A thesis submitted for the degree of Doctor of Philosophy of the University of Canberra

Thesis Title: **Communication Patterns on the Facebook page of Emergency Management Organisations**

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Abstract

Social Networking Sites (SNSs) have attracted millions of users by giving them an opportunity to communicate in a globally-connected world. This user communication has value in crises such as floods, earthquakes, fires and hurricanes. SNSs are used as tools to disseminate information in crises, but no existing studies have examined stakeholder input (such as comments posted by external organisations and members of the public on the SNSs of emergency management organisations) during the different stages of a crisis (pre-crisis, crisis and post-crisis) so as to understand the deployment, costs, and benefits of **many-to-many emergency communication,** and to help prepare future **resilience strategies**. To address these gaps in the literature, this study presents findings from a qualitative study of user posts on the Facebook page of two emergency management organisations, FEMA in the United States and ACT SES in Australia. A thematic analysis of user posts and interviews of emergency management organisation website administrators were used to examine this study's research questions.

This thesis, situated in the discipline of Crisis Informatics, identifies and categorises the patterns of communication (collection of major user-generated content) evident on the SNSs of emergency management organisations and their benefits and challenges for the stakeholders of emergency management. Contributions include the development of a framework for classifying information on SNSs which enables the identification of the overarching themes in emergency management, as well as the communication patterns and the communication culture of stakeholders. Activity Theory was used to describe communication on SNSs and its benefits and challenges for emergency management stakeholders. Practical contributions include recommending a social media strategy for organisations to mitigate criticism on the SNSs of emergency management organisations.

Findings indicate that based on the crisis communication matrix, emergency management organisations differ significantly in terms of communication at the inter-organisational (domestic and international) level. Communication from the public to organisations had significant positive as well as negative characteristics and included updates, criticism, requests, opinions,

recommendations and praise. In addition to their principal emergency management activities, the activities of organisations differ widely in terms of community services. With respect to communication from organisations to the public, in both cases communication was most intense in the pre-crisis phase. However, organisations differed markedly in terms of their open communication culture: all administrators filtered content and administered workflow for the approval of content as some users posted non-relevant information, but ACT SES adopted a more inclusive style of online communication than FEMA, reflecting ACT SES's institutional openness to public involvement, in the shape of volunteer recruitment.

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List of Acronyms

ACT SES	Australian Capital Territory, State Emergency Services
ADPC	Asian Disaster Preparedness Center
ADRC	Asian Disaster Risk Reduction Center
CDP	Center for Disaster Preparedness
EMO	Emergency Management Organisation
FEMA	Federal Emergency Management Agency
SNSs	Social Networking Sites (e.g. Facebook)
UGC	User-generated content are comments posted by users on SNSs
UNISDR	United Nations Office for Disaster Risk Reduction
USAID	The Office of US Foreign Disaster Assistance

Chapter 1 – Introduction

1.1 Introduction

Social Networking Sites (SNSs) are web-based services that have attracted millions of users by giving them an opportunity to create profiles and communicate in a globally-connected world (Anderson et al. 2016). SNSs enable multivocal communication, in contrast to one-way online communication channels (e.g. email communication). Many-to-many user communication has value in crises such as floods, earthquakes, fires and hurricanes (Sebastian & Bui 2009). Through SNSs, people can find out about impending crises, prepare for them and help their community. After crises have struck, SNSs help people in a crisis area to communicate and especially to know that their families are safe. In short, they can save lives.

Coombs (2015) divided crises into two categories: disasters, and organisational crises (Coombs 2015). A disaster is an unexpected natural event such as a flood or a storm, whereas an organisational crisis is an event that generates a negative outcome (e.g. reputation damage) for an organisation. The focus of this study is on the form of crises classified as natural disasters and the analysis is based on the information posted by stakeholders on the SNSs of emergency management organisations. A crisis has three phases: preparing for a crisis (pre-crisis); during a crisis (crisis), and after a crisis (post-crisis). SNSs have been of general use during these different stages (Frandsen & Johansen 2017), but there is limited literature which examines the types of information and the overarching themes evident in the three stages of crises.

In the pre-crisis phase, SNSs could be used to disseminate information about upcoming training sessions, while users sharing real-time information about ongoing crises could help administrators of crisis management organisations take appropriate measures. Further, users on the SNSs of crisis management organisations can extend emotional/psychological support to those traumatised by crises during the post-crisis stage of crisis management. To narrow down the boundary of this study, it makes use of the components of Activity Theory and follows a crisis informatics perspective, both of which are detailed in the literature review chapter. Crisis

informatics is defined as a multidisciplinary field in which people use technology to mitigate the impact of disasters (Reuter, Hughes & Kaufhold 2018). The major components of crisis informatics are users, technology and information (Reuter & Kaufold 2018). In this study, users include those who are posting content (posts/comments) on the Facebook page of emergency management organisations. Examples of users are the public and the staff of EMOs. Stakeholders include those involved in managing a crisis. For example, the public, other EMOs, public safety officials, Rural Fire Services and law enforcement agencies. Content posted by the public and emergency management organisations were chosen for this study. Hence, posts by organisations and comments by the public are referred to as "content" and only include text. Technology includes social networking sites (e.g. Facebook) used to communicate between stakeholders in emergency management. Information refers to the content posted by users on the Facebook page of emergency management organisations.

According to the United Nations Office for Disaster Risk Reduction (2016, Para 1), 'Access to information is critical for successful disaster risk management. You cannot manage what you cannot measure'. This thesis is a study of the information posted by the stakeholders of emergency management on the public SNS (Facebook) of emergency management organisations and the benefits and challenges eventuating from such content for individuals, organisations, and crisis management communities. Disseminating information to citizens through SNSs within the first 24 hours of a crisis raises awareness among users while the crisis management responders act (Hughes & Palen 2009). Conversely, users also express frustration and anger on SNSs about the way responders handle crisis situations (Anderson et al. 2016). Anderson et al. (2016) also found that some users felt abandoned and neglected by the government and the media during crisis relief efforts. Information disseminated on SNSs clearly generates both benefits and costs to the stakeholders of crisis management: the exact nature of these costs and benefits is the subject of this thesis. Further study of the effects of SNSs on crisis management, based on information posted by users, is critical because of the potentially catastrophic social and economic impact of crises; these may result in loss of human life, as well as material damages (National Strategy for Disaster Resilience 2011). Thus, to facilitate long-term sustainability in terms of reducing disasters and protecting social, economic, and environmental assets (Hyogo Framework for Action, UNISDR 2016), it is important that content posted by users on SNSs be analysed to determine the benefits

and challenges to crisis management stakeholders. This thesis is significant because its findings will lead to establishing the first comprehensive mapping of the patterns of communication evident on the SNSs of emergency management organisations. Patterns are collections of major user-generated content (i.e. status update, criticism and request) on the Facebook page of emergency management organisations. Patterns are used to measure the major type of user-generated content posted on the Facebook page of emergency management organisations. Patterns are different from themes which represent the major emergency management concepts prevalent on the Facebook page of emergency management organisations. This will help to target information dissemination via SNSs and identify the needs of crisis management stakeholders in future crises. Other analytical and practical expected outcomes are outlined below:

- The study will help to understand the communication culture of stakeholders evident on the SNSs of emergency management organisations. The analysis of an organisation's communication culture outlined here could be extended to other types of organisations with a presence on SNSs. Examining the patterns of communication evident on the SNSs of emergency management organisations will provide valuable advice for the administrators of emergency management organisations in devising a communication strategy.
- The analysis of user-generated content helps to develop situational awareness of a crisis for users and emergency management organisations.
- The study analyses the two-way communication (Hughes et al. 2014) between stakeholders in a crisis during the three phases of crisis management. Communication in terms of requests or updates (Mukkamala & Beck 2016) also facilitate managerial functions such as providing crisis management training to the public (Theil & Jennings 2012), which ensures community readiness before a disaster strikes.
- Another aspect examined in this study is how to facilitate the communication paradigm shift (Chan 2013) or multi-vocal approach (Frandsen & Johansen 2017) of stakeholders on the SNSs of emergency management organisations. Multi-vocal communication between stakeholders is of key importance because during the first few hours of a crisis, before professional crisis responders arrive on the scene, local community members and individuals will have rich and vital information about the situation which could be crucial for the administrators of emergency management organisations to handle crises effectively.

In short, analysing the content posted on SNSs by individuals during crises is of utmost importance to better prepare and devise efficient disaster resilience strategies for the future. SNSs are used as tools to disseminate information in crises (Anderson et al. 2016; Crowe 2011; Ahmed & Sargent 2014), but few studies have examined the information that stakeholders post in the different stages of a crisis to understand how they make sense and build their understanding of a crisis. The ubiquitous nature of SNSs (Marder et al. 2016) has further extended their importance in crisis management. In this regard, the fundamental principle of SNSs that makes them significant in the context of crisis management is the delivery of direct communication between stakeholders in a relatively free and open environment (Crowe 2011). Facebook is one of the public SNSs (Richter et al. 2009) that satisfies this fundamental principle of communication. The user-base of Facebook is larger than other popular SNSs (Wilson et al. 2012; Ngai, Tao & Moon 2015). Statistics indicate that worldwide active users of Facebook are 1.4 billion (Facebook 2018) whereas Google+, by comparison, has 440 million active users (Google+ 2016), and LinkedIn has around 562 million users (LinkedIn 2018). Thus, among SNSs, Facebook is the most popular communication tool used to post user-generated content (Wilson et al. 2012).

According to Hughes et al. (2014), SNSs have become the primary communication platform in crises and some of the SNSs used in crises are Twitter, Facebook, MySpace, YouTube, and LinkedIn. Some emergency management organisations for example, the Federal Emergency Management Agency (FEMA), a publicly-funded organisation based in the United States, uses three different SNSs (Facebook, YouTube and Twitter) to post different types of information during crises. Among FEMA's three SNSs, Facebook is the most popular in terms of user-generated content posted by users. Furthermore, among the different SNSs, Facebook was selected in this study based on its ability to disseminate rich information on crises and the extent of user-generated information available on the Facebook page of emergency management organisations. Hence, in this study the Facebook pages of two emergency management organisations were chosen to collect user-generated content for analysis.

The literature on SNSs has classified different types of users (Brandtzaeg 2012). Since this study examines the communications patterns of stakeholders on the Facebook page of emergency

management organisations to establish the benefits and challenges to the stakeholders of emergency management, it is necessary to begin by classifying the information posted by stakeholders. As an initial step, relevant literature on user classification schemas in SNSs were examined to devise strategies for classifying information on SNSs. There are distinct types of users on SNS and hence their usage patterns, and the consequences eventuating from their usage, are different (Valenzuela, Park & Kee 2009; Brandtzæg 2012). Users of SNSs have been divided between 'socialites' based on their socialising activities: 'debaters' based on their content contribution; 'sporadics' who exhibit only limited usage; 'lurkers' based on casual information browsing; and 'advanced users' based on frequent usage (Brandtzæg & Heim 2011). According to Fraustino, Liu and Jin (2012), during crises, individual users can be active or passive on SNSs whilst some users utilise SNSs to get specific information. Some individual users play a significant role in responding to crises by posting recent updates on SNSs as soon as a crisis strikes (Sebastian & Bui 2009). Other active users in crisis management are administrators of crisis management organisations who post updates on SNSs as a crisis unfolds (see FEMA Facebook 2018), public safety officials, and crisis responders.

User-generated content can be published on SNSs in the form of text, media or metadata (Kane et al. 2014). SNSs users can post content with ease, which increases the value of SNSs (Kaplan & Haenlein 2010). In a crisis, the varied nature of user-generated content is no different, with users posting different types of content on SNSs which include text, audio and video messages (Fraustino, Liu & Jin 2012). SNSs were used to post and share pictures of the Haiti disaster and related disaster videos (Fraustino, Liu & Jin 2012). Further, users may post such content either intentionally or impulsively on SNSs (Shim et al. 2013). Hence there may be diverse benefits and challenges eventuating from such content to users. Further, communities co-create and share content during crises (Oh, Agrawal & Rao 2013). Twitter has been used by people to share up-to-date information on crises and this has been useful for organisations in crises recovery efforts (Mukkamala & Beck 2016). Though both Facebook and Twitter are both SNSs, Twitter was, at the time this study was launched, a microblogging site with a limit of 140 characters per tweet (since doubled), which rendered it unsuitable for a thematic analysis aiming to establish the communication patterns and communication culture of organisations.

Researchers have argued that content posted by users on Twitter during crises could help to build a form of community intelligence (Oh, Agrawal & Rao 2013). During emergencies some of the broader types of messages shared by users on Twitter include action related information (Mukkamala & Beck 2016), information about incidents, causalities, events, and road traffic information (Ehnis & Bunker 2013). The literature also indicates that the processing of content and sharing of content between publics and crisis management organisations have been very complex during crises (Bharosa, Lee, & Janssen 2010; Jenvald, Morin & Kincaid 2001). Hence, it is important to systematically classify information available on the SNSs of crisis management organisations.

SNSs have been used in emergency management organisations such as the Asian Disaster Preparedness Center (ADPC) where the organisation maintains both open and closed groups on Facebook for internal and external use. Internal use includes communication between employees of this crisis management agency, which is not accessible to the public, whereas external use is intended for communication with the public. Hughes & Palen (2009) found that SNSs have been used by crisis management organisations to share information to citizens, whereas a recent study (Reuter & Kaufold 2018) found that SNSs were used to share information between stakeholders in crises. The framework that is used to examine the interaction between stakeholders in crisis management is the crisis communication matrix (Reuter & Kaufold 2018). The matrix describes four types of communication which are: (a) from organisations to the public, (b) from the public to organisations, (c) between organisations and (d) between communities or publics. The communication between stakeholders is represented by the user component of the Crisis Informatics discipline.

In sum, research on the widespread impact of SNSs on organisations (Parveen et al. 2015) and individuals (Nosko et al. 2010) is ever-growing. Studies on SNSs in the context of crisis management have focussed only on general communication between stakeholders of crisis management organisations for information exchange (Ahmed & Sargent 2014). No studies have systematically classified the types of user-generated content posted by users on the SNSs of crisis management organisations in order to determine communication patterns, overarching themes, benefits and challenges of content, communication cultures and patterns of information control. A

key question is whether user engagement will enhance or diminish the decision-making capability of crisis management administrators in mitigating the impact of future crises on societies.

1.2 Problem Background

Crisis Management is the process by which individuals, communities and organisations prepare themselves to cope with a situation that can prove to be fatal if not handled correctly through the timely implementation of suitable recovery strategies (Waugh & Tierney 2007). Crisis situations are varied but this study focuses only on natural disasters such as floods, hurricanes, and earthquakes which are considered to be critical disasters affecting societies (FEMA 2018; UNISDR 2016). Some of the most prominent natural disasters in the past decade have included hurricanes in the United States (e.g. Katrina, Rita, Wilma and Sandy); earthquakes in China's Sichuan Province, and Haiti; floods in Queensland, Australia; a Tsunami in Japan; and typhoon Haiyan in the Philippines (Chou, Zahedi, & Zhao 2014). Statistics indicate that in the last decade there have been 1,333 major disaster declarations in the United States alone, and a global statistic indicates that 3,455 cases of crises have been reported from flooding only (UNISDR 2016). It was found that in the last decade, disasters cost $1.4 trillion in damage, 1.7 billion people were affected, and 0.7 million people lost their lives (UNISDR 2016). Thus, natural disasters have a huge impact on the world and the effective management of crises which include preparedness, response and successful recovery planning is a crucial step for long-term safety and sustainability.

The emergency management organisations selected for this multi-site case study research are those organisations which manage natural disasters and have a presence on Facebook with a significant user-base and rich user-generated content. Out of 45 emergency management organisations contacted, the administrators of nine organisations gave their consent to collect data from their organisation's Facebook page. These organisations are The Federal Emergency Management Agency (FEMA) in the United States of America, the Australian Capital Territory State Emergency Service in Canberra, the Asian Disaster Preparedness Centre (ADPC) in Thailand, Disaster Control and Prevention in the United States, the Center for Disaster Preparedness in Philippines, the WorldWide Disaster Risk Reduction Network (WDRR) in Philippines, the Asian Disaster Reduction Center (ADRC) in Japan, the United Nations Office for

Disaster Risk Reduction (UNISDR) in Switzerland, and United Nations Environment Programme in Kenya.

To consider the benefits and costs of SNSs in crises, Vieweg et al. (2010) found that Twitter had contributed to situational awareness, whereas another study (Anderson et al. 2016) examined positive sentiments such as gratitude and desire to extend help in crises, and negative sentiments such as frustration and anger at those who did not provide help to an affected region. According to Sebastian and Bui (2009), individuals play a significant role in promptly responding to crises. Hence, content posted by the public in the event of a crisis has value in crisis recovery efforts. Further, from a practitioner's point of view it has been a challenge managing crises without being able to measure the information on crises (UNISDR 2016). It is also evident from the literature (Anderson et al. 2016; Vieweg et al. 2010) that a systematic classification of content posted by users on SNSs, which would enable organisations to analyse and establish communication patterns and their benefits and challenge to stakeholders in the three phases of crises, is lacking.

Among the emergency management organisations, FEMA is one of the most reputed and best-funded systems and a leading emergency management organisation worldwide (Haddow, Bullock & Coppola 2017). The agency has a presence on Facebook and at the time of this study (all pages accessed during January to June 2015), the publicly-accessible Facebook page of FEMA had more than 387,000 user likes and 383,000 followers in addition to a constant increase in the number of page likes by new users (FEMA Facebook, 2018). This indicates the richness of FEMA's Facebook page with user-generated content for analysis and for identifying the overarching themes in emergency management and establishing the benefits and challenges for the stakeholders of crises.

The ACT SES is a volunteer managed emergency management organisation supporting the community in crises such as flood and storm, 24 hours a day and seven days a week. The number of user likes for the ACT SES Facebook page is 20,331 with a majority of postings by the organisation and limited contribution from the public (ACT SES, 2018). The Asian Disaster Preparedness Centre (ADPC) is an emergency management organisation with headquarters in Thailand. The number of likes on ADPC's open Facebook page is 3,914 (ADPC, 2018). The staff

in the organisation post messages frequently, but limited responses were recorded from the public. The Center for Disaster Preparedness has its headquarters in the Philippines and the Facebook page has 9,308 user likes (CDP, 2018). The organisation is very active in posting messages on their Facebook page, but limited user responses were recorded from the public. The Disaster Control and Prevention handles different types of disasters including fire. The Facebook page of Disaster Control and Prevention has 1,447 likes with frequent posts by the organisation but very limited posts by users (DCP, 2018). The Asian Disaster Reduction Center (ADRC) is an emergency management organisation headquartered in Japan. The Facebook page of this organisation has 1,728 user likes with a limited number of posts by the organisation and few posts by users (ADRC, 2018). The UN Office for Disaster Risk Reduction (UNISDR) is a United Nations office working globally to reduce the risks involved in emergencies whose headquarters are in Geneva. The Facebook page of UNISDR has 19,690 user likes with frequent postings by the organisation but limited posts from the public (UNISDR, 2018).

FEMA is a federal organisation funded by the US government, whereas ACT SES is a voluntary organisation funded by the Australian government. UNISDR and UNEP are organisations supported by the United Nations whereas ADPC, CDP, DCP and ADRC are private emergency management organisations. This study's analysis of the posts on the Facebook page of the above organisations indicate that the most diverse user-generated content is located on the Facebook page of FEMA, followed by ACT SES, which makes them an excellent source to collect data for analysis. Further, Facebook has the highest number of users compared to other SNSs, which was also one of the reasons for choosing this platform in this study.

Although SNSs are used by individuals and organisations to disseminate information in a crisis, little research has been undertaken to classify content posted on SNSs in the context of crisis management. Kaewkitipong, Chen and Ractham (2012) and Frandsen and Johansen (2017) have examined general communication between agencies, communities, and between agencies and communities in crisis management, but systematically identifying the patterns of communication will serve to provide insights about the communication culture of organisations and how organisations manage the information flow on their public social networking sites. Further, administrators can develop situational awareness as the different stages (pre-crisis, crisis, and post-

crisis) of a crisis unfolds. In the context of multi-vocal communication in crisis management, the inter-cultural and multi-cultural positions of stakeholders should be taken into consideration (Frandsen & Johansen 2017, p. 129). Jackson (2011) found that although theories on culture are applied in diverse disciplines such as architecture, accounting, anthropology, business and technology studies, few researchers have studied the consequences of cultural practices for the discipline of crisis informatics. Specifically, open communication culture (communicating details in a crisis without hierarchical control) by stakeholders is increasingly important in crisis management (Ibid, p. 133). This analysis of the literature indicates that there is a gap in current knowledge regarding the communication culture of crisis management organisations. Hence, this study will address these limitations by examining to what extent crisis management organisations embrace an open communication cultural approach on their Facebook page, and what this means for their effectiveness and sustainability.

Emergencies have social and economic impacts on societies (UNISDR 2016). Hence, by examining the benefits and challenges of EMO-related communication it could be possible to implement disaster resilience strategies that would minimize loss of human life and protect assets in emergencies. To address the research limitations identified above, this qualitative study followed an interpretivist research paradigm and a multi-site case study research tradition. The content posted on the Facebook page of two emergency management organisations was thematically analysed to determine overarching themes in crisis management, communication patterns and communication culture evident on the Facebook page of emergency management organisations. To test the findings from the thematic analysis, seven administrators of emergency management organisations were interviewed to reconfirm the findings and to establish answers to research questions on information control and consequences for stakeholders of crisis management. Interviews were chosen in order to strengthen the findings of this study by combining methods (Bloomberg & Volpe 2016).

