies and other credible sources.
- *Timeliness and flexibility.* Four administrators agreed that posts on timeliness and flexibility were evident on the Facebook pages of their organisations. One administrator considered timeliness and flexibility in terms of the response efficiency of organisations during emergencies (e.g. response time of five minutes and less than 30 minutes in traffic). Some emergency management staff shared their experience in the context of emergency response operations. It was also shared that staff had been in communication with other organisations (e.g. Civil Defence) and closely watched the requests and updates on damages posted on organisations' Facebook pages.

Table 4 summarises the findings in terms of practical implications for users. In Table 4, X indicates agreement and NA indicates not applicable.

Table 4: Administrators' responses regarding practical implications

| | Admin1 | Admin2 | Admin3 | Admin4 | Admin5 | Admin6 | Admin7 |
|--------------------------------|--------|--------|--------|--------|--------|--------|--------|
| Pre-disaster recovery planning | X | X | X | X | X | X | X |
| Partnership and Inclusiveness | NA | X | X | X | X | X | X |
| Public Information Messaging | X | X | X | X | X | X | NA |
| Unity of Effort | X | X | X | X | X | X | X |
| Psychological Recovery | NA | X | X | X | NA | X | NA |
| Timeliness and Flexibility | NA | X | X | X | NA | X | NA |

Discussion

The interviews revealed that there were many announcements posted by users and some of them should be filtered, since they were commercial advertisements that were not relevant to emergency management. On the other hand, some announcements were posted to indicate hurricane alerts. The analysis also revealed a new type of

information: condolences posted occasionally by users when unfortunate incidents resulted in the loss of emergency management staff members' lives. According to administrators, criticism was not widely seen on social networking sites, although analysis of phase 1 revealed some criticism. Hence the management of EMOs should devise strategies for how to handle criticism posted by the public by first acknowledging those postings as the power of social networking sites, and by deriving the benefits of such content in terms of building organisational resilience in emergencies. The over-arching themes on emergency management developed using thematic analysis indicate that majority of user-generated content was evident in the preparedness and recovery phases, with only very limited content in the response phase. Thus, among the different types of user-generated content on EMO Facebook pages, social information (i.e. status update, request, announcement and praise) was most significant when compared with personal and professional information. Among the three types of social support (informational, material and emotional), informational or updates were the most prevalent forms of social support in the preparedness phase.

Information seeking was one of the implications of community leaders requesting educational or training resources. Administrators received requests to handle emergencies even from other countries, and users posted such information on the organisations' Facebook pages. This aspect indicates that the organisations could build trust with other stakeholders, which implies relationship building. Organisations also published details on the precautionary measures to follow in the recovery phase of a disaster. This implies knowledge dissemination. Administrators agreed that when their organisations were involved in events, they could establish collaborations. Thus coordination and collaboration are implications of posting information. Administrators suggested that their organisations had a reputation for disaster preparedness, which was evident through posting information on the Facebook pages of EMOs. Thus social identity is an implication eventuating from posting such information. During the interview, one of the administrators indicated that they had maintained two profiles on Facebook: a public Facebook page (on the basis of which the interview was conducted) and a closed group, after a significant increase in the number of group members as well as to protect them from previous security vulnerabilities that could damage the reputation of the organisation. One of the administrators disagreed with majority of the user-generated content (except praise and self-experience), which gives the impression that Facebook is used as a communication channel to receive and disseminate only certain types of information by the emergency management organisation.

Conclusion

The study shows that the benefits eventuating from posting information are coordination and collaboration, social identity, information dissemination, relationship building, social provisions and information seeking, whereas social conflict is a detrimental implication. This finding (i.e. the implications of posted content) concurs with one of the important social media strategies of EMOs. Users on the Facebook page of EMOs could connect with a network of users and easily spread knowledge on disaster preparations. With respect to costs, the process of filtering content is a major task, since users post information that is non-relevant (advertisements and pornographic materials) to

emergency management. Further, suspicious postings must be checked for the authenticity of their content. One organisational communication barrier found in this study was the reluctance of certain organisations to give official permission to access and gather data from their public Facebook pages. Privacy requirements could be one of the barriers to organisations sharing information with other stakeholders. Cultural barriers could be another social communication barrier, which is evident in this study in terms of the criticism posted only on the Facebook pages of organisations operating in the West.

The findings of this study indicate that the shared responsibility of a community is one of the major strategies that must be promoted among stakeholders to accomplish disaster resilience. Further, there has been limited evidence on partnership between local and global EMOs, which is one of the strategies for leading a change in disaster resilience. Hence administrators of EMOs must devise policies to address these issues, which could contribute to the long-term sustainability of societies in terms of disaster resilience. Further, harnessing user-generated content from social networking sites in real time, and integrating such information into emergency management systems, would provide community-based situational awareness to the administrators of EMOs. This would also lead to improved disaster resilience in the long term, through proper pre-disaster planning strategies.

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Appendix: Interview questions to administrators of the Facebook pages of emergency management organisations

- 1 Greetings and self-introduction.
- 2 To what extent do you find the types of user-generated content (i.e. comments posted by users) listed below on the Facebook page of your emergency management organisation?
 - a Request
 - b Praise
 - c Status update
 - d Announcement
 - e Criticism
 - f Recommendation
 - g Greetings
 - h Condolence
 - l Self-experience
- 3 Explain in a few words, by including examples from the Facebook page of your emergency management organisation, your agreement/disagreement.
- 4 To what extent do you find the implications (i.e. consequences or outcomes) listed below on the Facebook page of your emergency management organisation?

Theoretical

- a Information seeking/sharing
- b Relationship building
- c Knowledge dissemination
- d Coordination and collaboration
- e Identity construction (e.g. altruistic identity or helping nature)
- f Social provisions/social or emotional support
- h Social conflict (e.g. online disagreement with network connections)

Practical

- a Pre-disaster recovery planning (e.g. planning before a disaster)
- b Partnership and inclusiveness (e.g. collaboration with different departments including all communities in the recovery process)
- c Public information messaging (e.g. mass broadcasting in an emergency via mobile or other devices to suit the needs of different communities)
- d Unity of effort (e.g. respecting each organisations expertise in an emergency recovery effort)
- e Psychological recovery (e.g. to support people affected by a disaster)
- f Timeliness and flexibility (e.g. conducting recovery activities on time).

- 5 Explain in a few words, by including examples from the Facebook page of your emergency management organisation, your agreement/disagreement.
- 6 Explain in your own words the approach your emergency management organisation takes to crafting the discussion prompts on its Facebook page.
- 7 Explain in your own words the most significant benefit your emergency management organisation has accomplished through the Facebook page.
- 8 Explain in your own words the most significant cost (problems such as conflict with users or posting non-relevant or fake information) your emergency management organisation has experienced through its Facebook page.