1.3 Research Aims and Objectives

Although SNSs have been widely explored from theoretical and practical perspectives in the crisis management literature (Frandsen & Johansen 2017; Ngai, Tao & Moon 2015; Wilson et al. 2012; Cheung et al. 2010; Xu & Liu 2010; Lin & Lu 2011), to date research on patterns of

communication evident on the Facebook page of emergency management organisations and the resultant consequences to stakeholders of crisis management is sparse. Further, communication culture during the three stages of crises evident on the organisations' Facebook pages is yet to be explored. Thus, the main research question is:

What are the patterns of communication and the overarching themes evident on the Facebook page of Emergency Management Organisations?

This is followed by three sub-questions:

(i) What are the benefits and challenges of communication on the Facebook page of emergency management organisations for emergency management stakeholders?

(ii) What communication culture is evident on the Facebook page of emergency management organisations and how does it affect crisis management?

(iii) How do emergency management organisations manage the information flow on their Facebook page?

The first objective is to identify and classify different types of user-generated content posted on SNSs. Thus, an extant literature review was conducted to develop an information classification framework (typology) based on Classification Theory (Parsons 1996). The typology was used to classify the collected user-generated content into personal (e.g. name), professional (e.g. employer information) and social information (e.g. requests or updates).

The second objective is to examine the communication culture evident on the Facebook page of crisis management organisations; the third is to examine the control of information on the Facebook pages of crisis management organisations. After addressing the first objective by identifying user-generated content, the second and third objectives were accomplished in two steps:

1. The user-generated content was examined and interpretively analysed using thematic analysis following the steps proposed by Braun and Clark (2006). Thematic analysis was used only to generate themes based on the data collected from the Facebook page of FEMA and ACT SES. This helped to develop overarching themes in emergency management Facebook communication and to establish the communication culture (i.e. open communication culture) of stakeholders and benefits and challenges of content to stakeholders. Themes are used to represent overarching concepts in crisis management developed from coalescing similar concepts evident through the content posted on the Facebook page of emergency management organisations and developed using the steps of thematic analysis. Themes are different from patterns which identify the major type of user-generated content posted by users on the Facebook page of emergency management organisations. Open communication, as defined by Martins and Terblanche (2003), refers to the open sharing of information and a more horizontal style of communication which rejects hierarchies. This framework will be used to examine the organisations' communication culture. Activity Theory is the theoretical lens which constitutes the boundary of this study: it considers only one entity (emergency management organisation) at a time, as opposed to multiple entities. In short, users post information on SNSs resulting in benefits and challenges where the user is the subject, information is the object and benefits and challenges are the outcomes for emergency management stakeholders.

2. Interviews of administrators of crisis management organisations (one in Thailand, one in the US, two in the Philippines, one in Japan, one in Switzerland, and one in Kenya) were used to deepen understanding of how organisations manage information flows on their social networking sites. The interview questionnaire was prepared based on the different types of user-generated content and their consequences for emergency management stakeholders. The interviews helped to reconfirm the types of user-generated content posted on the Facebook page of emergency management organisations and identified by the information classification framework. The rationale for conducting interviews in the second phase was to test the findings of the first phase,

strengthening the findings of this study by triangulating methods (Bloomberg & Volpe 2016).

By analysing the user-generated content posted by users on the Facebook page of emergency management organisations, it is possible to incorporate theories describing communication as a process (posting content on SNSs). From a practical perspective the analysis supports how Facebook can be used as a beneficial tool in emergencies for seeking and sharing information, gathering awareness of the emergency management situation, extending timely help in relief operation, receiving funds, and organising a community of first responders and volunteers. The main challenge in answering the sub-research questions on overarching themes, communication patterns, communication culture and information control, is that there is a wide variety of user-generated content posted on various SNSs by different users (Kane et al. 2014; Nosko et al. 2010). The second challenge is to establish implicit and explicit consequences from different types of user-generated content (Brandtzæg 2012). The challenges were addressed by classifying and analysing information posted by users on the Facebook page of two emergency management organisations.

The Federal Emergency Management Agency (FEMA) is a well-known federally funded organisation in the United States and a leading emergency management organisation worldwide (Haddow, Bullock & Coppola 2017). The second agency investigated in this study is ACT SES, which is a state emergency management agency funded by the territorial government and supported extensively by community volunteers. The Facebook page of ACT SES had the highest number of user postings after FEMA. This, along with the abundance of user-generated content on the Facebook page of FEMA and ACT SES satisfied the criterion to collect content posted by users to determine overarching themes on emergency management. In terms of the scale, structure and operation of these two organisations, FEMA has a national-level emergency management responsibility compared to ACT SES where responsibility is primarily limited to a state. Thus, the two organisations - FEMA and ACT SES were selected from an examination of forty-five emergency management organisation worldwide, based on the extent and richness of the user-generated content available on the organisations' Facebook page. The benefits and challenges and

information control were established by conducting interviews of the administrators who manage the organisations' Facebook pages.

In qualitative and interpretive information systems research, Activity Theory has been used to analyse and understand human interaction through tools and artefacts (Hashim & Jones 2007). It is best used in historical and cultural situations when users, their goals and the tools used are under constant change. Activity Theory was used by Chen and Sharma (2013) to examine content produced in fire-related emergencies and a data model was developed to support information operability among various emergency management organisations. In this study, Activity Theory was used to identify the benefits and challenges of user-generated content posted on the Facebook pages of emergency management organisations to the stakeholders of crisis management. By applying Activity Theory in this study, user-generated content posted on SNSs is considered as the *object*, while Facebook is the *tool* where the content is posted. The benefits and challenges of user-generated content are the *outcome* according to Activity Theory, while the stakeholders in crisis management act as the *subject*. The *rules* indicate the guidelines and policies (information control) on posting content on the Facebook page of emergency management agency, whereas *division of labour* includes stakeholders (administrators) who review and post content on the Facebook page of emergency management organisation as well as take precautionary measures to mitigate, respond and recover in crisis situations. The *community* in the collective activity system includes stakeholders who are active (disseminating information) and passive (seeking information) users on the Facebook page of emergency management organisations. The methodology used to answer the research questions is detailed in the next section.

1.4 Methodology

This is a qualitative research project which employs multi-site case study methodology (Saunders 2011). Case studies are used in this study because they help to understand a complex issue by analysing contextual elements which leads to new findings or strengthening of existing ones. A multi-site case study helped to identify the differences and similarities between the two cases. Thematic analysis helps to discover significant themes by analysing content posted by stakeholders on the Facebook page of emergency management organisations. Users post different types of information on SNSs (Golbeck, Grimes & Rogers 2010; Morris et al. 2010) particularly in crisis

management (Anderson et al. 2016) which are subjective or semantically unspecified (i.e., diverse) in nature (Wilson et al. 2012; Graham et al. 2011; Lampe, Ellison & Steinfield 2006). Based on the information classification framework, an example of subjective information on SNSs is updates, whereas an example of objective information is date of birth (Chauhan & Huges 2016).

Answering the research questions on overarching themes, communication patterns, communication culture, and information control, requires classifying different types of user-generated content posted on SNSs and thematically analysing them to establish their benefits and challenges. As detailed in the previous section, different types of user-generated content are posted on various SNSs, but there is a lack of systematic classification of user-generated content on SNSs which would help to establish the patterns of communication on the Facebook page of emergency management organisations. This will be one of the findings and contributions to crisis management research of this study.

Further, existing social science theories and frameworks (Gregor 2006) are not suitable to classify and narrow down subjective user-generated content posted by users on SNSs. Hence it is imperative to develop a conceptual framework for classifying information on SNSs and to develop a common understanding on the different types of user-generated content. This classification is required to address the research questions about communication patterns and their benefits and challenges for stakeholders of crisis management. Thus, the first step in this study was to develop an information classification framework (typology) to classify information on SNSs. An extant literature review was conducted to develop the framework using Classification Theory (see literature review section for a definition of Classification theory). The framework consisted of three major types of information which are personal, professional and social information. This framework can be generalized to other domains than emergency management.

In the second step, to address the research questions, user-generated content posted on the public Facebook page of two emergency management organisations was collected and analysed. Based on the content collected, similarities and differences among the two organisations were examined as this study has a multi-site case study methodology. Data collection for this study was accomplished via two phases. In phase one, data was collected from the Facebook pages of two

established emergency management organisations, one in the United States and a second one in Australia. Based on the phase one results, the interview questionnaire for collecting data in phase two was prepared. In phase two, after receiving ethics approval from the University of Canberra Human Research Ethics Committee, data was collected by interviewing administrators or social media managers of seven emergency management organisations, one in Thailand, one in the US, two in the Philippines, one in Japan, one in Switzerland, and one in Kenya.

To establish benefits and challenges, thematic analysis was used to analyse content collected from the two organisations, which ensured succinct categorization of information (Lissack 1998). The method also reduces researcher bias due to its non-intrusive nature (Woodrum 1984). Furthermore, the literature indicates that thematic analysis has been widely used to collect and analyse data from websites (Steininger, Huntgeburth & Veit 2011) and SNSs (Shelton & Skalski 2014; Moreno et al. 2010). Thus, the data collected was thematically analysed to establish how differing communication cultures generate different costs and benefits for crisis management stakeholders in different cultural contexts. The research significance is detailed in the next section.

1.5 Research Significance

This research is significant as its outcome will lead to an understanding of stakeholders' patterns of communication, communication culture and information flow on the Facebook pages of emergency management organisations. These findings can be generalized and used as an exemplar for other crisis management organisations with a presence on SNSs. In order to manage future crises and understand their consequences, it is important to measure available information on crises which address one of the challenges proposed by practitioners (i.e. UNISDR) in emergency management. The communication culture of the organisation during the three stages of crises and the level of information control by admins on the Facebook page of emergency management organisations will help the administrators of emerging crisis management organisations to learn from past crises and devise strategies for their organisations. Further, to the best of this researcher's knowledge, this is a pioneering study in which Crisis informatics is cross-fertilising with Activity Theory.

An analysis of the user-generated content also helps to develop situational awareness of emergencies for the stakeholders of crisis management organisations. Further, examining user-generated content is important because before professional crisis responders arrive and during the first few hours of a crisis, local community members and individuals will have rich and vital information on crises which could be helpful for the administrators of crisis management organisations to handle the situation effectively. Further, practitioners and policymakers can develop strategies for individuals and organisations who want to maximize benefits such as identity or relationship building by posting content on SNSs. Thus, the findings of this research are expected to help crisis management stakeholders by identifying what types of user-generated content are useful to share using appropriate technologies, so that support groups can be formed during the phases of crises. This study could potentially highlight what types of user-generated content will generate negative ramifications now and, in the future, so as to reduce the harmful effects of user-generated content posted on SNSs. The role of culture in this regard will be essential and our focus will be to determine what types of organisational culture are best equipped to deal with many-to-many communication.

1.6 Thesis Structure

The subsequent chapters of the thesis are organized as follows:

Chapter 2 presents a review of the existing literature on SNSs, detailing the types of user-generated content on SNS and the benefits and challenges of using SNSs. This chapter also includes how SNSs are used in the context of emergency management and introduces theoretical approaches (e.g. Activity Theory) used in this study. Chapter 3 explains the research design. This is a qualitative research project (Blaikie 2000) based on an analysis of posts on SNSs, which is followed by interviews of administrators of emergency management organisations. A Thematic Analysis (Braun & Clarke 2006) of the content posted on SNSs was used to establish the overarching themes in emergency management. Chapter 4 explains the analysis of posts on the Facebook pages of two emergency management organisations. The collected data was coded, and thematically analysed to determine overarching themes, communication patterns, communication cultures, information flow and benefits and challenges . Chapter 5 builds on the findings of Chapter 4 by identifying overarching themes in emergency management. Interviews with the stakeholders of emergency management organisations and findings of interviews are presented in Chapter 6.

Chapter 7 draws conclusions regarding the role of organisational cultures in crisis informatics, provides recommendations to emergency management stakeholders and discusses how the findings of this study can extend future studies in crisis management.

Chapter 2 – Literature Review

This chapter reviews literature on the research field of this study, crisis informatics. First, types of interactions in social media are discussed. This is followed by a discussion on the components of the crisis informatics domain which are users, technology and information. Theories and frameworks used in social media are discussed. In the final section the influence of culture on information systems is discussed, followed by the benefits and challenges of social networking sites, which establishes the research questions of this study.

2.1 Types of Interaction in Social Media

Crises are broadly divided into natural or 'man-made' disasters. This research examines the impact of natural disasters on the stakeholders of crisis management by analysing the information posted on the SNSs of emergency management organisations. It is situated in the discipline of **Crisis informatics** which is defined as a multi-disciplinary field of computing and social science in which people use technology to mitigate the impact of disasters (Reuter, Hughes & Kaufhold 2018). The major components of the crisis informatics domain are users, technology and information (Reuter & Kaufold 2018), which are illustrated below.

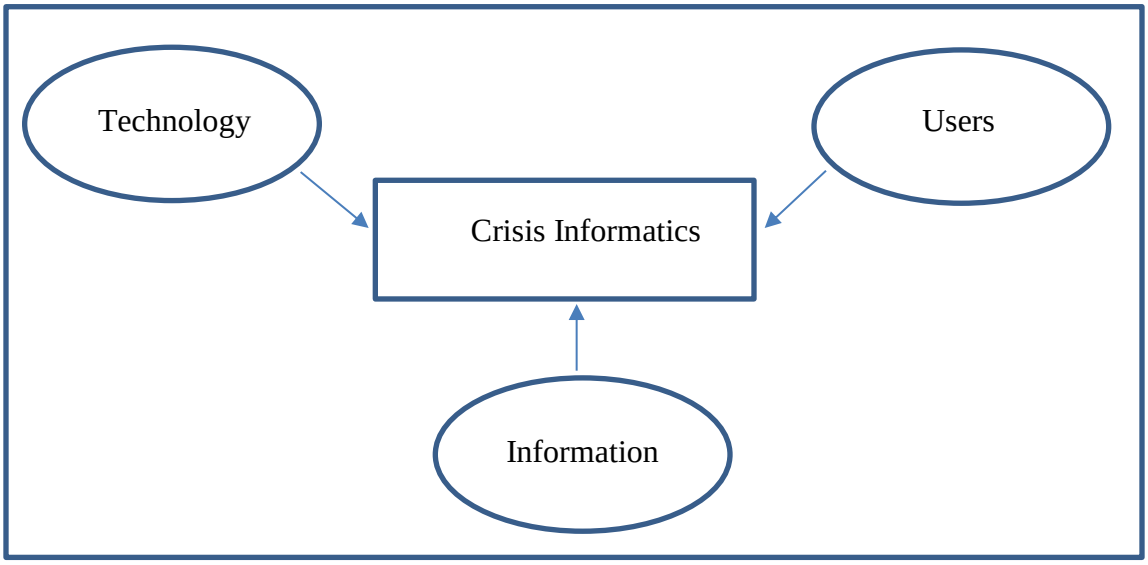

Figure 2. 1 : Crisis Informatics

In this study, users represent the public who post information on the social networking sites of emergency management organisations. The technology used is social networking sites (e.g. Facebook) and the information represents the publicly generated content posted on the social networking sites of emergency management organisations. There are several types of interactions in social media. Crisis communication is defined as the interaction between stakeholders in the different phases of a crisis which according to the crisis communication matrix are Authorities to Citizens (A2C), Citizens to Citizens (C2C), Authorities to Authorities (A2A), and Citizens to Authorities (C2A) (Reuter, Hughes & Kaufhold 2018).

In the context of citizen-to-citizen communication, it was found that citizens were involved in disseminating information and acted as information brokers (Hughes & Palen 2009). For example, the public gathered and synthesized information during the 2008 Sichuan earthquake using social media for dissemination (Qu, Wu & Wang 2009). In the 2010 Yushu earthquake, citizens used microblogging to find out information about other citizens (Qu, Huang, Zhang & Zhang 2011). Digital volunteers were found to synthesize, amplify and structure information during disasters (Starbird 2013). During the 2012 hurricane Sandy, citizen communication helped in saving lost animals (White, Palen & Anderson 2014). In the 2011 Tornado Super Outbreak, citizens set up self-help online communities to support the recovery efforts (Reuter et al. 2013). On the other hand, some of the challenges faced by stakeholders of disasters were the presence of inaccurate information posted by users on social networking sites during disasters and the limited sharing of information by less experienced volunteers in disasters (Wilensky 2014).

In the context of authorities-to-citizens communication, Reuter et al. (2016) studied the behaviour of stakeholders during emergencies. In the 2011 Thailand flooding disaster, the negative impact of social media was apparent as it facilitated the spread of false information and created unnecessary chaos among the public (Kaewkitipong, Chen & Ractham 2012). Differences in communication strategies between the fire and police departments during emergencies were found by Hughes et al. (2014) and the need for additional features in tools used in emergency management were suggested. Challenges in collaboration (Van Gorp 2014) and strategic use of

social media during emergencies (Plotnick & Hiltz 2016) were highlighted in the literature on crisis management.

In the context of citizen-to-authorities communication, the unreliability of posts (Mendoza, Poblete & Castillo 2010) and information overload (Hughes & Palen 2014) were the major issues. The advantages of using social media to raise funding during emergencies (Gao, Barbier & Goolsby 2011) and the maturity of volunteer organisations (Hughes & Tapia 2015) were other factors discussed in the studies on citizen to authorities' communication. In addition to this, examining the relevance of social media messages and the techniques and challenges for processing this data were discussed in other studies (de Albuquerque, Herfort, Brenning & Zipf 2015; Hughes & Palen 2014).

In the context of authorities-to-authorities communication, some organisations use internal social media channels. On the other hand, inter and intra-organisational collaboration was a drawback outlined by studies in crisis informatics (Rueter & Kaufhold 2018). The literature discussed above indicates that different types of communication occur among the stakeholders in crises. One of the limitations of the literature reviewed above is the lack of examination of communication patterns in the different stages (pre-crisis, crisis and post crisis) of crisis management. Furthermore, limited studies have examined the types of user-generated content prevalent in the communication among stakeholders. This is required to establish the overarching themes in crisis management and benefits and challenges of content to the stakeholders of crisis management. The components of the crisis informatics domain (i.e. technology, users and information) are discussed in the next section.

2.2 Technology

Social Networking Sites (SNSs) are web-based applications that allow users to create and exchange content which are personal (e.g. name), professional (e.g. employment), and social (e.g. events) (Kaplan & Haenlein 2010; Kim, Jeong & Lee 2010). The prominent features of SNSs include personal profile creation, establishing and communicating online, voicing individual opinions, online group participation, suggesting personalised content to retain online group participation among users as well as disseminating such information to network connections (Kim,

Jeong & Lee 2010). Thus, SNSs are technological innovations that are used for interpersonal communication and collaboration among users (Kane et al. 2014).

The history and development of SNSs are extensively mentioned in the study of Boyd (2008) who presents “SixDegrees.com” and “Classmates.com” as networks that belong to the category of SNSs. Although “Classmates.com” emerged ahead of “SixDegrees.com”, the significance of the latter was the integration of user profile creation and listing details of friends in their network. Boyd (2008) claims that this was followed by another wave of social networks such as “AsianAvenue”, “BlackPlanet”, and “MiGente”, exhibiting the unique features of “SixDegrees.com”.

Earlier research found that the popularity of SNSs varied when the service was offered in different geographical settings (Fragoso 2006; Goldberg 2007). To further exemplify this argument, Kim, Jeong & Lee (2010) found that “Hi5” was popular in Central Africa, while “Facebook” was popular in Egypt. Similarly, “MySpace” and “Facebook” were dominant networks in North America, while “Orkut” and “Migente” were popular in Central and South America. In Southeast Asia, although the online social network, “Friendster” was the most popular, “Orkut” was dominant in India and Pakistan followed by “Xianonei” and “Xing” in China, “Cyworld” in South Korea, “Hi5” in Thailand, and “Mixi” in Japan. In the Pacific Islands, including New Zealand, “Bebo” was the most popular OSN. Further, in Europe “Badoo” and “Bebo” gained significant popularity, while in the Middle East and majority of Arab countries, “Facebook” was dominant. Among the different SNSs, Facebook is the most popular SNS in terms of its general user-base (Facebook 2018) and contains rich user-generated content in the context of crisis management (Gill et al. 2014).

Users are widely adopting social networking sites as communication and information sharing tools due to the characteristics of user created content, free to use (Handayani & Lisdianingrum 2011) and a multi-platform technology (Kaplan & Haenlein 2010). Its use is so widespread that in twenty minutes, there are 10 million comments and 1 million status updates on Facebook (Hepburn 2011). A recent update indicates that 510 comments, and 293,000 status updates are posted on Facebook every 60 seconds (Noyes 2015). Other statistics indicate that

worldwide users of Facebook are over 1.4 billion (Facebook 2018), and LinkedIn with 562 million users (LinkedIn 2018). Social networking sites have been used widely in higher education (Erskine et al. 2014); government (Cumbie & Kar 2014); physician-patient interaction (Dantu, Wang & Mahapatra 2014); e-democracy (Finau et al. 2014); and emergency management (Gill et al. 2014). Thus, the wide user-base and extensive usage are making social networking sites an important communication and information sharing tool (Ngai, Tao & Moon 2015; Wilson et al. 2012).

2.3 Users

In the context of new SNSs continuously evolving for different purposes (Heidemann, Klier & Probst 2012), SNSs are generally classified into seven different types (Richter et al. 2009). According to Richter et al. (2009), SNSs are ranked among the top sites frequently visited by users on the Internet and the seven different types of SNSs are public, business (professional), content, target, domain, activity and micro SNSs. The criteria used by Richter et al. (2009) for classifying SNSs are relationship type (e.g. friend or business contact), purpose of usage (e.g. altruistic or hedonistic), social networking feature (core or enabling), mode of usage (interaction or self-portrayal), as well as target (e.g. mothers or students), and domain focus (e.g. videography or bodybuilding). An example of public-SNS is Facebook; business-SNS is LinkedIn; content-SNS is Flickr; target-SNS is cafemom.com; domain-SNS is patientslikeme.com; activity-SNS is Poptent.net; and micro-SNS is Yammer.com (Richter et al. 2009).

Earlier studies indicate that the popularity of SNSs varied when the service was offered in different geographical settings (Fragoso 2006; Goldberg 2007) which indicate that there are different types of users on SNSs. According to Brandtzæg & Heim (2011) users of SNSs have been classified as socialites based on their socialising activities; debaters based on content contribution; sporadics based on limited usage; lurkers based on casual information browsing; and advanced users based on frequent usage. Since there are distinct types of users on SNS, their usage patterns, and consequences eventuating from usage are different (Valenzuela, Park & Kee 2009; Brandtzæg 2012). Though the above studies have reported the evolution of SNSs, the different types of SNSs and different types of users on SNSs, only few studies have examined the content posted by users on SNSs. A unique characteristic of SNSs is user-generated content for which users require only

limited technical expertise (Kaplan & Haenlein 2010) and this user-generated content posted on SNSs entail a wide variety of information (Nosko et al. 2010).

2.4 Information

User-generated content is defined as information in the form of text, audio, video, images, or metadata (San Martn & Garcia-De los Salmones 2017; Kane et al. 2014), that are posted by users either intentionally or impulsively on SNS (Shim et al. 2013). A review of various studies on user-generated content in the context of profile related content, profession related content and social context is discussed in the following sections (Case, Han & Rimes 2016; Kaplan & Haenlein 2010; Utz 2016).

2.4.1 Profile-related content

Profile-related content posted by users range from personal data (name, photo, birthday, gender) to relationship details, achievements, hobbies and interests, email address, and phone number (Tsay-Vogel, Shanahan & Signorielli 2018). SNSs include a user profile which includes basic information (name, photo, age, birthday, relationship status, gender, type of relationship), personal information (interest, favourite music and TV shows, movies, books, and quotation), contact information (mobile phone, land phone, address), and education and work information (school attended, employer details) (Xu, Wei, Chen, Chen & Liu 2016). The profile information also includes marital status, religious status and political party membership information as well.

User profile content disclosed on SNS was grouped into standard, sensitive and potentially stigmatizing information by Nosko, Wood & Molema (2010) and Zhitomirsky-Geffet & Bratspiess (2016) and this classification was used to examine identity threats (such as impersonation) to users. Standard information includes gender, birthday, birth year, email and profile picture while sensitive information includes employer information, job position, message, photos and albums. Meanwhile, stigmatizing information includes religious and political view, sexual orientation, interests, activities, favourite music, movies, and quotes. SNSs have enabled the sharing of

personal information with known acquaintances as well as with strangers (Stutzman, Gross & Acquisti 2013).

Users of SNSs can be connected with the schools that they have attended and with details such as the courses attended on their user profiles (Jeon et al. 2016). The other types of information shared by users are courses taken, education background, academic interest and achievements, location, profile photograph, honours, awards and extracurricular accomplishments. Further, younger and elderly users exhibit differences in their use of SNSs in terms of sharing and expressing themselves online and on online popularity. The literature examined above on the types of information that users post on SNSs give insights into communication patterns of users examined in this study.

Individual tastes of users on SNSs in terms of hobbies and interests such as music, books, movies, television shows, in addition to general interest such as camping, painting or hiking, were studied by examining the personal information shared by users on their SNS profiles (Skoric 2016). Examining identity construction on SNS indicated that SNSs users generated identities implicitly through social interactions among network connections (Gallardo, Jenkins & Dillon 2016). The literature also indicates that Name is used to search users by first or last name, initials or partial names (Gil-Or, Levi-Belz & Turel 2015). Bilingual names are more appealing to local and global users of SNSs as well as to establish truthful user representation on SNSs. Disclosing one's name might lead to profile cloning whereas posting birthday and month will broadcast that information to friends and support the maintenance of pre-existing relationship on SNSs. By disclosing birth year, age is revealed, which facilitates connection with peers of the same age group (Pfeil, Arjan & Zaphiris 2009). Further, revealing full birthday (day, month, and year) may lead to identity theft. By posting gender on SNSs profile, gender identity is revealed to facilitate friendship. Literature indicates that including gender facilitate stereotyped representation of masculinities and femininities (Pfeil, Arjan & Zaphiris 2009).

An option to disclose personal contact details only upon request enables the maintainance of individual privacy. Alternative SNS contact information facilitates more network connections, whereas posting professional information will lead to strong external networks (Skeels & Grudin

2009). Using online communication tools extends an SNS's network and increases communication with strangers. Further, providing information about region reduces privacy as strangers can identify users' physical location. Locating users based on region may result in abuse or physical assault. Moreover, sharing a phone number might result in unwanted contact from strangers and additional contact information provided can de-anonymize a user by combining information shared by users on different SNSs (Strater & Lipford 2008). By disclosing marital status, users are willing to reveal social status to the community, while matching online connections leads to relationship building. Sharing partner's name indicates a bond of intimacy and closeness resulting in bonding social capital. Posting one's marriage date may result in the enjoyment of receiving anniversary wishes from family, friends and well-wishers. Disclosing a partner's name might lead to profile cloning, whereas religious and political views are indicators of ideology (Bilge, Strufe, Balzarotti & Kirda 2009).

The above literature indicates that user profile information posted on SNSs are Name, Birthday, Gender, Profile Picture, Email address, Contact Information, Marital status, Religious View, Political view, Language Proficiency, Honours and Awards, and Interests. The literature (Nosko et al. 2010; Richthammer et al. 2014) on SNS data types indicate that semantically specified content on SNSs include mandatory content and optionally provided content. Mandatory content is the information that users must provide for successfully enrolling on SNSs such as Name, Birthday, Gender, and Email address. Optionally provided content is non-obligatory information that users may choose to provide while enrolling on SNSs which includes Contact Information, Marital status, Religious View, Political view, Language Proficiency, Profile Picture, Honours, Awards, and Interests. Since mandatory content and optionally provided content provide basic information about SNS users, they are coalesced as "User Information".

The literature (Stutzman, Gross & Acquisti 2013; Zywica & Danowski 2008) also indicates that user profile information could include honours and awards as well as qualifications accomplished. This second set of optionally provided content has been classified under content that have succinct or concise meanings (Richthammer et al. 2014). Hence honours, awards and educational qualifications which are related to educational details of SNS users are coalesced as "User Education".

The literature described above indicates that different types of user-generated content are posted by users on SNSs which include basic user profile and education information. One of the limitations of the studies reviewed above is that different types of user-generated content posted by users on SNSs are mentioned without analysing consequences for users. The next section describes the content posted by users on SNSs in relation to their profession.

2.4.2 Profession-related content

Profession-related content includes positions held, professional experience, professional affiliations, professional contacts, and employment status (Case, Han & Rimes 2016). Other types of content users post on SNSs include job title, job description, job start date, number of company friends, job-related groups (internship groups), and job description. Career history and employer information were additional profession related content posted by users on SNSs. Other profession related content includes types of job opportunities available and career progression from technical to managerial position over a period. Further, information described above which are available on SNSs were used by users (software professionals) to locate expertise in a field (Skeels & Grudin 2009).

Users share professional information such as project updates with colleagues and are motivated to connect with colleagues at a personal level and advance their career in an organisation. Further, more connections generate more opportunities for users' future employment (DiMicco & Millen 2007). Disclosing profession related content leads to keeping in touch with colleagues, contact between distant employees, and finding co-workers with expertise or project experience, and improve interpersonal communication. On the other hand, challenges faced by professionals include maintaining a single SNS profile for both professional and non-professional use. Thus, with multi-level access controls and multiple user profiles, SNS users can maintain professional and social profiles independently. In this study, access controls and multiple user-profiles provide insights into the research questions examining the benefits and challenges of information posted on SNSs, especially in the context of social identity.

Profession-related content posted on SNSs include Professional Skills, Interests, Job Description, Job Start Date, Positions Held, Resume, Graduation Year, Career History, Job Title, Employer Information, and Professional Affiliations. Thus, a third set of optionally provided content classified under information with succinct or concise meaning (Richthammer et al. 2014) are Career History, Job Title, Employer Information, Job Description, Job Start Date, Resume, Positions Held, Professional Affiliations, and Professional skills. Since these optionally provided content are related to employment details of SNSs users, they are coalesced as "User Employment".

The literature described above indicates that different types of user-generated content are posted by users on SNSs which include users' professional information. Though limited professional benefits are listed in the above studies, a majority of studies reviewed in this section include listing the different types of user-generated content posted by users on SNSs without examining the consequences of content to users. The next section describes the content posted by users on SNSs in relation to social information.

2.4.3 Social information

SNSs are one of the main avenues where disclosure of information facilitates social interaction, collaboration and information dissemination (Maiz et al. 2016). Social information posted by users includes praise, jokes, greetings, photos, and videos to represent users' identity. Collaboration on SNSs leads to user-generated content such as personal diaries (author's life details), advertisements, and announcements (Kaplan & Haenlein 2010). Other types of information posted on SNSs are complaints, random thoughts, diaries, questions, user availability on SNSs, self-experience, announcement, opinion, greetings and other miscellaneous information or text that doesn't convey any meaningful information.

Drinking or alcohol-related photos, party photos, and inappropriate humour are types of information that students wish to keep away from potential employers. Some users post cartoons or memes on SNSs to criticise and influence political decision-making. Users build social relationships with other users through interactions. SNSs engage users in democratic processes

with political and civic participations, protests, boycotts, unofficial strikes and posting information about such events (Kettles & David 2008). große Deters, Mehl & Eid (2016) examined the types of questions asked, answers contributed, and the motivation to ask social networks instead of using web search engines, finding that SNSs enable seeking and sharing of information through social connections. Another study suggests that criticism, anecdotes, rumours, and gossip resulted in the generation of online tension among users (Miller & Melton 2017). One of the reasons for this tension is the unlimited flow of information that spans across different groups on SNSs, resulting in information reaching unintended recipients. A hashtag is a type of user-generated content that can be used to direct a posting to an individual or an event (Conole & Culver 2009). Users also post different types of photos and videos on SNSs which include Vacation Photos, Project Photos, Variety of Photos, Party Photos, and Videos.

The types of information that users post on SNSs in the social information category are Status Update, Invitation, Recommendation, Diaries, Random Thoughts, Request, Gossip, Criticism, Announcement, Greetings, Opinion, Self-Experience, Hash Tags, Creative Writing, Cartoons, Praise, Photos, Videos, and Other. According to Richthammer et al. (2014), the above disclosed content posted on SNSs do not have succinct or clearly defined meanings. Furthermore, in the disclosed content category, user-generated content are of three types: text, video, photos or cartoons (Kaplan & Haenlein 2010). Thus, users can post information either through a textual mode or by using rich media. Hence Party Photos, Vacation Photos, Project Photos, Variety of Photos, Cartoons, and Videos are classified as "Media Rich Information" due to the nature of content. On the other hand, Announcement, Creative Writing, Invitation, Status Update, Request, Greetings, Praise, Recommendation, Diaries, Opinion, Random Thoughts, Gossip, Criticism, Self-Experience, Quotations, and Tags (for instance, person or place) discussed in this section are classified as "Textual Communication" due to the nature of content.

The literature described above indicates that in the social information category, users post content in two different forms which are textual and media-rich information. The above analysis of literature on content posted by users on SNSs indicates that users post information in the context of profile, profession, and social category. The existing social science theories and framework (Gregor 2006) for analysis are not suitable to classify and narrow down subjective user-generated

content posted by users on SNSs. Hence it is imperative to develop a conceptual framework for classifying information on SNSs and to develop a common understanding on the different types of user-generated content. This classification is required to address the research questions on communication patterns and its benefits and challenges to stakeholders of crisis management.

2.5 Theories and Framework

Theories and framework relevant to classification of information, information disclosure and its dimensions are discussed in this section.

2.5.1 Classification Theory:

An Information system contains abstract things and hence Classification Theory which can classify human perceptions (Parsons 1996) has been chosen as the most appropriate theory to represent user-generated content (i.e. abstract things) posted by users on social networking sites (i.e. Information Systems). Objects and properties are the primitive constructs of the information model built using the classification theory (Parsons 1996). A piece of information (i.e. object) posted by users on social networking sites that can be used to identify a person directly or indirectly includes properties such as name, age, phone number, marital status, credit card number or residential address (Padyab, Backteman-Erlanson & Brulin 2016). Users also post information which includes education-related properties such as degrees received and universities attended by users (Wade & Roth 2015). Thus, information about users and their educational details are semantically specified (i.e. succinct) information (Richthammer et al. 2014) which exhibits structural (user information) and relational properties (education related) (Parsons 1996) of objects. According to Tow, Dell & Venable (2010), name, relationship status, friends list, photos, date of birth, and education history are classified under personal information. Hence user information and their education details are classified under personal information.

On the other hand, user posts on job-related properties include employment history and professional skills (Case, Han & Rimes 2016). Thus, employment details of users are semantically specified (i.e. succinct) information (Richthammer et al. 2014), which exhibits relational properties (Parsons, 1996) of objects. Professional information includes curriculum vitae and other

professional connections (Islam & Mäntymäki 2011). Hence users' employment details are classified under professional information. Users also post information such as opinions, concerns and moods which are important in a society and can be analysed for gaining valuable insights for enterprises (Johnston et al. 2016). On the other hand, some users post comments (i.e. criticism or profanity) on social networking sites that are not appropriate for facilitating social interactions in a community (Miller & Melton 2017). Thus, information that users post in a societal setting does not have semantically specified meaning (i.e. no defined single value) (Richthammer et al. 2014) which exhibits behavioural properties (Parsons 1996) of objects. Users also post photos, videos (Kaplan & Haenlein 2010) and cartoons (Cranefield & Oliver 2014) in addition to text. Hence party photos, vacation photos, project photos, cartoons, and videos are classified as 'media rich information' due to the nature of content. Social information includes activities and events of network members as well as those messages that are important in a community (Quan-Haase & Young 2010). Hence users' textual communications and media rich communication are classified under social information. From the above analysis, the major components in the information classification framework are personal, professional and social information. The personal component has user information and education details as sub-components; professional component has employment details as sub-component; and social component has textual communications and media-rich information as sub-components. The classification framework has been developed from literature taking into consideration the different types of content posted by users which adds to the generalizability of framework and its application in various domains. In this research, the information classification framework is applied on the content posted by users on the SNSs of emergency management organisations to establish its benefits and challenges to stakeholders of emergency management. The content posted on SNSs are further discussed based on the concept of information sharing in the next section.

2.5.2 Activity Theory:

In qualitative and interpretive information systems research, Activity Theory has been used to analyse and understand human interaction through tools and artefacts (Hashim & Jones 2007). It is best used in historical and cultural situations when users, their goals, and the tools used are under constant change. Activity Theory was used by Chen and Sharma (2013) to examine content produced in fire-related emergencies. The fundamental principles of Activity Theory are: (a)

knowledge is mediated through tools and (2) the unit of analysis is the human activity (Taylor et al. 2018). The theory has been used in the context of organisational change, implementation of information systems, disaster response, education and health (Karanasios and Allen 2018). In this study Activity Theory focusses on the use of tools for the interaction of humans with their environment and can be used to represent complex activities such as emergency management (Mishra et al. 2011). Crisis management is a complex activity and Facebook is the tool through which subjects (users on the Facebook page of EMOs) interact with the environment around them to achieve an outcome. Activity Theory is an appropriate theory for this study since context or activities can be studied in detail along with the motivation of an activity. The advantage of Activity Theory in comparison with other theories is its flexibility in analysing multi-level composition of activities (Mishra et al. 2011).

Activity Theory (Sannino & Engestrom (2018) has been used in comparison with other frameworks (McGee et al. 2016, Wilkins & McCarthy 2011) due to the following reasons:

1. Activity Theory provides multi-voicedness in which an object can be classified as a generalised object or a specific object and can be analysed from a societal perspective or personal sense. In this study, content posted on the Facebook page of EMOs is the object and can be distinguished into three major categories of user-generated content which are personal, professional and social information. Thus, the object can be analysed from individual and societal perspective (i.e. affecting community) which is one of the limitations of other frameworks (McGee et al. 2016, Wilkins & McCarthy 2011).

2. Activity Theory provides a boundary for this research using its components such as subject, object, outcome, rules, community, division of labor and instruments. A contribution to the existing components in the Activity Theory is the cultural environment where the activity takes place. In this study, horizontal individualism has been found to be one of the cultural environment characteristics that promote open communication in EMOs.

3. The 3rd generation activity theory suggests that unit of analysis is a constellation of two or more activities which takes the form of multi-activity collaboration or a producer-client relationship. In this study, the posts of EMOs can be considered as a producer and the public comments can be classified as a client in the producer-client relationship which is also one of the limitations of other frameworks (McGee et al. 2016, Wilkins & McCarthy 2011). This separation of producer-client relationship helps to segregate between the EMO posts and the comments of the public. This addresses the second research question regarding the benefits and challenges to the stakeholders of crisis management. Further, if there is a considerable amount of engagement (i.e. posts) from other stakeholders such as law enforcement agencies, Rural Fire services, and Ambulance services, each of these can be considered as a single activity which provides input to the second activity to establish the benefits and challenges of posts to the stakeholders of crisis management.

In this study, Activity Theory was used to identify the benefits and challenges of user-generated content posted on the Facebook pages of emergency management organisations to the stakeholders of crisis management. By applying Activity Theory in this study, user-generated content posted on SNSs is considered as the *object*, while Facebook is the *tool* where the content is posted. The benefits and challenges of user-generated content are the *outcome* according to Activity Theory, while the stakeholders in crisis management act as the *subject*. The *rules* indicate the guidelines and policies (information control) on posting content on the Facebook page of emergency management agency, whereas *division of labour* includes stakeholders (administrators) who review and post content on the Facebook page of emergency management organisation as well as take precautionary measures to mitigate, respond and recover in crisis situations. The *community* in the collective activity system includes stakeholders who are active (disseminating information) and passive (seeking information) users on the Facebook page of emergency management organisations. Hence, the collective activity system built upon the Activity Theory provides a lens to describe users' activity of posting content on the Facebook page of emergency management organisations.

2.5.3 Situational Crisis Communication Theory (SCCT):

Situational crisis communication theory (Coombs, 2005) is a theory in the discipline of crisis communication which describes how the responsibility of a crisis is attributed to an organisation and how it affects the reputation of this organisation. The reputation of the organisation also depends on the crisis type, crisis history and how the organisation has handled crises previously. The types of crisis suggested by the situational crisis communication theory are victim cluster, accidental cluster and intentional cluster. In the victim cluster, the organisation is also a victim of the crisis (e.g. natural disasters). In the accidental cluster, the actions of the organisation were classified as unintentional and were not directly linked to a crisis (e.g. break down of an equipment in an emergency). In the intentional cluster, the actions of the organisation were inappropriate and were directly linked to a crisis (e.g. late emergency warning messages). Crisis history refers to the type of crises an organisation has faced in the past and how they took care of the stakeholders who were affected by crises.

Some of the crisis response strategies proposed by the theory are deny, diminish and rebuild. The deny strategy suggests that the organisation's reputation will not be damaged if the organisation is not involved in the crisis or if the crisis information is a rumour. The diminish strategy tries to establish with credible evidence that consequence of a crisis is not that bad or there is no direct connection between the crisis and organisation. The rebuild strategy suggests extending help to those who were affected by a crisis and ask for forgiveness. In conclusion, the information posted by emergency management organisations on their Facebook page will provide the contextual information of the organisation (i.e. organisation's response and communication strategies) which influences the reputation of the organisation.

2.5.4 Information Disclosure:

Information sharing is described as the deliberate or voluntary process of communicating users' thoughts and experiences (Derlega et al. 1993). In this study, information sharing is defined as different types of information that users post on social media through different communication technologies. To understand a phenomenon in detail (such as communication patterns in this case), one of the significant steps is to examine the phenomenon in the context of a framework (Zhang & Benjamin 2007). In the context of social media, a self-disclosure model of information was

proposed by Posey et al. (2010). The model is built upon Social Exchange Theory (Thibaut & Kelly 1959), Social Penetration Theory (Altman & Taylor 1973), and Communication Privacy Management Theory (Petronio 2002). Social Exchange Theory explains the rewards and costs eventuating from social interactions of users on social communication media. The Social Penetration Theory describes the depth of information disclosure because of profound intimacy developed during social interactions on social communication media. In this study social penetration theory in terms of depth and breadth could be used to explain the concept of relationship building among stakeholders of emergency management due to sharing of information on SNSs. Controlled information disclosure due to privacy concerns could be explained using Communication Privacy Management Theory. In this study, communication privacy management theory can be used to explain why certain crisis management organisations are keen on moderating the information posted by the public on the SNSs of their organisation.

The facilitators of self-disclosure are social influence (influence of others in users' social actions) and reciprocity, whereas trust and privacy risk (consequences caused as a result of posting personal information) impede self-disclosure (Posey et al. 2010). Privacy on social communication media was examined by Gross and Acquisti (2005) using Social Network Theory to understand the extent of social capital gained by users because of social interaction among network members. Among the theories examined, Social Penetration Theory describes the dimensions of information disclosure in a cross-cultural context (Posey et al. 2010). Examining dimensions of information disclosure give insights into the communication culture examined in this study. Hence, to derive the dimensions of information disclosure on social media, models of information disclosure are discussed.

In the Trust-risk model of information disclosure, perceived risk and trust on social communication media are influenced by internet privacy concern, control, and the importance of communication media in the social life of users (Lo 2010). In the study, control is defined as users' perception about their capability to control social actions that affect them. The study suggests that sharing complete personal profiles are found to be more problematic than posting personal information in small units. The research model suggested by Lo (2010) largely correlates with the uses and social gratifications approach for Internet (Stafford & Gillenson 2004). From a

costs/benefits perspective, the research model includes the cost aspects (internet privacy concern) of posting information on social media in-addition to the benefits of convenience in communication. Another self-disclosure model was proposed by Krasnova et al. (2009) to examine the breadth of information disclosure on social communication media which suggests that enjoyment increases information disclosure on social communication media. Having discussed the information disclosure models in this section, dimensions of information disclosure are examined in the next section.

2.5.5 Dimensions of Information Disclosure:

In the context of information disclosure on social communication media, Peterson and Siek (2009) suggest that the degree of information disclosure (depth and breadth) on social communication media have positive correlation with the level of user participation. In another study on privacy regulation in social communication media, Lehikoinen, Olsson and Toivola (2008) suggest that the breadth and depth dimensions of information disclosure are influenced by the level of anonymity, type of communication media used to post information, and the ability to modify information before posting. On the other hand, Posey et al. (2010) examined self-disclosure on social communication media in a cross-cultural context where the authors suggest that the degree of collectivism increase the self-disclosure behaviour of individuals. In our study, the dimensions of culture give insights into the communication culture examined on the Facebook page of crisis management organisations.

In the context of general information disclosure, the depth (intimacy level) and breadth (topic diversity) dimensions of information disclosure are studied by Levinger and Snoek (1972) and Huesmann and Levinger (1976). It was suggested by Levinger and Snoek (1972) that the level of relatedness between participants in a disclosure starts at awareness, surface contact, and finally reaches mutuality (minor, moderate and major intersection between participants). Another study (Huesmann & Levinger 1976) indicates that in a disclosure process, value to participants increase with the depth of information disclosure between participants. Another study (Greene, Derlega & Mathews 2006) on information disclosure suggests that the disclosure messages incorporate the

breadth and depth dimensions of disclosure. In this study, the breadth and depth dimensions give insights into the concept of relationship building among the stakeholders of crisis management based on the information posted on the SNSs of crisis management organisations.

Decision-making processes in social situations are studied by Omarzu (2000) and the author suggests that the decision to disclose and the disclosure message constructs such as what, how, and whom to disclose is ascertained based on the beneficial and harmful consequences of disclosure. The study also found that primary information disclosure dimensions such as breadth and depth influence subjective utility (individual satisfaction eventuating from a social action) and subjective risk (individual consequences eventuating from a social action). The study also suggests that the breadth of information disclosure decrease with an increase in subjective utility whereas duration of information disclosure increases with an increase in subjective utility. The study claims that the depth of information disclosure was found to decrease with an increase in subjective risk. The consequences of posting personal information in terms of when and why such information is beneficial to users are studied by Chaudoir and Fisher (2010). The study also used the disclosure dimensions (depth and breadth of disclosure) discussed above and suggest that the disclosure process is alleviated by social support, changes in social information and reducing inhibiting factors of disclosure. Since there are different types of social communication media based on usage and focus (Heidemann, Klier & Probst 2012; Richter et al. 2009), different types of information are shared on different social communication media. Having discussed the models of information disclosure, factors influencing information disclosure are discussed next.

In a study on self-disclosure, Greene, Derlega and Mathews (2006) found that the background factors that influence the decision to disclose or non-disclose are culture, social acquaintances, and individual differences. With respect to the control factors on information disclosure, previous research (Nosko et al. 2010) suggests that age and information disclosure are negatively correlated. This indicates that young people in societies are more susceptible to disclosing information on social communication media rather than old people. Thus, social actions in terms of information disclosure on social media are largely influenced by the culture of social technology users (Kim, Sohn & Choi 2011). From a theoretical perspective, Davison and Martinsons (2003) explains that there is a significant increase in the literature that discusses the

influence of culture on information systems. The study claims that major failures in the adoption of Information systems is due to the cultural mismatch between individuals and information systems. Hence, literature relevant to the influence of culture on information systems is discussed.

2.6 Culture and Information Systems

Studies related to culture are presented to establish how culture influences information systems. From a cross-cultural management perspective, culture distinguishes individuals belonging to distinct social groups (Hofstede 1980). In the context of information systems and from a behavioural perspective, Karahanna, Evaristo and Srite (2006) suggest that dimensions of culture include values and practices, with values largely influencing individual behaviour (posting of crisis information on SNSs in this study). Karahanna, Evaristo and Srite's (2006) description of culture in terms of values (collectivistic and individualistic values) is adapted in this study to explain the influence of culture on the information disclosure behaviour of social technology users on social media. In collectivism, group norms take precedence over individual preferences whereas in individualism, personal preferences are valued than group norms. According to a study conducted by Stavropoulos et al. (2018), Australia and the USA are considered as countries demonstrating individualistic cultures. Individualistic cultures focus on the needs of the individual over the community (Stavropoulos et al. 2018). But according to the social structures and policies in these countries, Australia reflects horizontal individualism and the USA reflects vertical individualism. In horizontal individualism, equality in opportunities and social welfare between individuals is assumed whereas in vertical individualism, a sense of inequality between individuals is generally accepted and competition is a key cultural tradition.

According to Herring (2007), social media are perceived differently across cultures and earlier research (Fragoso 2006; Kim, Jeong & Lee 2010) suggested that culture seems to be one of the factors that influence the popularity of social communication media in different geographical settings. Further, cross-cultural differences exist between users in the usage of social communication media (Pookulangara & Koesler 2011). Other studies (Hargittai 2007; Bagozzi & Dholakia 2002) inform that communities are formed on social media based on similar cultural characteristics. On the other hand, cultural characteristics of social technology users influence their commitment in adopting and using social media (Vasalou, Joinson & Courvoisier 2010). In the

context of cultures that are found to be predisposed in disclosing themselves on social media, Pflug (2011) reveals that certain Asian cultures are inclined to disclose less personal information in comparison with other western cultures. Another study suggests that cultural dimensions (individualism) influence disclosing problematic content on social media (Karl, Peluchette & Schlaegel 2010). Culture is reviewed here since communication culture is examined in this study based on the information posted on the SNSs of crisis management organisations.

Information Systems are influenced by cultural differences (Ives & Jarvenpaa 1991) and cultural barriers are one of the major limitations in sharing information across geographical boundaries (Menou, 1983). Cultural differences are one of the challenges faced by management to implement and manage information technology applications globally (Ives & Jarvenpaa 1991). On the other hand, cultural sensitivity involved in transferring information system applications developed in one culture to other cultures is minimized through the concept of cultural prototype (Shore & Venkatachalam 1994). Thus, culture plays a significant role in the adoption and use of information systems. To understand the theoretical background explaining the influence of culture on information systems, theories on culture are discussed next.

2.6.1 Theories and Framework on Culture

A review of culture is outlined below to offer greater insights into the communication culture evident on the SNSs of crisis management organisations which is the third research question in this study. A theoretical model was proposed by Karahanna, Evaristo and Srite (2006) to establish the relationship between levels of culture and individual behaviour. This model was based on the Theory of Reasoned Action (TRA) and Subjective Culture model. The Theory of Reasoned Action used in Karahanna, Evaristo and Srite's (2006) model predicts behavioural intention, attitude and behaviour (Fishbein & Ajzen 1975). The Subjective Culture model describes the perception of social environment by members of a society (Triandis 2018). Karahanna, Evaristo and Srite (2006) study claims that one of the factors that influence individual behaviours (information disclosure) is supranational (regional, ethnic, religious, and linguistic) cultures.

Although a majority of cultural studies in earlier research (Ferratt & Vlahos 1998) are based on Hofstede's multi-dimensional framework, Ford, Connelly and Mesiter (2003) identified major limitations in Hofstede's framework. The critical concerns raised by Ford, Connelly and Mesiter (2003) are (1) treatment of culture as static over time; (2) demographics-based cultural classification; and (3) disregarding the existence of cultural subgroups. Cultural subgroups within nations have been widely discussed elsewhere (Huo & Randall 1991) indicating that even national culture is dynamic. Thus, the literature indicates that cultural differences exist within nations.

On the other hand, the Cultural Theory proposed by Douglas (1978) was used to classify different types of social relations and the theory was extended to find out the impact of cultural values and beliefs on social relations. The theory describes culture in terms of social relations, cultural biases, and social life of users (Thompson, Ellis & Wildavsky 1990) which offers insights into the examination of communication culture and addresses the third research question of this study. Jackson (2011) describes social relations at an individual level and is built upon association between people. Jackson (2011) also explains that although Cultural Theory is applied in diverse disciplines such as architecture, accounting, anthropology, business and technology studies, limited literature is available on its application in the domain of crisis informatics. The cultural dimensions used in the Cultural Theory are the grid and group, and these dimensions helps to describe an individual's societal identity (Jackson 2011). This also give insights into the consequences of social information posted on the SNSs of crisis management organisations. The grid dimension indicated how external factors such as age, gender and education, influence individuals. The group dimensions indicate how individuals are influenced by group characteristics. According to Thompson, Ellis and Wildavsky (1990), in a high grid environment, individuals followed accepted norms because of group compulsion, whereas in a low grid environment, group norms are considered trivial. The study also suggests that in a high group environment, individuals follow the accepted norms of a group to which they belong.

Based on grid and group dimensions, Thompson, Ellis and Wildavsky (1990) extend culture into four subcultures (individualism, egalitarianism, fatalism, and hierarchism). Among these subcultures, egalitarianism espoused strong group and weak grid dimensions which characterise teamwork and cooperation leading to group trust and loyalty (Jackson 2011). On the

other hand, according to Jackson (2011), Fatalism does not support individuals' preference over group preferences. Hierarchism indicates precedence of group authority and control on individuals. In cultural theory, individualistic orientation is characterised by weak grid and weak group orientation which indicates that individual preferences and opinions take precedence over group authority and control (Jackson 2011). The cultural theory examined here will provide valuable insights into the research question on communication culture evident on the Facebook page of emergency management organisations.

The analysis of theories and frameworks on culture discussed above indicate that multi-cultural groups are present within nations and these groups within a society will demonstrate distinct behaviours (Tajfel 1978). Further, the theoretical model in an earlier study (Karahanna, Evaristo & Srite 2006) establishes the influence of culture on society and behaviour. Thus, the literature indicates that culture influences the information disclosure behaviour of social technology users on social media. The levels of culture and dimensions of culture are discussed in the next two sections to develop an in-depth understanding of the influence of culture on the information disclosure of social technology users and to address the research question on communication culture.

2.6.2 Levels of Culture

Individual behaviours are influenced by different levels of culture and one of the factors that influences behaviour is supranational cultures represented by regional, ethnic, religious, and linguistic characteristics (Karahanna, Evaristo & Srite 2006). The authors suggest that values and practices are the two critical components considered in examining the influence of culture on individual behaviour. Further, values learned through experience (education) are considered stable, and transition in values over time influence cultural changes (Karahanna, Evaristo & Srite 2006). On the other hand, practises are learned through social interactions at workplace, and are accomplished once the values are fixed. The values considered in this study are terminal values (personal and social values) and instrumental values (moral and competence values). In the study of Karahanna, Evaristo and Srite (2006), an example of personal value is self-centeredness, social value is society centeredness, moral value is honesty, and competence value is logical thinking. They also described supranational cultures that support personal, social, and moral values. Further,

values are found to be more significant than practices among supranational cultures. Thus, it is argued individual values (collectivistic values) play a significant role in examining the influence of culture on information disclosure.

The Theory of Reasoned Action (TRA) suggests that behavioural intentions (benefits and challenges of posting information on SNSs) are the antecedent factors that influence a specific behaviour (Karahanna, Evaristo & Srite 2006). Since this research is on understanding the consequences of posting information by social technology users, behavioural intentions are narrowed into social behavioural intentions (e.g. relationship building) based on Karahanna, Evaristo and Srite (2006) theoretical model. In another study, Lehikoinen, Olsson and Toivola (2008) found that culture significantly influence the information disclosure of social technology users which reiterates the pre-defined consensus in literature on the influence of culture on social technology users' information disclosure.

The self-disclosure behaviour of social technology users on social media is examined by Posey et al. (2010) and the study claims the influence of cultural dimensions on users' information disclosure. In the context of general information disclosure, Greene, Derlega and Mathews (2006) suggest that culture is one of the background factors that influence the decision to post or not to share information. On the other hand, in posting problematic information, culture is considered as one of the factors that influence posting of information (Karl, Peluchette & Schlaegel 2010). Further, from a user-centric system design perspective, Faloutsos et al. (2010) argues that understanding social technology users' behaviour (posting of information) on social media gathered much attention in recent times. In general, based on the studies discussed above (Karahanna, Evaristo & Srite 2006; Lehikoinen, Olsson & Toivola 2008; Posey et al. 2010; Greene, Derlega & Mathews 2006), it is understood that one of the factors that influence the posting of information by social technology users is culture. Hence, dimensions of culture that influence information sharing are discussed next.

2.6.3 Dimensions of Culture

Dimensions of culture are examined in this section since this study examines information posted by users on social media. According to Straub et al. (2002) culture is an amalgamation of

different components which include individuals' cultural background, sub-cultures, national, and professional culture. Thus, it is not appropriate to classify individuals' culture based on demographics only. In another study, Hofstede (1980) classified human groups based on cultural dimensions such as individualism/collectivism, power distance, uncertainty avoidance, and masculinity/femininity. Individualism/collectivism refers to ties among people in a community; power distance indicates the differences in inequality based on power in a society; uncertainty avoidance indicates coping with anxiety; and masculinity/femininity refers to the degree of overlap between the roles of men (e.g. assertive) and women (e.g. modesty). These cultural dimensions provide insights into the communication culture examined as the third research question of this study. Another study (Straub & Watson 2001) examines the influence of culture on Information Technology Transfer (ITT) in the Arab and American cultural context, which reifies the importance of monochronic/polychronic dimension in studying individual culture. The monochronic/polychronic dimensions are also studied by Hasan and Ditsa (1999) while investigating the influence of culture on IT adoption. It is also suggested that in some cultures, tasks (posting information) are accomplished in parallel (polychronic), while in other cultures tasks are consummated in a linear (monochronic) mode (Rose et al. 2003).

On the other hand, Triandis (2018) explains that the cultural dimension of individualism, at the personal level, is defined as idiocentrism. Similarly, collectivism at the personal level is defined as allocentrism. This extension of group dimension to individual dimension (individualism to idiocentrism) further incorporates the consensus in literature that culture is dynamic in nature. The models of culture in single, multiple, and social dimensions are studied (Trompenaars 1993; Morden 1999) and in single dimension model, the cultural dimensions considered are monochronism, polychronism, idiocentrism and allocentrism. Thus, the dimensions of culture based on the literature discussed above are monochronism and polychronism (Straub & Watson 2001; Rose et al. 2003), and idiocentrism and allocentrism (Triandis 2018; Morden 1999). These dimensions are used to examine the influence of culture on posting information by social technology users on social media.

Martin (2001) proposed three perspectives on culture: integration, differentiation and fragmentation The integration perspective argues that culture and technology are highly

interrelated (Cabrera, Cabrera & Barajas 2001). According to the differentiation perspective, Huang et al. (2003) suggest that the adoption of information systems is influenced by sub-cultural differences. In another study (Jackson 2011), the three perspectives on culture is integrated with the Cultural Theory to describe the influence of culture on the adoption of information systems. In the context of information disclosure, Greene, Derlega and Mathews (2006) model describe the disclosure message constructs such as who was disclosing, what was disclosed, how was it disclosed, when and where was the information disclosed to understand the influence of culture on information disclosure. The study articulates culture and social acquaintances as the antecedent factors that influence individuals' decision to disclose or non-disclose information.

With respect to organisational culture, open communication (Martins and Terblanche, 2003), is a determinant of organisation culture and is used to examine the communication culture of organisations. Examining communication culture in terms of open or closed communication is the third research question in this study. Lehikoinen, Olsson and Toivola (2008) suggest that the type of communication channel (social media) used to disclose information is one of the mediating factors that influence the degree of information being posted during online social interactions. Further, considering the information disclosure message constructs (how) embedded in Greene, Derlega and Mathews (2006) study, it is argued that Social Media (e.g., Facebook or Twitter) and Social communication technologies (wireless or wired technologies) mediate posting of information by social technology users. Among the different SNSs, Facebook was selected in this study based on its ability to disseminate rich information on crises and the extent of user-generated information available on the Facebook page of emergency management organisations. Understanding the influence of culture leads to the research question on examining the communication culture evident on the Facebook page of emergency management organisations. To understand the consequences of information posted on SNSs, the benefits and challenges of SNSs are discussed in the next section.

2.7 Benefits of Social Networking Sites

A review of user benefits of SNSs is presented with respect to self-presentation (Xu & Liu 2010), social interaction (Cheung et al. 2010), and information sharing (Kim, Jeong & Lee 2010). This analysis builds on the analysis of culture to provide insights into the implications (benefits) of

content posted by users on the SNSs of crisis management organisations which is the second research question of this study.

2.7.1 Self-presentation:

It is the positive feeling an individual perceives after disclosing personal information which is in one's interest to a social group. Xu and Liu et al. (2010) suggest that relationship maintenance (defined as persistent communication between participants to maintain friendship in a social group) is an immediate benefit of self-presentation in SNSs. Boyd (2004) explains that self-presentation and connection with others are the major driving factors for users to use SNSs. In the context of browsing information on SNSs, it was found that profile network navigation facilitated identity validation of users (Donath & Boyd 2004). According to Donath & Boyd (2004), impression management is one of the prominent driving factors that motivate users to use SNSs and connect with online friends. Impression management is a benefit to users which creates positive impressions about one among others and eventually makes these sites popular among users (DiMicco & Millen 2007). According to Boyd and Ellison (2007), SNS users' visibility (popularity), quick access, and different types of user contacts (friends as bi-directional, and fans as one-directional ties or followers) are other benefits that SNSs provide to users.

2.7.2 Social Interaction:

For social interaction and collaboration, users of SNSs could create and promote individualised profiles (Krasnova et al. 2010; Cheung et al. 2010). SNSs also helped in increasing individuals' social capacity (measured by the number of people individual shares information with) (Adams 2011) and helped users to accomplish utilitarian (immediate access), hedonic (leisure), and altruistic (charity) goals (Xu et al. 2012). According to Haythornthwaite (2005), SNSs is primarily used for online communication between already known offline relationships which is described as communication between hidden-ties. Lampe, Ellison and Steinfield (2007) suggested that user profiles helped SNSs users to connect easily with other users and facilitated the formation of new relationship among SNS users. Lin and Lu (2011) explain that SNSs entail enjoyment (defined as perceived happiness in using computer), usefulness and increase in peer connections (defined as the number of connections in a social group).

Online community participation is described by Kim, Jeong & Lee (2010) as another benefit of SNSs. It is found that SNSs benefit old aged people by reducing the monotonous nature and dullness in their daily life. SNSs have also enabled users to search and find out old friends settled elsewhere, facilitate entertainment, and bring self-satisfaction by helping others (Kim, Jeong & Lee 2010). Elderly users could achieve social connectedness (Goswami et al. 2010) through SNSs. According to Krasnova and Veltri (2010), the convenience involved in maintaining relationship between online community members is a benefit of SNSs.

Other general benefits of SNSs include transactional (sales) and relational social commerce activities (promotion, customer support, and product development) (Saundage & Lee 2011) as well as reaching out to diverse groups of users. Health social networking (Storni & Griffin 2009), product reviews and professional career development (Xu et al. 2008) are other benefits of SNSs to users. Spertus, Sahami and Buyukkokten (2005) found that user groups, formed on SNS based on their collective presence on communities were recommended with similar communities of interest, which is one of the benefits of SNSs. These online communities which are formed based on special interest group further extends the relationship formation among SNS users. Enjoyment to users (Sledgianowski & Kulviwat 2008) and the ability to maintain social ties (Ellison, Steinfield & Lampe 2007) are some of the important benefits of SNSs to its user.

2.7.3 Information Seeking & Sharing:

SNSs add value to individuals, organisations and the society by facilitating seeking and sharing of information (Agarwal et al. 2008). SNSs support disseminating information free of cost and soliciting information (Crowdsourcing) on SNSs has been utilised by businesses to promote social product development and by political and community leaders to support a common course (Kettles & David 2008). From an altruistic perspective, SNSs are used to find the owners of lost items by posting digital content (for instance, photographs from a lost camera) on online communities, for the owners to identify their lost items. It was also found by Kim, Jeong & Lee (2010) that in some middle-eastern countries (for instance, Egypt) SNSs were used to convey human rights concerns, freedom of speech, and democracy. In yet another context, SNSs support

charity initiatives, popularise environmental concerns, and support the visibility of political candidates (Kim, Jeong & Lee 2010). Thus, the benefits of SNSs are widespread.

SNSs can increase users' social capital since knowledge is disseminated among peers in online environments (Magro et al. 2009). SNSs can increase the popularity of budding musicians by sharing their audio/video (Kim, Jeong & Lee 2010). Henderson and Gilding (2004) suggest that SNSs encourage trust and lead to self-promotion or greater visibility for celebrities (for instance, former US president Barack Obama and singer Britney Spears) (Kim, Jeong & Lee 2010). Thus, SNSs lead to user popularity. Further, SNSs can generate collective knowledge (for instance, product recommendation) from social communities which could be further personalized by individuals' interaction (one-to-one) with community members (Kim, Jeong & Lee 2010).

The literature indicates SNSs have been used for marketing and collaborative decision-making (Kiron et al. 2012). An example of marketing includes making an angry customer happy by providing a solution to the issues raised. Another example of a collaborative decision-making was informing customers in advance about a service break-down of a cruise-ship to avoid further bookings. In an organisational context, SNSs were used by customers, suppliers, and employees worldwide to communicate their experience to network connections (Lai & Turban 2008). Further, according to Kiron et al. (2012), an organisation's SNS is trustworthy due to the large number of posts from customers' worldwide. Organisations also use SNSs for innovation (Kiron et al. 2012) and some examples include Lego and Threadless (Naik 2015), which are organisations inviting new designs from public. Communication within an organisation is another benefit of using SNSs. This enabled collaboration between employees within an organisation (Kiron et al. 2012). SNS also facilitated the review of product feedback instantaneously by the management, and helped decision-making easy by contacting employees in the different departments of an organisation through SNSs. Thus, from an organisational perspective, the benefits of SNSs include improved brand visibility, revenue generation, advertising, promotion, cost reduction, reaching new customers, receiving referrals, enhanced customer service, customer communication, building relationship, and receiving feedback (Parveen et al. 2015).

In general, the benefits from the use of SNSs in organisations have been classified in terms of internal and external use (Martin & Bavel 2013). The internal use includes improved information seeking, information sharing, access to professional expertise, and on the job learning. Other internal uses of SNSs are easier access to senior management, interconnection between

departments and best practices, open discussion and internal communication on innovative business initiatives, collaborations spanning across the different departments in an organisation, generating new ideas and extending business functionalities. Employee engagement and improved productivity by reducing internal mails as well as duplicating tasks is yet another use of SNSs in organisations.

The benefits from external use (outside the organisation) include better insight about customers and their requirements, understanding market fluctuations, and keeping track of online communities so that customer preferences and requirements are met rather than accomplishing organisations targets. Innovation by collaborating with the online communities and virtual groups as well receiving feedback to improve existing products and services are some other benefits of using SNSs in organisations. Better care of the customers by two-way communication between the public and organisations and engaging customers with incentives, brand awareness and flexible communication channels are other benefits of using SNSs in organisations. Some organisations customise SNSs and examples include 'IdeaStorm' of Dell for open innovation, 'MyIdeas' of Starbucks for generating ideas, 'Spot' of the Nationwide Mutual Insurance Company to resolve customer queries, 'Blueshirt Nation' of BestBuy for generating ideas and forum discussions, 'D Street' of Deloitte and 'Beehive' of IBM for enhanced social communication among employees (NaiK 2015; Kiron et al. 2013). Thus, there are widespread benefits of SNSs for organisations. The general benefits of social networking sites are discussed in the study of Enenkel et al. (2018), Kim & Hastak (2018a), Kim & Hastak (2018b), Hugelius et al. (2017), and Tim et al. (2017). These include real-time communication of early warnings (Enenkel et al. 2018), user-engagement (Kim et al. 2018a), information dissemination (Kim et al. 2018b), recruitment of volunteers for emergency services (Hugelius et al. 2017) and the role of social networking sites in disaster response (Tim et al. 2017). Though recent studies have discussed the benefits of social networking sites, none of the above studies have examined the benefits and challenges of information posted on social networking sites. Based on the literature reviewed above, Table 2.1 given below summarises the benefits of SNSs for its users.

Table 2. 1 User benefits of Social Networking Sites

User Benefits	References
Self-presentation	Boyd (2004)

Relationship maintenance	Xu & Liu (2010)
Identity validation	Donath & Boyd (2004)
Impression management	DiMicco & Millen (2007)
Increase in visibility	Boyd & Ellison (2007)
Increase in social interaction	Krasnova et al. (2010); Cheung et al. (2010)
Increase in social capital	Adams (2011)
Increase in friend connections	Lampe, Ellison & Steinfield (2007); Lo (2010)
Extending offline interactions	Kobler et al. (2011)
Social connectedness	Lampe, Ellison & Steinfield 2008; Goswami et al. (2010)
Information seeking & dissemination	Kim, Jeong & Lee (2010); Saundage & Lee (2011)

There are numerous benefits of SNSs, but users may encounter a number of challenges as well. Some of the problems of SNSs for users are reviewed in the next section.

2.8 Challenges of Social Networking Sites

The challenges faced by users of SNSs are presented with respect to identity theft (Foley and Nelson 2009), privacy-related issues (Krasnova et al. 2010), and security risks (Peterson & Siek 2009). An analysis of challenges of SNSs will provide insights into the consequences of content posted by users on the SNSs of crisis management organisations which is the second research question of this study.

2.8.1 Identity Theft:

The Identity Theft Resource Center (Foley & Nelson 2009) categorized identity theft as one of the major costs of SNSs, involving monetary and emotional cost. Identity thieves collate discrete pieces of profile content such as full names, birth-days and photos from SNSs to generate fake

online profiles (Hasib 2009). In some cases, these anonymous profiles created were impersonated by linking to the online corporate profiles of individuals. This online identity, followed by trust developed in due course, influence potential users to disclose substantially over and above than their intended postings on SNSs. According to Sullivan (2012), there has been a sudden increase in the number of identity theft cases reported in recent times. Among identity related threats, it was found that SNSs increased phishing attacks, revealed confidential and financial information to unintended recipients (Hasib 2009). Profile-squatting includes creating fake user profiles through identity theft and impersonated known user-profiles. Thus, users of SNSs can be target of social embarrassment (Hasib 2009). It is estimated that up to 4.5 million teenagers are potential targets of identity theft (Brooks 2007).

2.8.2 Privacy Loss:

Privacy loss is another major cost for users of SNSs as described by Hui et al. (2007). According to Culnan and Armstrong (1999) benefits of SNSs are compromised by individual privacy factors. Perceived privacy risk was described as one of the significant costs to users of SNSs (Krasnova et al. 2010). According to Gross & Acquisti (2005) as far as privacy issues are concerned, majority of SNS users are casual about the profile information they post on SNSs. Privacy concerns of SNS users were studied by Fogel and Nehmad (2009) and it was found that individuals who post profile content were more inclined towards showing risk taking behaviour when compared to those who have not posted content online. Further, according to Fogel and Nehmad (2009), privacy concerns on SNSs were highlighted more seriously by women than men. In the context of personally identifiable information (contact number and address) posted on SNSs, men disclosed more than women. Privacy issues on SNSs also arise from the unintentional posting of profile content and dissemination of this information by third parties (Boyd 2008). In the context of privacy related threats, Hasib (2009) describe the concept of digital dossier which was created based on information posted by users on SNSs. The digital dossier concept was used by identity thieves to damage SNS users' online image (social threat).

According to Zinman and Donath (2007), spammers with a presence on SNSs exploited users' willingness to connect with strangers as a potential spamming target. Disclosures of profile content on SNS resulted in the identification of users by others, resulting in unwanted online

contact requests (Joinson 2008). Other more serious problems for SNS users include cyber bullying, cyber stalking, phishing, malware attacks, fake online identities (Kim, Jeong & Lee 2010), spreading false information (Boyd & Ellison 2007), and spamming (Zinman & Donath 2007).

Hasib (2009) found that cyber stalking led to SNS users' physical and psychological damage. One of the potential factors that led to cyber stalking was personal information (home address, telephone number) posted on SNSs. The existence of fake user profile information on SNSs led to several legal issues which were complex to resolve due to the non-existence of real users (Kim, Jeong & Lee 2010). In-addition, SNSs not only resulted in information overload, but also results in reduced productivity at work place (Tan & Vasa 2011). Sensitive posting on SNSs have led to job applicants being denied employment opportunities and reduced work productivity due to excessive assimilation of information posted on SNSs during office hours (Tan & Vasa 2011). In an extreme case, as far as individual damage is concerned, Kim, Jeong & Lee (2010) identified SNSs in South Korea that posted information on committing suicide in social groups. According to Patchin and Hinduja (2010) by posting personally identifying information on SNSs, users experienced embarrassment, condemnation, damage to one's reputation, and victimization.

2.8.3 Security Threats:

Security threats on SNSs include assault behaviour (Patchin & Hinduja 2010), risk of burglary by sharing too much information (Peterson & Siek 2009) and risk of individual privacy (Brooks & Anene 2012). Other impact to users of SNSs includes mental stress (Kim, Jeong & Lee 2010), security, privacy, and legal issues (Stutzman et al. 2012). According to Patchin and Hinduja (2010), users have become very selective in posting information and to whom the information was posted and there has been an intermittent increase in the rate of assault behaviour among teenage SNS users. Research done by Golle (2006) indicate that the majority of the US population perceive that their identities are easily disclosed by interrelating information (gender, ZIP code, and date of birth) that are already posted on social websites at different occasions. Thus, SNSs envisage significant challenges to individual users.

The literature discussed above identifies some of the challenges of SNSs and it is argued here that SNSs are one of the potential targets for identity thieves to steal personal information. Brook's (2007) study also highlight that potential recruits dampened their own career by posting personal and sensitive information (alcohol addiction) on SNSs. This suggests that SNSs adversely influence the professional and personal life of SNS users. The consequences of posting information on SNSs include stalking, identity theft, harassment, and blackmailing. According to Gross and Acquisti (2005), a majority of users are not concerned about posting personal information on SNSs and some users were willing to accept the default privacy settings provided by SNSs which maximised their online visibility. The free availability of user information on SNSs has made these users potential targets of digital dossiers.

From an organisational perspective, some studies indicate that the adoption rate of SNSs among organisations have been sluggish (Smith 2009). Some of the factors for this are effort and time required for sharing information (Yuan et al. 2013), language barriers (Bertot et al. 2010) and loss of control in sharing information (Macnamara & Zerfass 2012). Other factors include unwanted disclosure of confidential organisational information on SNSs (Macnamara & Zerfass 2012). Further, there are some risks associated with the use of SNSs in organisations (Yuan et al. 2013). Some employees won't be willing to share information on SNSs if it can involve competitive advantage or personal gains. Some users can even misrepresent the information on SNS which can be detrimental to organisations (Yuan et al. 2013).

Information overload is another negative aspect of SNSs for decision-making in organisations (Yuan et al. 2013). Loss of productivity is yet another issue with SNSs in an organisational context. An organisation's reputation can be damaged by the employees posting sensitive or derogatory comments on their SNSs. (Chaudhary et al. 2011). Users on an organisational SNS page can be unpredictable since some of the comments posted for promoting a product or marketing may turn into controversial discussion by the public on SNSs (Hill 2012). Posting confidential information by employees on organisational SNSs can lead to embarrassment or financial damage for organisations. An example is posting information on SNS about the arrival of a delegate on a secret mission which lead to embarrassment for the Government (Molok 2010). Table 2.2 summarises the challenges of SNSs to its users.

Table 2. 2 Challenges of Social Networking Sites

User costs	References
Spamming and phishing	Zinman & Donath (2007)
Undesirable and inflammatory content.	Boyd & Ellison (2007)
Identity theft	Brooks & Anene (2012)
Information overload	Tan & Vasa (2011)
Cyber bullying, cyber stalking	Kim, Jeong & Lee (2010) Patchin & Hinduja (2010)

To summarise, there is a growing number of users on SNSs, a new medium for information exchange with the capability of posting user-generated content. SNSs are public domain media open to a very wide network of users. User-generated content on SNS are analysed daily for personal, professional and other use by users worldwide, downloaded and stored by search engines and other databases which can have future ramifications. There are different types of SNSs based on usage and focus (Heidemann, Klier & Probst 2012; Richter et al. 2009). Further, users of SNSs have different usage patterns (Valenzuela, Park & Kee 2009; Brandtzæg 2012; Wilson et al. 2012). Thus, different types of user-generated content are posted by users on SNSs. As evidenced in the literature reviewed, though there are numerous benefits of SNSs to individual users and organisations, challenges of SNSs lead to more users making their profile pages private, and some users even discarding their profiles on SNSs. Although there are considerable challenges posed by using SNSs, they are obviously unknown, indicated by the increased adoption of SNSs. Hence this research examines the communication patterns of users on the SNSs of emergency management organisations to understand the benefits and challenges to stakeholders of emergency management.

2.9 Use of SNSs by Emergency Management Organisations

The use of SNSs in organisations are proliferating at a fast pace (Haro-de-Rosario, Sáez-Martín and Caba-Pérez, 2018) and from an organisational perspective, the role of SNSs in

emergencies has been widely discussed in the literature (van Gorp, Pogrebnyakov & Maldonado 2015; Ahmed & Sargent 2014; Oh, Agrawal & Rao 2013). Emergency Management is the process by which individuals, communities and organisations prepare themselves to cope with a situation that can prove to be fatal if not handled correctly through the timely implementation of suitable recovery strategies (Waugh & Tierney 2007). Emergency situations can eventuate from disasters. Some of the most prominent disasters in the past decade include hurricanes in the United States (Katrina, Rita, Wilma, and Sandy); earthquakes in China's Sichuan Province, and Haiti; floods in Queensland Australia; a Tsunami in Japan; and, typhoon Haiyan in Philippines (Chou, Zahedi & Zhao 2014). Statistics indicates that in the last decade there have been 1,333 major disaster declarations in the United States and a further 35 disaster declarations have been reported (FEMA 2018). Thus, effective management of emergencies which includes successful recovery planning is a crucial step in the long-term sustainability of societies.

In emergency management, communication occurs between emergency management agencies, communities, and between agencies and communities (Ahmed 2011). In the context of emergencies, local communities, government agencies, and humanitarian agencies all play a significant role (Oloruntoba 2005) by conducting seminars and workshops online, educating stakeholders on how to deal with emergencies and preparing response plans. Issuing accurate and timely warnings is another major aspect of communication in emergency management to minimize harm (Samarajiva 2005), whereas providing emotional support afterwards may help to defray psychological damage (Perez-Lugo 2004). Furthermore, social networking sites have been used by humanitarian organisations to record events from victims of emergencies (Triplett et al. 2009). Thus, there are widespread benefits of using social networking sites in emergency management.

An emergency management model has three phases: mitigation, response, and recovery (Richardson 1994). Mitigation is the most crucial phase as detailed planning to handle emergencies are prepared during this stage. Proper planning will not only reduce the loss of human lives and damage to property, but also lessens the social and economic impact (Ahmed 2011). In the response phase, relevant help is extended to victims of the emergency to ensure that normalcy is being restored in the shortest possible time (Asghar, Alahakoon & Churilov 2006). The recovery phase, encompassing both short and long-term measures, is the final stage (Yasemin & Davis

1993). The short-term recovery enables restoration of basic amenities to society, whereas long-term recovery delivers fully-fledged rebuilding of damaged infrastructure so that social, economic, and cultural aspects of a society are again fulfilled.

According to van Gorp, Pogrebnyakov and Maldonado (2015), SNSs were used to disseminate information, receive information from public, and participate with other emergency management organisations. From an organisational perspective, branding of the organisation was a benefit of using SNSs, whereas barriers included lack of leadership and staff adoption. Another study (Ahmed & Sargent 2014) examined the communication tasks and participants on SNSs in an emergency and found that individual community members were the participants and sharing information and disseminating alerts and warnings were the communication tasks accomplished through SNSs. It was also found that collective social reporting on a micro-blogging SNS was effective in spreading information in an emergency (Oh, Agrawal & Rao 2013). Further, users of social networking sites have the flexibility to post user-generated content with much ease, which increases the value of social networking sites, when used in various context (Kaplan & Haenlein 2010). The significance of user-generated content in the context of social networking sites has been further highlighted in the study of Kane et al. (2014).

Some studies have examined the use of social networking sites by emergency management organisations to share information to citizens (Hughes & Palen 2009), whereas other studies have concentrated on sharing information between stakeholders in an emergency (Reuter & Kaufold 2018). Though social networking sites are used by citizens and organisations to disseminate information in an emergency, there is a lack of literature identifying its use in the three phases of emergency management. In addition, the literature is limited on communication patterns and communication culture on SNSs. Yet another issue to be addressed is how emergency management organisations control the flow of information on their SNS. Further, literature investigating the generation of overarching themes eventuating from the content posted on a public social networking site is sparse.

According to Sebastian and Bui (2009), individuals play a significant role in immediately responding to emergencies. Hence, content posted by the public in the event of an emergency has

immense value in emergency recovery efforts. Though studies on emergency management have examined communication between agencies, communities, and between agencies to communities (Kaewkitipong et al. 2012; Reuter & Kaufold 2018), none of the studies have examined communication patterns on the main public social networking site (e.g., Facebook) of emergency management organisations to determine overarching themes on emergency management. Further, research has not been done to classify content posted on SNSs in the context of emergency management, to determine succinct themes evident across the collected posts and to classify themes according to the phases of emergency management. To address this gap in research and practise, this study analyses the content posted on the Facebook page of two emergency management organisations, to determine the resultant themes which will be mapped towards the three phases of crisis management.

The above analysis of literature indicates that a research gap exists in terms of understanding the communication patterns, communication culture of organisations and how organisations control information flow on their SNSs. A systematic analysis of user-generated content posted on SNSs would help to garner and establish benefits and challenges of information to stakeholders of emergency management.

2.10 Conclusion:

In this chapter, different types of analytical approaches to SNSs were introduced, followed by a discussion on the components of crisis informatics. Theories and framework relevant to social media, influence of culture on information systems, and the benefits and challenges of SNSs were discussed. From an organisational perspective, FEMA and ACT SES are the emergency management organisations chosen for examining communication patterns, communication culture, benefits and challenges and how organisations control information flow on their SNSs. The next chapter will discuss research design and methods suitable for this study.

Chapter 3 – Research Design

The aim of this thesis is to examine the communication patterns on the Facebook pages of emergency management organisations in order to address a gap in the crisis informatics discipline when it comes to user-generated content: not all organisations have similar cultural practices, hence their interactions with diverse publics will be different. To what extent does this impact crisis management?

This chapter describes the research design that guides this study of the communication patterns, communication culture, information control and benefits and challenges of user-generated content posted on the Facebook page of emergency management organisations to its stakeholders. The chapter explains and justifies: (1) The research philosophy; (2) the data collection methods; and (3) the data analysis methods.

3.1 Research Paradigms

Research paradigms point to assumptions about a researcher's learning process during the inquiry and how the research ought to be accomplished by the researcher (Bloomberg & Volpe 2016). In qualitative research, the four paradigms are postpositivism, interpretivism, critical theory and pragmatism. In postpositivism, causal relationships are tested and verified. Reliability and validity are important in postpositivism, whereas in interpretivism or social constructivism, social, cultural and historical aspects are important for establishing reality. Critical theory has a focus on how to bring reforms or social justice to communities, whereas in pragmatism, problem context, actions and its outcomes are important rather than antecedent conditions as in postpositivism. A positivist research approach incorporates the predictive nature of a phenomenon under investigation, whereas interpretive research is built upon the assumption that reality is accomplished through the shared meaning of objects (Myers 2013).

Interpretive research is suitable for coalescing different types of subjective information and to understand a social phenomenon (Saunders 2011). This research leads to an in-depth understanding of a social phenomenon in terms of examining the communication patterns of

stakeholders of emergency management in terms of updates, criticism or request, their communication culture, how administrators manage the flow of information on the SNSs of emergency management organisations and benefits and challenges of user-generated content to the stakeholders of emergency management. Further, users post different types of user-generated content on social networking sites (SNSs), which are subjective in nature (Wilson, Gosling & Graham 2012). Thus, interpretivism is the research paradigm that is suitable to guide this research.

In addition to the research paradigms, procedures in a qualitative research design are guided by research traditions or genres (Bloomberg & Volpe 2016; Gondo, Amis & Vardaman 2009). The genres in qualitative research are case study, ethnography, phenomenology, grounded theory, hermeneutics, action research and postmodernism. Among the above genres, case studies are the most appropriate for this research since themes, patterns and issues are examined in this study. Among the three variations of case analysis, which are single, multiple or intrinsic case study, multiple case studies are employed in this study as it examines two emergency management organisations. Further, generalizability is not the goal of case study research and transferability will be accomplished in similar contexts and settings.

The rationale for adopting a qualitative research design (Bloomberg & Volpe 2016) is due to the nature of this research which examines a social situation (i.e. crisis management) and interactions (user posts on Facebook) that enables the researcher to understand communication patterns on the Facebook page of EMOs. The research does not start with hypotheses, but a set of guiding research questions to understand and explain the phenomenon at hand fully. Thus, the research questions that this study will address are:

> *What are the patterns of communication and overarching themes evident on the Facebook page of Emergency Management Organisations?*
>
> *This is followed by three sub-questions:*

(i) *What are the benefits and challenges of communication on the Facebook page of emergency management organisations for emergency management stakeholders?*

(ii) *What communication culture is evident on the Facebook page of emergency management organisations and how does it affect crisis management?*

(iii) *How do emergency management organisations manage the information flow on their organisations' Facebook page?*

The method of sampling and data collection are described in the next two sections.

3.2 Sampling

The sampling strategy used in this research is criterion sampling which indicates that all participants should meet one or more criteria predetermined by the research team. The criteria used were the extent of comments posted by stakeholders on the Facebook page of emergency management organisations. Only organisations who had a presence on Facebook and who were involved in managing natural disasters were considered. Thus, out of forty-five organisations considered in this study, two organisations (FEMA and ACT SES) satisfied the criterion of rich user-generated content for data collection and analysis. The difference between the two organisations in terms of management is that FEMA is a federal government organisation whereas ACT SES is a volunteer-based organisation with a few salaried staff members supported by the state government. Among the types of SNS such as public, business, domain, content, activity, and micro SNSs, Facebook satisfied the criterion of rich user-generated content posted by the stakeholders of emergency management organisations.

3.3 Data collection

Data collection for this study occurred in two phases. In the first phase, freely available content in the form of text comments was collected from the public Facebook page of two emergency management organisations after receiving approval from the University's Human Research Ethics

Committee. In the second phase, administrators or social media managers of seven emergency management organisations were interviewed based on the findings from the first phase of this study. This helped to test the findings established in the first phase of this study. The two phases of data collection are described below.

3.3.1 Phase 1: Collection from Facebook pages

In this phase, Facebook was chosen for collecting data since the number of users and the extent of rich user-generated content on Facebook surpassed other types of SNSs (Caers et al. 2013; Chen & Sharma 2013; Wilson et al. 2012; Yung 2017). Among social networking sites, Facebook is one of the most popular social networking sites used in emergency management, and falls into the category of proactive utilisation, in terms of sharing information and reviewing public posts (Wukich 2016). Further, to conduct an interpretive analysis of content, one of the primary criteria is to collect rich subjective information (Walsham & Sahay 1999). Facebook comments (Chari ET AL 2016; Kim & Johnson 2016) satisfied this criterion of rich user-generated content when compared with other SNSs. The steps of data collection are described below.

An individual user account was created on Facebook to examine the presence of popular emergency management organisations on Facebook. Only emergency management organisations whose primary activities included managing natural disasters (i.e. flood, fire, earthquake, or storms) were considered in the search. Forty-five emergency management organisations which maintained a public Facebook page were identified. Criterion-based sampling was used to filter the most significant emergency management organisations in terms of user postings in the timeframe from January to June 2015. As mentioned above, the most significant organisation in terms of user postings was the Federal Emergency Management Agency in the US, followed by ACT State Emergency Services in Australia. These two organisations also satisfied the maximum number of users on their Facebook pages in comparison with other emergency management organisations. Thus, data was collected from the Facebook page of these two organisations.

The dataset for the first organisation (FEMA) included user posts during the period January to June 2015, whereas the second organisation (ACT SES) included user posts during the period

January to June 2016. The first dataset included 944 user posts after data cleaning, whereas the second dataset included 333 user posts. Collecting raw data in spreadsheets for pre-processing has been used in earlier research (Gordon, Blake & Shankaranarayanan 2013) and in line with this approach, data was collected in Microsoft word document for pre-processing due to the text nature of the user-generated content. The above description of "When", "How", "What", "Where" and "How much data" were collected for analysis ensured the rigour of the research process (Sarker, Xiao & Beaulieu 2013).

Content was copied as it was displayed on the Facebook page of emergency management organisations. This helped the coding process since contextual features (embedded in the form of images) helped to code the content with more ease and efficiency. Data was parsed carefully to remove data that cannot be analysed such as text or symbols which are not understandable and useful for analysis in emergency management. This is referred to as data pre-processing. The images and video recordings were very limited (less than 10%) in comparison with the total collected posts and hence this study considered only text comments of stakeholders for coding and analysis. The coding followed the information classification framework discussed in section 2.5.1 of chapter 2.

3.3.2 Phase 2: Interview of Administrators

In this phase, administrators or social media managers of 45 emergency management organisations identified in Phase 1 were contacted through email or Facebook inbox with a request for participation in semi-structured interviews. The request included the participant information and consent form approved by the University's Human Research Ethics Committee. The interview questionnaire (Appendix 1) was prepared based on the analysis of data collected from the Facebook page of first organisation (dataset1). This helped to test the findings of phase 1 in terms of the communication patterns and their consequences for emergency management stakeholders. Out of 45 emergency management organisations contacted, seven administrators provided their consent to participate in interviews. The interviews were conducted after receiving ethics approval from the University of Canberra's Human Research Ethics committee. Most of the interviews took

one hour and thirty minutes. The interviews were conducted between August 2016 and November 2016. The interviews were conducted via Skype and recorded using the Amolto call recorder which was integrated into Skype for enabling automatic recording. Details of the organisations who have participated in the interview are given below in Table 3.1. The emergency management organisations listed below manage natural disasters and the social media administrators of the organisations were interviewed. Except for the United Nations office for Disaster Risk Reduction and United Nations Environment Programme, all other organisations are private organisations. In terms of geographic spread, the organisations are from five different countries.

Table 3. 1 Details of Emergency Management Organisations

Number	Emergency Management Organisations	Country
1	Asian Disaster Reduction Center	Japan
2	Center for Disaster Preparedness	Philippines
3	United Nations office for Disaster Risk Reduction	Switzerland
4	Asian Disaster Preparedness Center	Thailand
5	Disaster Control and Prevention	USA
6	United Nations Environment Programme	Kenya
7	World Disaster Risk Reduction	Philippines

3.4 Data Analysis

Thematic Analysis (Braun & Clarke 2006) is a method to identify, analyse, and discover patterns (themes) from collected data. In this study, thematic analysis was used to generate themes only from the data collected from the Facebook page of FEMA and ACT SES. In thematic analysis, themes relate data to the proposed research questions, and help to discover interesting meaning from the collected data. An inductive thematic analysis was employed in comparison with deductive thematic analysis (Patton 1990) since the themes evolve from the user-generated content collected from a public social networking site (i.e. Facebook page). The reasons for choosing Thematic Analysis in comparison with other analytical methods (Grounded Theory, Conversation Analysis, Discourse Analysis, Narrative Analysis, and Interpretative Phenomenological Analysis) which can be used to discover patterns in qualitative data are:

(a) Conceptual flexibility, since Thematic Analysis has few prescriptions and procedures to follow (Braun & Clarke 2006; Smedley & Coulson 2017). Other data analysis methods such as Grounded Theory (Urquhart 2016), Conversation Analysis (Silverman 2016), Discourse Analysis (Burman & Parker 2016), Narrative Analysis (Olusoga & Kenttä 2017), and Interpretative Phenomenological Analysis (Snelgrove 2016) are theoretically bounded.

(b) The aim of Thematic Analysis is to discover themes that embed experiences and meaning in terms of communication patterns, communication culture, information control and benefits and challenges eventuating from the content posted by stakeholders of emergency management on SNSs.

(c) Thematic Analysis is not used to develop theory from collected data (Braun & Clarke 2006)

Other advantages of using Thematic Analysis (Braun & Clarke 2006) in this study are:

(a) Flexibility, in terms of learning the analysis method, especially for beginners.

(b) Discovery of unanticipated social insights. In this study, social insights (e.g. praise from the public and content damaging the reputation of organisations) were presented in terms of benefits and challenges eventuating from the content posted by users on SNSs.

(c) Rich analyses may lead to recommendation of policy development. In this study, this was presented in terms of content (e.g. announcements) that may alleviate the negative consequences (e.g. criticism) on the stakeholders of emergency management.

Further, the literature indicates that Thematic Analysis has been applied in the social media domain to establish themes (Smedley & Coulson 2017). Since this study aims to establish the communication patterns, communication culture, information control, and benefits and challenges of content posted by stakeholders on SNSs, Thematic Analysis is one of the suitable methods to analyse data.

Thematic Analysis was applied in five steps:

(a) In the first stage, the entire collected user posts were read once to get detailed insights into the different types of content posted by users, and initial thoughts on the collected data were recorded. Based on the recorded thoughts, a second round of reading was conducted, which ensured the closeness of researcher with the collected data.

(b) In the second stage, content was coded under each of the user-generated content category. After collecting user posts, they were fed into NVivo 10 for coding and analysis. To make the coding process easier, all types of user-generated content for social networking sites (Kurian 2016) were created initially in NVivo. Each user post (each sentence) was examined and then coded with the relevant user-generated content. Lengthy user posts were read thoroughly and broken down to code succinctly under the relevant user-generated content. After the first round of coding, clarifications that arose were discussed with a researcher who hold a research active university classification, specialising in social media research. This resulted in a second round of coding and an agreement on coding was accomplished. These steps were followed to ensure the rigour of the research process by specifying how the content was collected and what was collected (Sarker et al. 2013). To test the coding consistency, inter-coder reliability was calculated on a random sample of 14% using NVivo 10 and is illustrated below. The user-generated content mentioned in Table 3.2 are components of the information classification framework classified under social information.

Table 3. 2 Inter-coder reliability

User-generated Content	Cohen's Kappa	Definition	Example (User comments from the organisation in USA)

Criticism	0.9551	An expression of disapproval (Kaplan & Haenlein, 2010)	*The officer has not scheduled a CERT class ever, even after receiving interest from people.*
Request	0.8185	A service sought from network connections (Morris, Teevan, & Panovich, 2010)	*How do I sign up for a lesson?*
Announcement	0.8635	A notice to share information (Honey & Herring, 2009)	*Just started a state-wide training; basic lessons are offered.*
Recommendation	0.9697	An open-ended post for suggestions (Morris et al., 2010)	*Contact the office of emergency management*
Greetings	0.9748	A note of welcome posted by users (Chun et al., 2008)	*Thanks*
Praise	0.6945	An appreciation towards other's actions (Greenhow & Robelia, 2009)	*You are the best, proud to be part of it.*
Status-update	0.7544	Information posted by users to notify others about users' actions, thoughts, and feelings (Nosko, Wood, & Molema, 2010)	*Counties use wheel driven track system on their rescue trucks.*

(c) In the third stage, major user-generated content was collated and themes which are relevant to emergency management and supported by the data were searched. This was done by analysing and combining different sections of data that are similar in nature. To facilitate

this process, themes were broadly considered with respect to the phases of crisis management – pre-crisis, crisis, and post-crisis. This is in consistent with the recommended method entailing the development of thematic maps in data analysis (Braun & Clarke 2006). Themes without enough support from the collected data were discarded at this stage and coding was revisited to ensure that no data was missed in the earlier coding. To ensure that the standards for thematic analysis were strictly followed, initial generation of a theme was documented and illustrated using thematic maps, which were discussed and confirmed with the supervisors.

(d) In the fourth stage, the entire content was read again, and related content was identified. Themes that succinctly represent the coded data emerged from the analysis and were further substantiated using examples of user posts.

(e) The fifth stage of analysis is writing the findings which will be described in Chapter 5.

Chapter 4 explains the results from two emergency management organisations. Chapter 5 tests the findings of phase 1 of this study by conducting interviews with the administrators/social media managers of seven emergency management organisations.

3.5 Conclusion

This is a qualitative research guided by an interpretive research paradigm. This study has two phases. In the first phase, freely available data was collected for thematic analysis. For data analysis, thematic analysis was used to establish overarching themes embedded in the pre-crisis, crisis and post-crisis phases of crisis management. The research questions on communication patterns and communication culture were addressed using the data collected from phase 1. The outcome of Phase 1 resulted in the development of a semi-structured interview questionnaire. In the second phase, interviews were conducted with seven administrators of emergency management organisations which was used for testing the findings from phase 1 of this study. The research questions on information control and benefits and challenges were addressed using the data collected from Phase 2.

Chapter 4 – Findings: Categories of content on EMO Facebook pages

This chapter presents the results of user-generated content collected from two emergency management organisations (EMOs), the Federal Emergency Management Agency (FEMA) in the United States (dataset 1) and the ACT's State Emergency Services in Australia (dataset 2). In this thesis posts collected from the Facebook page of FEMA have been referred to as dataset 1 and posts collected from the Facebook page of ACT SES have been referred to as dataset 2. These two organisations were selected due to the rich user-generated content on their Facebook pages which satisfied the criterion-based sampling technique explained in the research design. Further, FEMA and ACT SES are exemplars that helps to understand how different organisations use social networking sites in crisis management. An information classification framework was developed by reviewing literature on social networking sites. Classification theory was used to divide information into succinct or contextual information which was further sorted into broader categories of personal, professional and social information on the Facebook page of emergency management organisations. The organisations examined in this study are introduced first, followed by the communication patterns evident on the organisations' Facebook pages.

4.1 Emergency Management Organisations

The organisations selected for this study are two diverse organisations in terms of the scale of emergency management operations but are comparable in terms of rich user-generated content posted on their Facebook pages. The Federal Emergency Management Agency is funded by the federal government in the United States, whereas the Australian Capital Territory's State Emergency Services are funded by the territorial government in Australia. The Federal Emergency Management Agency manages natural disasters occurring in all the states of United States of America, whereas the Australian Capital Territory's State Emergency Services manages disasters only in the Australian Capital Territory. The analysis of data for the two organisations will be done separately and subsequently compared to provide insights in the discipline of crisis informatics.

The Federal Emergency Management Agency in the United States is the most reputed and publicly funded system in the United States and a leading emergency management organisation worldwide

(Zavar & Hagelman III 2016). The agency is present on Facebook, providing the flexibility for users to post user-generated content with much ease (Sadiq, Tharp & Graham 2016). The ACT's State Emergency Services in Australia operates as a not-for-profit agency supported by community volunteers (Goode et al. 2017). Among social networking sites, Facebook is one of the most popular social networking sites used in emergency management, and falls into the category of proactive utilisation, in terms of sharing information and reviewing public posts (Wukich 2016). Statistics indicate that the publicly accessible Facebook page of the first organisation (FEMA) has more than 387,000 user likes and 383,000 followers as well as a constant rise in the number of page likes by new users (FEMA Facebook 2018). The second organisation (ACT SES) has more than 20,331 user likes (ACT SES Facebook 2018). The abundance of user-generated content on the Facebook page of these organisations made them a unique avenue to collect content posted by users to answer the research questions of this study. In the following section, user-generated content on the Facebook page of two organisations are discussed.

4.2 Communication Patterns

Because of the proactive nature of many-to-many communication, discourse originating from EMOs will be included in the analysis as it often generates user responses in the shape of comments. In the context of FEMA, Facebook posts contributed by the organisation were only seven percent in comparison with the public posts.

In the first phase of this research, data posted during the period January to June 2015 was collected from the Facebook page of FEMA and classified using the information classification framework described in Chapter 2. Similarly, data posted during the period January to June 2016 was collected from the Facebook page of ACT SES and classified using the same classification framework. The findings from the classification of user-generated content indicates that status-update, criticism, and request were most prevalent in the FEMA dataset, whereas status-update, opinion, recommendation, and praise were the major content types posted by users on the social networking site of ACT SES. Examples of the relevant types of user-generated content are listed below in Table 4.1. The dataset 1 refers to the user posts collected from the Facebook page of emergency management organisation in the United States (FEMA), whereas dataset 2 refers to the user posts

collected from the emergency management organisation in Australia (ACT-SES). Table 4.1 is a summary of the overall findings, followed by detailed explanation.

Table 4. 1 User-generated content and examples

User-generated Content	% (dataset 1)	% (dataset 2)	Example 1 (dataset 1)	Example 2 (dataset 2)
Status-update	*41*	*42*	*If this was an actual test it would follow with instructions what not to do in case of a hurricane or a tornado or a dairy queen blizzard (FEMA, male, 2 May 2015)*	*Getting ready for heavy rain and probable flooding on this side (SES, female, 10 Feb 2016)*
Criticism	*34*	*3*	*They ended our CERT in lower township. The shame is we had a good group, mental health, nurses and radio. We had it all; and even in an extreme emergency, we are not allowed to assist out fire dept or police and only allowed to assist our neighbours. This is not what I envisioned the CERT program to be (FEMA, female, 12 Feb 2015)*	*Often, we get asked if our rescue boats have fishing rods. (Public comments on the lack of support by emergency staff during a flood) (SES, male, 9 March 2016)*

Request	*11*	*3*	*How do you teach a bark alert if your dog naturally alerts a different way? (FEMA, female, 1 April 2015)*	*Please send any photos from storms or floods since we don't get the best ones during a disaster. (SES, male, 20 May 2016)*
Praise	*2*	*8*	*I am very grateful to the men and women of the US forest service; Fireman saved my life in 85. I thank them every chance I get. They are all heroes. (FEMA, male, 2 May 2015)*	*The unit has been doing some amazing work during the recent storms and floods, a big well done for the wide spread emergency response. (SES, male, 10 March 2016)*
Recommendation	*2*	*9*	*If your home is heavily damaged or destroyed, check your homeowners policy for loss of use, then find a place to rent near your home, and move out asap, because good rental property will become in short supply soon. (FEMA, male, 15 June 2015)*	*Check and clear gutters and drains around your house (SES, male, 12 April 2016)*
Opinion	*1*	*14*	*Tests are off-leash with the possible exception of some of the obedience, but most likely that is also off-*	*Leave that to the emergency unit to make a decision. (SES, female, 14 March 2016)*

			leash (FEMA, male, 9 June 2015)	

In the following section each type of user-generated content is described in detail. The First dataset refers to the posts collected from the Facebook page of FEMA and the second dataset refers to the posts collected from the Facebook page of ACT SES.

4.2.1 Status update:

First dataset: Data analysis of the first dataset indicates that some users were interested in volunteering for training sessions or starting a local chapter of the community emergency response team near their residence. There is some evidence of updates on extending help to the needy in terms of what is required to get back on track after an emergency. Some users posted updates regarding the help offered by the local community in an emergency. Very few users posted updates on increasing the resilience of the nation, which can only be accomplished through coordinated efforts. Users also posted updates on the efforts of emergency management organisations to estimate damage and help the victims of an emergency for a speedy recovery, which indicated coordinated efforts. Some other users posted updates on how they participated in disasters along with the response team members.

Examples of user comments are:

Went out with response team members on 5 occasions of hurricanes and storms	*FEMA, male*	*11 Feb 2015*
Member of the community emergency response team wish to start a chapter here	*FEMA, male*	*9 March 2015*

In the context of our discussion of different kinds of user-generated content, it is clear that hybrid forms of coordination are occurring on the Facebook page of FEMA such as user-to-user, user-to-EMO, and EMO-to-EMO (e.g. police communicating with emergency services). Coordination in

disaster resilience occurs in the form of volunteering for a task and extending help to the needy in emergencies. Thus, the theoretical implication evident from the analysis of status-update information is coordination, which concurs with a study on coordination and collaboration among relief organisations (Lai, She & Tao 2017). In this study, coordination can be seen among the public or volunteers involved in emergency management. From a practical perspective, this implies leading a change through coordinated efforts which echoes the 1st National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011). Thus, it is imperative to train staff members of emergency management organisations to develop leadership skills that would help them to build and strengthen coordination among stakeholders to improve disaster resilience.

Risk Communication: There is some evidence that house buyers are keen to understand the extent of floodwater risk associated with an area. Users posted updates on the lack of emergency evacuation orders sent on personal mobile phones among a large crowded audience. This is described as one of the greatest security shortcomings since the audiences were not aware of the risks in the event of an emergency. This suggests a lack of risk communication to the public on the part of emergency management organisations. There is some evidence of how critical emergency rescues were carried out even without examining the structural fitness of a damaged building which indicates lack of risk awareness in emergencies. Users also posted updates on areas where there has been consistent flooding and power outages for more than seven days. Some users updated on the change in government policies on individual assistance in an emergency.

Examples of user comments are:

how about this state, affected by record flooding and $10,000 to be spent by individuals in damages alone;	*FEMA, male*	*21 April 2015*
minimum requirements for receiving individual assistance from emergency	*FEMA, male*	*11 Jan 2015*

management organisations have been raised		

Risk Awareness: The posting of information by users implies awareness of risk eventuating from disasters. For example, users posted updates on flooding and the delay in receiving help during an emergency. There is some evidence on the precautionary measures taken to protect surrounding buildings after the major collapse of a high-rise building, which indicates risk awareness of a disaster resilient community. Users posted updates on the expenses incurred because of a hurricane and updates on the flooding that they faced from recent rains and the risk of not able to receive insurance coverage for the damages incurred. There is some evidence of users posting updates on the necessity of paying flood insurance for houses on mortgage irrespective of the yearly weather, since any adverse weather condition and subsequent flooding might put a great burden on the house owner. Some users posted updates on the injuries caused to individuals during an earthquake. Some users posted updates on the flood damage expenses far exceeding the insurance coverage amount which indicates that users should have an awareness of risks when preparing insurance coverage. The above findings with respect to risk communication and awareness are in consensus with the crisis communication matrix (Reuter, Hughes & Kaufhold 2018) developed in the crisis informatics literature.

Examples of user comments are:

check on the possible structural damage to other buildings and ensure re-compacting soil around the damaged structure	*FEMA, female*	*15 March 2015*
running outside during an earthquake brings most injuries, caused by falling objects; now I know what to put in the insurance coverage agreement	*FEMA, female*	*5 May 2015*

From the above discussion, it is evident that understanding the risks for home buyers, large crowded audiences, those entering damaged buildings and their surroundings, areas of consistent flooding, and individual emergency assistance are all important for a disaster resilient community. Thus, the theoretical implication of posting such updates is risk communication. This finding concurs with a study by Zhang et al. (2016) on communicating interpersonal pre-warning information to the public during emergencies. The dissemination of interpersonal pre-warning information is crucial in crises such as Tsunamis, terrorist attacks and chemical leaks where there is insufficient responding time for government agencies to inform everyone in the disaster area.

On the other hand, a practical implication is the risk awareness of a disaster resilient community, which is in consensus with the 2nd National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011). In the context of risk awareness, the administrators of emergency management agencies should consider emerging technologies that enable clear and nationally consistent dissemination of risk awareness messages. Furthermore, administrators can analyse risks that are changing in the short and long-term to take precautionary measures based on the knowledge gained.

Community support, capacity and capability building: In relative terms, not many users post updates on the damage incurred to vacation homes at the shore and the ineligibility for such applications to receive housing grant money from emergency organisations. Users also posted that every effort was taken to support those affected by such damages and past issues were analysed to improve future emergency situations. Very few users posted updates on disasters as it happened, which could be communicated to other network connections to save life. Users also posted updates on critical situations that eventuate from an emergency. Updates on the benefits of attending community emergency response team programs which helped individuals to prepare themselves and assist a community in an emergency were also posted. The response team members were trained to handle emergencies eventuating from earthquake, flood, tornados, volcanic eruptions, and wind storms.

Our analysis of the content also indicates that some users posted information on the availability of community emergency response team programs in a nearby locality for potential attendees. Disseminating information to potential concerned participants on attending response team programs led to the building of local capacity and capability which increased disaster resilience. Thus, shared responsibility among stakeholders (i.e. publics and organisations) is one of the requirements for successfully managing emergencies since organisations alone cannot handle emergencies when the impact is severe.

Some users posted updates on fire safety as well as 'hurricane season' which is one of the ways of disseminating information to the public to get prepared. There are some instances of updates on the need to plan well prior to hurricane season as well as to update communities in urban areas. Other types of risk include spoiling a large quantity of food and several dwellings due to power outages and heavy storms. Data analysis indicates that though perfection cannot be accomplished easily in relief operations, stakeholders acting as an integrated and coordinated group are vital in increasing disaster resilience. Coordination and collaboration are further emphasized by extending eligible financial support to disaster victims without any delay.

Examples of user comments are:

The program prepares individuals in basic disaster response skills and can support their neighbourhood or workplace in an emergency	*FEMA, male*	*9 May 2015*
stayed away from my home to accomplish this goal and to extend help to those affected by disasters	*FEMA, male*	*20 April 2015*

From the above discussion, it is understood that information is disseminated in different forms pre-crisis (planning before a hurricane season), crisis (some updates on the disaster as it happens) and

post-crisis (ineligibility to receive housing grant money). There is also some evidence of communication and collaboration to support the victims of an emergency as well as to improve recovery efforts in future disasters. Thus, the theoretical implication of posting updates is risk communication (information dissemination) and collaboration. This finding is in consensus with a study by Zhang et al. (2016) on disseminating information via social networking sites. From a practical perspective, posting updates educates users about various risks in emergencies. This results in building local capacity and capability for handling future emergencies and concurs with the 3rd National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011). Thus, administrators of emergency management organisations should encourage open discussion of risks among stakeholders to anticipate and manage future risks.

Partnership with stakeholders: There is also some evidence that users partnered with a global humanitarian organisation which provided emergency assistance and disaster relief. Other user posts include joining religious groups which were involved in emergency management (e.g. Engaging Faith Communities). Based on the National Strategy for Disaster Resilience, partnering with stakeholders in a disaster is an approach which increases disaster resilience. Thus, the theoretical implication evident from the analysis of status-update information is coordination and collaboration, whereas the practical implication is partnership for disaster resilience (Goode et al. 2017; Wilkins & McCarthy 2011). Users also posted updates on their membership in the community emergency response team and acknowledge that they enjoyed learning skills for handling emergencies. It is also mentioned that a shared responsibility lies with the public in handling critical emergencies, since emergency management staff will not be able to handle such emergencies without any external help. In an emergency, taking care of an individual's household members reduces the load on emergency agencies and such individuals can be an asset to the community. Others suggest response team programs are a good investment and getting involved in such programs gives them self-satisfaction and is represents the way to take care of one's family and community in emergencies.

Examples of user comments are:

I was part of a humanitarian organisation's response to a disaster	*FEMA, male*	*5 Feb 2015*
learning excellent skills for emergency preparedness, response team cannot be expected to handle it all on their own	*FEMA, female*	*10 March 2015*
very proud to be a CERT member, learning how to take care of loved ones and the community	*FEMA, female*	*9 May 2015*

Users also posted updates on how a certified member can assist the neighbourhood when immediate emergency assistance is not available. Some users updated on the importance of having flood insurance which is one of the characteristics of individual empowerment and responsibility in disaster resilience. There are some updates on attending a course on emergency management to equip themselves in future emergencies. Attending the course would help to determine whether a given structure would be safe for emergency rescue and recovery. The theoretical implication of posting a user's role or designation (e.g. certified member) in a community emergency response team is constructing an identity, which concurs with the study of Bergstrand & Stenmark (2016) on identity construction for users. The practical implication of users' willingness to learn, or volunteering to conduct emergency preparedness programs, entails individual empowerment and responsibility which meshes with the 5th National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011). Hence the administrators of emergency management organisations should encourage building resilient communities who could get support and resources from local networks to facilitate emergency recovery efforts.

Risk Communication: Some users posted updates on the relocation of those who have built houses in flood-prone areas to a higher ground. It was also posted that extending aid to those house owners who were repeatedly affected by flood due to constructing their houses in low-lying areas were

considered an inefficient approach. Some users post updates on how to protect lives and property by placing protective sandbags. The theoretical implication of posting such updates is risk communication which concurs with the study on communicating information to the public in the context of emergency management (Wukich 2016). The practical implication is strategic land use planning, which helps to understand the potential risk factors and mitigate the impact of such disasters to individuals and communities. This is in consensus with the 6th National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011). Thus, the administrators of emergency management organisations can recommend that the construction of infrastructure should meet a resilient standard which can reduce expenditure for future recovery efforts.

Logistics and Communication Preparedness: In the context of crisis preparedness, there is some evidence on the use of wheel driven track system for rescue vehicles especially in the winter season since such vehicles don't get stuck when compared with ordinary vehicles. This implies that a sound and well-established arrangement would reduce the impact of disasters. Thus, preparedness is one of the characteristics of disaster resilient communities and one of the findings in this study. The findings also concur with Wilkins & McCarthy (2011) on preparing stakeholders for mitigating the impact of future emergencies. Users also posted updates on the alerts sent by emergency broadcast systems. Updates include how emergency alerts sent to the whole network instead of the affected region caused unwanted panic among the public. In terms of comparing mobile alerts with siren alerts, mobile alerts have an additional benefit when it comes to reception since lack of power might turn-off siren alerts.

Examples of user comments are:

flood prone areas getting worse due to rise in sea level	*FEMA, male*	*10 March 2015*
alerts are pushed on to the complete mobile network which receives signals even during an emergency	*FEMA, female*	*5 May 2015*

Users also posted updates on the need to register with emergency responders so that timely warnings and instructions could be received. Some users posted updates on specialized devices that facilitate disaster resilience. Another additional capability in the event of a flood or fire is being prepared with an inflatable raft for rescue. There is some evidence that emergency responders should have speaker microphones with portable radios to strategically support emergency situations. In the context of power outages, some users describe the capability of additional storage devices that can be used to supply power during emergencies. There is also some evidence about weather receivers used in emergencies. On the other hand, dogs are trained to assist emergency management organisations and hence considered to be a supporting capability for disaster resilience.

Disaster Resilience: In the context of personal resilience, users posted updates on the disaster plans taken to support them in an emergency which indicate capabilities that support disaster resilience. Furthermore, updates on the availability of trailers to support rebuilding of properties are another capability facilitating disaster resilience, as well as long-term post-crisis crisis management goals. There is also some evidence on a new acupuncture unit that was started to help individuals who were affected by trauma and disaster related stress. This is one of the activities that supports the post-crisis phase and aids in disaster resilience. The theoretical implication eventuating from such postings is risk preparedness for resilience and mitigating the impact of future disasters. The practical implication point to additional capabilities acquired for disaster resilience which concurs with the 7th National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011). Thus, the administrators of emergency management agencies should encourage and support ongoing recruitment, training and retention of paid and voluntary staff members to strengthen the capacity of organisations to mitigate the impact of future emergencies.

Examples of user comments are:

our office has a weather radio and I have a tornado app in addition to a disaster responder	*FEMA, female*	*20 Jan 2015*

I always trust the dog, may be in any situation	*FEMA, female*	*15 May 2015*

***Second dataset*:** Data analysis of the second dataset (user comments posted on the Facebook page of ACT SES) indicates that majority of updates dealt with how the emergency management staff responded to emergency recovery efforts and attended community and education events. Other updates included public requests received by the organisation after a storm, how the agency helped the public during the weekend, and the support provided by the agency in searching for missing people. Updates were also posted when a missing person was found which shows that Facebook was not only used for natural emergency related services, but also for other humanitarian emergencies such as finding out missing people. The agency also supported community events (e.g. first aid support) other than emergencies. Updates were posted on the use of advanced technology to track storms which unfortunately did not work as planned.

Relationship building: Information posted on the number of community recovery tasks completed by the emergency management organisation results in the creation of an organisational identity. Updates were posted on how like-minded members of the organisation have formed relationship while working at the organisation and how staff took care of their family despite their commitment to voluntary emergency management services. Updates were posted on how the staff provided emergency assistance (e.g. house damage due to fallen trees) to the community. Other tasks undertaken by the voluntary emergency management staff include emergency storm and flood responses, lighting tower and support to other emergency services, traffic direction and marshalling for incidents and events, land search in support of the police, air search in support of the Australian Maritime Safety Authority, urban search and rescue support to the ACT Fire & Rescue, providing flood rescue boats, and supporting Balloon Spectacular events in the State.

Updates were also posted on staff attending the National Volunteering Conference and promoting their emergency related activities to the conference delegates, denoting an organisational identity. Further, the organisation also demonstrated cultural diversity among staff members by recruiting volunteers with hearing impairment. Updates on recovery efforts were posted, some of which indicated the willingness of the emergency staff to risk their life and save those who were trapped

in flood waters. Updates were also posted on how the staff conducted a new course on weather planning and response based on an invitation by a reputed university in Australia. The above analysis indicates that inter-agency coordination and collaboration is evident in the case of state emergency services in Australia. This finding of Agency to Agency communication pattern (A2A) is in agreement with the crisis communication matrix (Reuter, Hughes & Kaufhold 2018) in the emergency management literature.

Examples of user comments are:

They received 1842 requests for assistance yesterday in Sydney and surrounding regions and will spend many days cleaning up the devastation;	*SES, male*	*11 Jan 2016*
Through her interpreter, Ali was able to explain and show the media her role as an active volunteer with the Tuggeranong Unit	*SES, female*	*15 March 2016*
The xxx received 71 Requests for Assistance (RFA's) which were attended to by volunteer SES Crews, ACT Fire & Rescue and TAMS teams.	*SES, male*	*5 April 2016*

Risk communication and challenges: Another update was on the change in climate followed by heavy rainfalls, adding emergencies. Several other updates emphasized the power of water and loss of life during floods and described the strength of past emergencies by posting relevant photos. Updates were also posted on educating people on how dangerous floodwater could be in

comparison with bushfire, the impact of flash flooding and its consequences in terms of loss of lives and monetary loss. An example of manner in which ACT SES communicated to the publics was when emergencies due to trees falling on people during extreme weather conditions were compared with casualties afflicting those falling from buildings in the second half of 2016. This addresses the challenges involved in communicating risk to communities and illustrates the way ACTS SES is tailoring its message to its audience. The communication culture of ACT SES in this pre-crisis stage represents relationship-building through a conversational, easy-to-relate-to example. By posting this information, ACT SES is attempting to educate the public on how potential risks come to life as well as creating a feeling of proximity which could lead to more volunteers joining.

Some other updates included fire danger ratings and traffic accidents. Updates on current weather and other hazards have been posted to engage with the community and to get prepared for future emergencies. Other updates included how the media and public sensationalize weather news and its impact on emergency management organisations, and updates on specialized damage repair training provided to the staff and the use of emergency equipment. Quick updates on road closures were posted which contradicted some news reports. This indicates the veracity (i.e. accuracy) and velocity of communication using SNSs.

Examples of user comments are:

We struggle sometimes to get the community to understand the significant risk of storms and floods	*SES, female*	*10 May 2016*
Even though the water looks relatively shallow initially, it gets deeper very quickly and the force behind it would be tremendous	*SES, male*	*12 April 2016*
Our colleagues at xxxx shared an interesting post	*SES, male*	*20 March 2016*

about the weather being described as "bipolar" and the damage that can be caused by relating natural phenomena to mental illness;		

Coordination and collaboration: Updates were also posted on the deployment of emergency management staff locally as well as internationally to share their experience and to obtain feedback from other agencies. This indicates coordination and collaboration among local and international organisations. Updates were posted on strategies to increase staff strength by recruiting women to join emergency services. Regular training and orientation sessions for new recruits were conducted by the agency to keep the staff updated and prepared for future emergencies. Some training include driving and recovery techniques, activities to undertake operations off the road for missing person searches or communications deployments.

Updates were also posted on the statistics provided by the ACT SES to the Environment and Planning Directorate on the number of casualties due to falling trees which could be considered in future planning. This demonstrates coordination and collaboration among local organisations. Updates were posted on emergencies and how the organisation's staff members supported the community in collaboration with the law and enforcement agency, indicating cross-agency cooperation. During emergencies, the organisation also received help from nearby community members. Updates on visits from other emergency management agencies and transfer of communication technology to other emergency services were also posted. Other updates included funding received and shared by the emergency management organisation, best wishes for a fundraising rally organized by a volunteered emergency management staff, and updates on the new facilities provided to the emergency management organisation by the government.

Openness in communication: Updates of a personal nature were posted by emergency management staff which show openness in communication and challenges (abuse towards emergency workers) faced by staff during emergency management. Updates on staff gatherings

such as morning tea were posted, denoting a good team spirit among staff members. Updates on the memorial service offered to those volunteers who lost their lives while on duty, providing life membership for their commitment and sacrifice, and how the agency was personally connected to volunteers' family members were posted. The agency also posted updates on the extra effort that staff took to find relatives of volunteers who had lost their lives in the past. This was to ensure that at least one of the relatives attend the memorial service. This indicates relationship building among community members. Updates on wearing orange (the signature colour of the organisation) to support the agency was posted. The emergency organisation also communicated gratitude towards other organisations who helped them in emergencies. Historical updates about the connection Indigenous Australians have with the land were posted on the Facebook page of ACT SES. This indicates recognition of the local culture and openness in communicating cultural diversity.

Examples of user comments are:

Two weeks ago NSWSES crews assisted in the response to the hail damage in Tuggeranong on 25 January 2016. Tonight, ACTSES crews reciprocate this support working in Queanbeyan;	*SES, male*	*02 Feb 2016*
Quick minds and generous hearts helped to generate $2,750.10 at the xxx volunteer Trivia Night through donations and auction, supported by 123 volunteers, staff and family from across xxx and ESA	*SES, female*	*10 May 2016*
Last night xxx got engaged to her partner xxx. The two	*SES, female*	*15 March 2016*

have been together for six years and xxx took xxx up Mount Ainslie to propose :);		

4.2.2 Criticism:

First dataset: Data analysis of the first dataset indicates that some users criticized the lack of coordination evident among those who were managing and conducting emergency management training programs. There is some evidence that a few officials were not interested in conducting the program and described the programs as unnecessary. Several users criticized the lack of help extended to the community by the agency after a major disaster such as a hurricane. Some community emergency response teams were shut down due to the lack of organizational leadership and the team members who worked collaboratively in the past criticized the actions of the agency since they could not provide assistance during emergency situations to other agencies in the field. For example, users posted though the response team members could help the public in an emergency, they were not allowed to help the fire or police department. This illustrates a lack of inter-agency coordination and collaboration in emergency management.

Social conflict: Some users criticized sending wrong alerts and the lack of help extended to the public during floods by emergency management organisations. There is also some evidence about the lack of proper utilization of funds in a disaster by the head of a political governing body. Other criticisms include the lack of support extended to the public in the event of a flood that has not been declared as a disaster by the government. Users also criticized the lack of support by politicians in an emergency when they were more concerned about winning the next election. Users criticised the management of emergency management agency for discussing the emergency in a meeting rather than implementing practical solutions when the region was facing an emergency.

It was also evident that FEMA lacked proficiency in resource management. Some users remarked that regions that had not been flooded were categorized as ‘flood zones’ by the emergency management agency and that residents were then asked to pay for flood insurance. It was also

evident that the construction of dams has resulted in reducing the threat from floods. Several users criticized the lack of support extended to victims by the emergency management agency. A few users posted that individuals and groups should be given the same treatment in an emergency. Users criticized the insurance coverage policies of the emergency management agency which were very narrow in terms of coverage. There is some evidence on the lack of support extended to users and their families in an emergency. From the above discussion, it is clear that social conflict is one of the research implications eventuating from posting criticism on social networking sites, as shown in a study of providing crisis information during a wildfire (Chauhan & Hughes 2017). From a practical perspective, our analysis found several instances indicating lack of coordination between agencies at crucial times (for example structural engineers and FEMA firefighters were communicating during an emergency which resulted in poor decision-making and even loss of life). This deviates from the 1st National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011).

Some commenters criticized man-made solutions to natural disasters such as engineered weather (toxic materials being poured into the atmosphere to generate rain) which could affect public health. One user posted that in a toxic environment and freezing temperature, homelessness itself is an emergency. There was some evidence that regional maps were not updated to reflect flood zones, which resulted in lack of evidence regarding areas that may be under risk in the event of flooding. Some users criticized the procedures involved in getting aid for their house at a time when they were out of the country and area was flooded. Though social conflict eventuates from posting criticism, risk communication and awareness of a disaster resilient community are a practical implication which is in accord with the 2nd National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011).

Examples of user comments are:

overwhelming when officers ignore public's query	*FEMA, female*	*10 February 2015*
4th year of drought, but still have to pay flood insurance	*FEMA, female*	*15 March 2015*

cannot understand about the toxic substances raining down in quantities on all of us	*FEMA, male*	*21 April 2015*

A few users posted that in the event of a disaster eventuating from collapsed structures, proper planning should be conducted in consultation with structural engineers and building inspectors rather than rescue team members to avoid further loss of life. This means that critical information should be communicated to users to educate them about potential risks involved in rescue operations. Several users criticized the fact that individual emergency assistance had been reduced because of government decision-making.

A few users criticized the lack of interest shown by some members of the public in attending community emergency response team training sessions. Some users asserted that it was foolish to rebuild in flood zones, with strategic land use planning issues deviating from the 6th National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011). The literature indicates that issuing timely alerts is one of the features of risk communication in emergency management (Wukich 2016). The alerts implemented to warn the public about major disasters were triggered even during a normal thunderstorm. There was some criticism that weather alert applications were used to track users. Users posted that there was limited value and not much worth, if the existing insurance policy and the recently introduced new insurance policy were almost the same. This implies that the capabilities implemented to support disaster resilience have failed to a certain extent, which deviates from the 7th National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011).

Examples of user comments are:

relying on rescue team members instead of engineers and inspectors of the building is just suicide	*FEMA, male*	*15 May 2015*

rebuilding in flood areas is foolish	*FEMA, female*	*20 June 2015*

Second dataset: The analysis of the second dataset indicates that users criticized the government's policies and initiatives to plant gum trees near houses. Emergency management staff shared their frustration on the lack of responsibility of the public to obey flood warnings issued by the organisation on the ACT SES Facebook page. This irresponsible behaviour of the public resulted in many avoidable rescue efforts during the flood causing the loss of life of staff in some instances. Further, such incidents resulted in risky emergency recovery efforts for the emergency staff which were quite unnecessary. Some members of the public suggested that it was cruel to find fault with the people affected by a flood and the emergency management staff members should be considerate in such situations rather than reiterating their warnings. Alternatively, some users suggested that risking the life of emergency management staff to save those who did not listen to the flood warnings of the emergency management organisation was not worthwhile. The above indicates that social conflict is a theoretical implication which aligns with the challenges involved in risk communication. This is one of the findings of this study, which agrees with Chauhan & Hughes (2017) on social conflict in the context of providing timely and relevant crisis information through social media to the public. These findings also suggest that emergency management organisations should align their risk communication strategies in such a way that the public is empowered to understand the risk to themselves and to the community.

Examples of user comments are:

We're angry, we're frustrated and we're sick of people time and time again ignoring our warnings	*SES, male*	*5 Jan 2016*
SES is sick of having to risk their lives on idiots who don't exercise common sense and stay out of flood waters	*SES, male*	*10 May 2016*

4.2.3 Request:

First dataset: Data analysis indicates that users posted requests to find out if the emergency agency really helped the public in emergencies. Other requests were to help a family running short of basic utilities and for the agency to respond to queries in emergencies. Users also posted requests on how the structural engineers would miss the communication of an imminent collapse of a damaged structure. Requests were also posted to inquire why there were no proactive actions from the agency to protect the public in an emergency. Other requests included reconsidering payment of flood insurance premiums on instalments to support the individuals staying in flood-zone areas and request to re-evaluate the current flood zones. The above discussion indicates that several requests were made by users which entail information seeking, an implication which is in consensus with a previous study in emergency management (Silver & Matthews 2017). It is also evident that several instances of lack of coordination exist which deviate from the 1st National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011). Thus, it is imperative to train staff members of emergency management organisations to develop inter-agency relationship skills in order to help them build and strengthen mutual respect and trust among stakeholders to improve disaster resilience.

Some users requested emergency warnings to be posted in specific areas. Others post requests regarding the weather in an area. Users also request the agency to visit damaged houses and to help affected communities. Other requests include information about a state which is facing an emergency and requests to help a homeless family. The above discussion reveals the risk awareness of a disaster resilient community which is in consensus with the 2nd National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011).

Examples of user comments are:

now is the best time to consider re-evaluation of the flood zone	*FEMA, male*	*12 January 2015*

tornado warning is there more specific in an area	*FEMA, female*	*16 March 2015*

There is some evidence of users posting requests to help their families. Other requests were to disseminate information on an emergency preparedness webinar, send emergency warning messages and to check for assistance received for damages caused by a flood. The above discussion involves risk communication with network connections in an emergency which is in accord with the 3rd National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011). There is also some evidence of users posting requests on how to participate as a volunteer in emergency management. Some users request potential participants to look out for the announcements on training lessons. Some others request how to get a community emergency response team started. Other requests were to consider joining the response team and to find out areas where precautionary measures should be taken to mitigate the effect of disasters. There is some evidence of request regarding whether households are prepared for an emergency since disasters can occur unexpectedly and enough supplies should be stored for survival. Users posted requests to search for other community emergency response team programs to participate and prepare for emergencies in case the local programs were not suitable. Some users also requested for training lessons in specific regions. The above analysis indicates the importance of risk preparedness to handle future crises effectively.

Users also posted request on how to extend their help in an emergency. Other requests were for a grant to support the aftermath of an emergency and to check whether state assistance has been requested by the local emergency management officer during an emergency. Requests were also posted on how to enrol for an emergency management course. Data analysis indicates that those who wanted to join as a volunteer in emergency management has been requested to contact the local humanitarian office. Other requests included the need of personal resilience and the role individuals must play in accomplishing this mission and finding out volunteers who are interested in helping disabled individuals in an emergency. The above discussion indicates empowerment and risk preparedness by taking responsibility, which is in consensus with the 5th National Strategy for Disaster Resilience. Hence the administrators of emergency management organisations should encourage building resilient communities who can get support and resources from local networks

to facilitate emergency recovery efforts. Users also posted that some members of the community re-built their houses on the flood zone areas. The above discussion indicates that there is evidence of lack of strategic land use planning which deviates from the 6th National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011). Thus, the administrators of emergency management organisations should recommend that the construction of infrastructure be of a high enough standard which will reduce expenditure in future recovery efforts.

Examples of user comments are:

provide a post on Facebook about today's webinar on family emergency preparedness	*FEMA, female*	*22 May 2015*
is your family prepared and have the necessary supplies	*FEMA, female*	*10 February 2015*
people prepare, we as a nation need to understand the importance of resiliency	*FEMA, male*	*22 April 2015*

Other requests include the necessity to double flood insurance coverage and request to clearly distinguish and identify the emergency alerts received on mobile phones. Further, warnings should be sent only for major emergencies such as tornados and earthquakes rather than a normal thunderstorm. There is some evidence of request on how to train canines for emergency management. Other requests include finding out if users require flood insurance and request to receive alert service on users' smartphones and indication of the nearest camp in an emergency. Users also posted that critical emergency device can be obtained for everyone involved in an emergency by telephoning or emailing. Thus, risk preparedness is communicated on the organisation's Facebook page. There is some evidence on companies who wanted to list out their disaster relief services. Other requests were to thank fire-fighters who have helped the public in emergencies. From the above discussion, it is evident that communication devices, canines, fire-fighters, and insurance products come under the capabilities that support disaster resilience and is

in accord with the 7th National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011).

Second dataset: Data analysis of the second dataset indicated that emergency management staff requested users to post their stories and photos taken during emergencies since staff could not get relevant photos while the rescue efforts were being undertaken. Requests were also posted to show consideration towards staff members from other emergency management units who were involved in handling emergencies. Apart from natural emergencies some users requested to post information about missing individuals. The above requests indicate coordination and collaboration among the emergency management organisation and the public. Requests were also posted to preserve the privacy of individuals who were affected by emergencies. There were posts to show support for the emergency management organisation by wearing an orange outfit and some posts indicated that emergency management organisations provided logistics support during fire emergencies. In comparison with dataset1, only very few requests were found in dataset2.

Examples of user comments are:

If you have any photos from storms or floods in the ACT we would love to see them. We don't always get the best footage when we are busy with operations so your stories and photos would be greatly appreciated	*SES, male*	*14 April 2016*

4.2.4 Opinion:

First dataset: There were no significant user posts in the form of opinions found in the first dataset.
Second dataset: Data analysis of the second dataset indicates that opinions were posted on the emergency recovery efforts and carelessness of the people driving on floodwater. When strong opinions were posted by users on driving through floodwater, the agency did not take sides with

any group of users but emphasized the risk and communicated the awareness of issue. It was also apparent that the agency took control of the discussion when serious opinions were posted by different groups of users who support and disagree with the issue of driving on floodwater. Opinions were also posted on the tragic loss of life due to flood waters, on a new operation and training facility for the organisation which could be convenient to attract new recruits, on prejudice, intolerance, and the kind of language used for communication on the Facebook page of emergency management organisation. The above analysis of user opinions indicates risk awareness and communicating risk in a professional way. Opinions were posted on the voluntary response of the public to join emergency services, on the strong network collaboration among emergency management volunteers by senior management staff and on showing respect to those fellow colleagues who lost their life while on duty. The above analysis of user opinions indicates voluntary contribution, collaboration and engagement with the public. Data analysis also indicates that ACT SES embraces diverse (i.e. supporting/criticizing) opinions of the public which illustrates the organization's open communication culture.

Examples of user comments are:

But its the xxx idiots that drive through the raging flood waters, get stuck and then expect some poor innocent person the rescue them	*SES, male*	*02 May 2016*
There are hundreds of thousands of words in the English language at your disposal. Ultimately, it's up to you which ones you decide to use	*SES, female*	*10 March 2016*
Receiving so many applications to become a volunteer of the ACTSES is	*SES, male*	*20 June 2016*

an overwhelming response from the people of Canberra who are always generous with their time to help their fellow citizens; It's also very pleasing to see that 132 of the applications are from women.		

4.2.5 Recommendation:

First dataset: There is no significant user recommendations found in the first dataset.

Second dataset: Data analysis of the second dataset indicates that several recommendations were posted on how to protect citizens, their family, and their property before an upcoming storm or flood. Recommendations were also posted to realize the power of water during floods. To explain the impact of the power of water, some posts recommend looking at the photo of the region before the flooding. For legal and reputational preservation reasons the staff recommends not to post crime related information on their organisation's Facebook page. For up-to-date weather information, staff recommends visiting the meteorology website. Recommendations were also posted on driving while it rains, how to take care of pets, and maintain the privacy of individuals while posting comments. It was also recommended several times not to drive through floodwater. The above analysis of user recommendations indicates risk awareness and risk communication respecting the privacy of individuals.

Examples of user comments are:

Stayed tuned for a comparison photo over the next few days of what this area looks like when its not in flood!;	*SES, female*	*4 March 2016*
We ask that you please keep the family and friends	*SES, male*	*10 April 2016*

involved in this incident in mind and carefully consider your comments before posting.		

4.2.6 Announcement: There is no significant announcement found in the first dataset. Data analysis of the second dataset indicates the majority of announcements were on heavy rain fall and potential flooding. Some announcements on weather warnings (e.g. hailstorms) were given priority for immediate broadcasting. On some occasions, there were announcements that cancelled severe weather warnings (e.g. thunderstorms) issued earlier to certain regions. Other announcements include information on social events organized by the staff members of emergency management agencies to collect funds for local volunteers and dedicating a day to show gratitude towards emergency management organisation's staff members and announcing that to the public. Another announcement was on the recruitment of volunteers to the emergency management organisation and the participation of emergency management staff in a conference. Some announcements indicate starting a new facility for the effective management of emergency services. A special announcement dealt with a staff member of the emergency management organisation receiving an accolade for the young citizen of the year. Other announcements included the release of water from a reservoir, loss of life, and how staff responded to user requests during wet weather conditions. Announcements were also posted on events that were organized to build relationship among community members. Thus, announcements led to risk communication, relationship building and social identity (supporting emergency preparedness and recovery efforts) among a community of users. From a practical perspective, communicating information and risks to people in the form of announcements is in accord with the 3rd National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011).

Examples of user comments are:

currently two teams are activated for immediate response	*SES, female*	*21 April 2016*

4.2.7 Praise:

First dataset: Some posts praised fire-fighters by recognising them as heroes, and thanked them for their brave service during emergencies, whereas others acknowledge fire-fighters' work in terms of offering help when people are trying to save themselves in emergencies. Some users posted their experience in terms of the help offered by emergency management staff in searching and finding out their loved ones during an emergency.

Example of user comment is:

Grateful to emergency responders for saving my life, emergency responders are heroes	*FEMA, male*	*10 March 2015*

Second dataset: Some users posted about how they emphasized the dangers involved with flood pathways to their children. Emergency management staff praised those users who emphasized the dangers of driving on flood waters and felt happy to see the outcome of their educational efforts at schools embraced by parents. This indicates that emergency management staff could establish relationship with communities which implies relationship building in the context of social networking sites. Some posts praised emergency management organisation for serving the community and users were happy for being part of the best organisation in a country. Users created social identity by being part of a reputed organisation that helped the community in emergencies. Another user-post considered emergency management staff as heroes in a disaster. Hence social provision (Skopp et al. 2016) which indicates support received from the public is an implication to stakeholders of emergency management. Some posts also praised the efforts of other emergency management organisations in emergency recovery.

Users also praised the dedication of staff members of emergency management organisation. Some posts honoured staff members who have lost their life while helping communities in emergencies and others who have retired from their voluntary service. The role of women in taking part in emergencies was also praised. Other posts commended a staff member for receiving a young citizen of the year award. These posts helped to share information among network connections and create an identity for the organisation and its staff. Thus, the theoretical implications from praise

are relationship building, social provisions and social identity. From a practical perspective, implications indicate leading a change by recognizing staff and the efforts of other agencies in emergency recovery efforts which is in accord with the 1st National Strategy for Disaster Resilience (Goode et al. 2017; Wilkins & McCarthy 2011).

Examples of user comments are:

great to hear our efforts at school reached adults	*SES, male*	*5 February 2016*
thank you for years of service; honoured past and present firefighters; today is the day to appreciate this	*SES, male*	*21 March 2016*

Further, different regional units of the emergency management organisation were praised on several occasions. On the other hand, law enforcement agencies and ambulance services were also praised. The deployment of staff for handling emergencies abroad has received praise from the international community. Some members of the public even praised those staff who were coordinating events in the organisation's headquarters. The onsite medical treatment provided by the ambulance services division helped to reduce the transports to hospitals which was also praised by the public. This indicates coordination and collaboration between different units in the local, interstate and international level.

Apart from praising the agencies for their contribution, some staff members of the emergency management agency were praised for their expertise in managing local and international emergencies. This implies creating a professional identity for the staff members of emergency management organisations. On some occasions emergency management staff was pleased with children reminding their parents of the hazards of floodway based on the education provided to school children by SES staff. Staff also praised those who educate the public during emergencies. This implies risk communication and educating the public on the dangers of floodway.

Staff members of the emergency management organisation have praised their colleagues for helping the public during those times when warnings have been sent to stay indoors. Since most of the emergency management staff is performing this service on a voluntary basis, the employers of those staff were also praised for being flexible during their office hours. Some staff members also praised the public for taking care of their children while they were on emergency response tasks. It was also emphasized that the love and support shown by the families and public to the staff members have been crucial, which indicates social provision. Staff also praised elderly colleagues who have retired from the service and whose service on some occasionwent unrecognized. Fire and emergency service personnel were sometimes placed in dangerous situations and lost their life while on duty. Thus, elderly staff members and employers of voluntary emergency management staff were praised for their voluntary support to emergency services. It was also mentioned by staff that cultural harmony and integration was accomplished by recruiting and training people from minority communities. This led to organisational identity which promotes cultural diversity among staff.

Examples of user comments are:

The Sydney Hailstorm is just one example of this inter-agency work;	*SES, male*	*12 June 2016*
We do lots of work in schools to educate kids but its great to hear its reached our adult community as well	*SES male*	*10 March 2016*
Would like to pay our respect to all Aboriginal and Torres Strait Islander (ATSI) people, and to recognise that currently we have our first two identified Aboriginal volunteers undergoing recruit training,	*SES female*	*15 May 2016*

which is a milestone for the ACTSES.		

4.2.8 Greetings:

First dataset: Users posted greetings in response to fire-fighters help and sacrifice in maintaining the safety of the public during emergencies, whereas others showered blessings on first-responders around the world. There is some evidence of users posting greetings specifically to fire-fighters or a group of fire-fighters, identified by their name and designation. Some instances of user posts indicate that mothers, grandmothers, and mothers-in-law of fire-fighters show their gratitude by mentioning names of their loved ones and thanking fire-fighters for their altruistic service to the society. Some mothers are proud of their son being a fire-fighter, and few users wish that fire-fighters would stay safe while getting involved in emergencies.

Examples of user posts are:

God shower blessings on emergency responders for their sacrifice to keep the public safe.	*FEMA, female*	*15 May 2015*
Thank you (Name), and all your emergency responders, thanks to emergency responders' worldwide, thanks to emergency responders of a region.	*FEMA, male*	*20 June 2015*

Second dataset: Data analysis of the second dataset indicated greetings were posted in different forms. In majority of occasions it was thanking colleagues of the emergency management team for their teamwork, whereas on other occasions it was congratulating a member for receiving an accolade or a new regional posting. The organisation congratulated the new recruits on the day of

their graduation and thanked the public for promoting awareness of emergency issues such as driving through floodwater. Some greetings are in response to sending emergency warning messages whereas others take the form of communicating information to keep safe. This implies risk awareness and risk communication among network connections.

Examples of user comments are:

Good luck to our five fire-fighters current deployed to Western Australia from all members of the ACTSES	*SES, male*	*20 March 2016*
Thank you SES for the warning	*SES, male*	*14 April 2016*

4.3 Discussion

According to the **crisis communication matrix** (Reuter and Kaufhold 2018), four types of communication are evident on Social Networking sites. They are communication between agencies, communication from agencies to the public, communication between the public and communication from the public to agencies. Further in crisis management, communication occurs in three different phases which are pre-crisis, crisis and post-crisis. The Facebook pages of FEMA and ACT SES are exemplars of emergency management organisations with rich user-generated content where FEMA handles all incidents in the United States and ACT SES handles incidents only in the Australian Capital Territory. Analysis of data indicates that the pattern of communication was intense from the public to agencies. Most communication occurred in the pre-crisis or preparedness phase of emergency management followed by the post-crisis or recovery phase of emergency management. The types of content identified in the analysis are status-update, criticism, and request followed by opinion, recommendation and praise. Criticism was seen in the pre-crisis (e.g. lack of training) and post-crisis (e.g. weak recovery efforts) phases, with very limited occurrences during a crisis. The second organisation had an open communication culture evident in relation to relationship building with communities and volunteers of other agencies, transparency in sharing funding information to the public, gender equality, cultural diversity and

minority inclusion in volunteer recruitment. It must be noted that the volume of emergencies handled by the first organisation in the United States is far greater than that handled by the second organisation in a single territory in Australia. Hence the extent of criticism found on the Facebook page of the Federal Emergency Management Agency in the United States shoudl be related to the volume of emergency management services offered by the organisation. Criticism could be considered as the power of social networking sites and administrators could devise strategies to address criticism by providing relevant announcements and recommendations to the stakeholders of emergency management. The State Emergency Services in ACT – Australia demonstrated inter-agency coordination and collaboration at the local and international level which was not seen with the Federal Emergency Management Agency in the United States. In general, emergency management is not the responsibility of organisations alone, but a shared responsibility of the stakeholders of emergency management which includes the public and emergency management agencies.

The data analysis also revealed a new type of content which has been termed ‘condolence’. This category was found only in the second dataset. Condolence was posted to mark the loss of a staff member. Several members have posted condolences on the Facebook page of the organisation, thanking staff members for their services. This finding on a new type of content concurs with the study by Posey et al. (2010) on the depth of information disclosure where profound intimacy is developed among stakeholders during interactions on social networking sites. This also implies that despite life-threatening risks faced during emergency recovery efforts, staff at the emergency management organisations are willing to help the community. Long serving members of the emergency organisation were also praised for their services to the community. The above analysis provides a professional identity for the staff working in emergency services which indicates their dedication and commitment to the community. This also helps the new recruits to understand the requirements of their role in emergency services.

Examples of user comments are:

The xxx is saddened to hear about the death of a xxx	*SES, male*	*10 April 2016*

member whilst volunteering to help his community.		
A true asset to every organisation he was a part of. You will be missed my friend, fair winds and following seas mate, an era now gone as this warriors tour of duty comes to an end and begins anew in the heavenly fleet	*SES male*	*05 March 2016*

The discussion in this chapter implies that the core principles of the national strategy for disaster resilience are embedded in the major types of user-generated content posted on the Facebook page of two emergency management organisations. The core principles discussed under each of the user-generated content mentioned in this chapter are leading change and coordinating effort, understanding risks, empowering individuals and communities, reducing risks in the built environment and supporting capabilities for disaster resilience. On a similar note, the priorities of the Hyogo Framework (McGee et al. 2016) that are in line with the major types of user-generated content discussed above are improving early warning systems, creating risk awareness, and improved land use and development planning.

From a theoretical perspective, the components of Activity Theory examined in this chapter are object, subject, outcome and tools. The object is the type of user-generated content identified in this study which are status-update, criticism, and request, followed by opinion, recommendation, and praise. Condolence is a new type of user-generated content or object identified in this study. Subject refers to the stakeholders of emergency management who post comments on the Facebook page of emergency management organisations. Facebook is the tool used in this study due to its rich user-generated content in the context of emergency management. According to Activity Theory, outcomes refer to the benefits and challenges to the stakeholders of emergency management which are identity construction, social provisions and social conflict. The themes eventuating from analysis is yet another outcome which will be discussed in the next chapter.

4.4 Conclusion

This chapter explores communication patterns on the Facebook page of two emergency management agencies which are exemplars in the field of emergency management in terms of user-generated content. The dominant patterns of communication identified are status-update, criticism, and request in FEMA whereas status-update, opinion, recommendation and praise were identified in ACT SES: this indicates that the communication strategy adopted by ACT SES (more in tune with an open communication culture) is paying off as the public is reacting in a more positive way than in the US.

This study contributes to the identification of user-generated content posted by users on Facebook. An analysis of content identified in this study implies that Facebook is primarily used by users for risk awareness and communication, co-ordination and collaboration, relationship building, and information seeking in the context of emergency management. Users may reap the benefits of identity construction and social provisions; whereas social conflict is a detrimental consequence. By analysing the findings, administrators and policy makers of emergency management could identify the extent to which the core principles of disaster resilience are enhanced using public social networking sites to maximize the success of recovery in disasters.

Chapter 5 – Themes on Emergency Management

This chapter presents the results of a Thematic Analysis of data collected from the Facebook page of FEMA and ACT SES. The initial classification of data was accomplished using the information classification framework which is described in the research design (chapter 3, Phase 1) of this study. The patterns of communication in the form of status-update, criticism, request, opinion, recommendation and praise, evident on the Facebook page of FEMA and ACT SES are presented in Chapter 4.

Thematic analysis is a method to analyse qualitative data to identify, examine and record patterns in order to develop overarching themes in emergency management. Thematic analysis is applied on the same data which was classified using the information classification framework and follows the five-step approach proposed by Braun and Clarke (2006). NVivo was used to classify the data and these steps are described in Chapter 3. Thematic analysis is used to identify what is important for people caught up in emergency situations management based on the comments posted by stakeholders on the Facebook page of FEMA and ACT SES. This helped to answer the research question on overarching themes in emergency management. The themes identified in this study are "Self-preparedness", "Emergency signalling solutions", "Companion", "Aftermath", and "Gratitude". Identifying the strength of these themes in the different EMOs will enable me to determine to what extent SNS can contribute to crisis management in different cultural contexts. A summary of the five themes eventuating from the user-generated content are presented Table 5.1 below.

Table 5. 1 Emergency Management Themes and Examples

Themes (Phases of Emergency Management)	User-generated content	Example
	Status-update	*"We need to educate the people especially in the urban area (FEMA, male, 10 April 2015)*

Self-preparedness (Pre-crisis phase)	Recommendation	*"Also get earthquake insurance…it is inexpensive and I have it on my home" (FEMA, female, 19 Mar 2015)*
	Request	*"As it would be for me to take a course with you? What are the guidelines?" (FEMA, male, 1 May 2015)*
	Announcement	*"National PrepareAthon Day is this Thursday! Millions across the country will take an action to prepare for emergencies" (FEMA, male, 2 Apr 2015)*
	Criticism	*"They ended our CERT in lower township. The shame is we had a good group, mental health, nurses and radio. We had it all; and even in an extreme emergency, we are not allowed to assist out fire dept or police and only allowed to assist our neighbours. This is not what I envisioned the CERT program to be." (FEMA, female, 12 Feb 2015)*
Emergency signalling solutions (Pre-crisis phase)	Status-update	*"It this was an actual test it would follow with instructions what not to do in case of a hurricane or a tornado or a dairy queen blizzard" (FEMA, male, 2 May 2015)*
	Criticism	*"Problem is that they go crazy with alerts. I don't want a warning for a thunderstorm, I want a warning for*

		something dangerous like a tornado" (FEMA, male, 26 Feb 2015)
Companion (Pre-crisis phase)	Recommendation	*"If you come across a dog starring at a pile of debris and not moving, trust the dog and start looking! Dogs are amazing indicators whose instincts we need to learn to trust" (FEMA, female, 27 Mar 2015)*
	Request	*"How do you teach a bark alert if your dog naturally alerts a different way?" (FEMA, female, 1 April 2015)*
	Opinion	*"Tests are off-leash with the possible exception of some of the obedience, but most likely that is also off-leash" (FEMA, male, 9 June 2015)*
Aftermath (Post-crisis phase)	Criticism	*"Great job cowards…; a xxx contractor came over to my house, didn't even think about looking at our property damage, and said nothing could be done for us" (FEMA, female, 8 June 2015)*
	Status-update	*"We never called these guys in, we have no idea what they are doing here!" (FEMA, male, 1 June 2015)*
	Request	*"Has anyone in Oklahoma gotten any assistance, say with a private road or fence, destroyed by flood*

		waters?" (FEMA, female, 16 June 2015)
	Announcement	*"Texas is trying to establish an acupuncture based medical reserve corps – first responders, evacuees, anyone affected by trauma and disaster related stress…check it out!" (FEMA, female, 29 June 2015)*
	Recommendation	*"If your home is heavily damaged or destroyed, check your homeowners policy for loss of use, then find a place to rent near your home, and move out asap, because good rental property will become in short supply soon." (FEMA, male, 15 June 2015)*
Gratitude (Post-crisis phase)	Greetings	*"Thank you fire-fighters." (FEMA, female, 5 May 2015)*
	Praise	*"I am very grateful to the men and women of the US forest service; Fireman saved my life in 85. I thank them every chance I get. They are all heroes ." (FEMA, male, 2 May 2015)*

5.1 Theme1: Self-preparedness

This theme is primarily defined by status-updates, recommendations, requests, announcements, and criticisms posted by users on the Facebook page of our two emergency management

organisations. Trained members of a community response team can assist the public in emergencies when professional emergency responders are not immediately available. Some community emergency response team members engage in practising search and rescue without appropriate equipment. Users also posted that receiving training ensures that they can take care of their family and be an asset to society when emergency strikes unexpectedly. In addition, for some users, training that prepares them for handling emergencies brings self-satisfaction. There is some evidence of users posting updates on stocking supplies to survive an emergency. A few users posted updates on the dangers involved when structural engineers are not consulted in the search and rescue of collapsed structures. Thus, lack of preparedness can be detrimental in certain emergency situations.

Examples of user comments are:

We carried victims on doors; if something like that happens, even xxx will be overwhelmed the first few days, that's why being a prepper is a good idea;	*FEMA, male*	*1 Feb 2015*
No point in taking chances!! So, I have everything possible that could be needed to last at-least one week + without any assistance, even medical issues that may arise;	*FEMA, male*	*16 April 2015*

Users also posted recommendations to be followed in an emergency caused by earthquakes and ascertain that valuable recommendations can only be provided once the user has been prepared for handling emergencies. Some users requested their community members to check whether their family has been prepared for an emergency (for instance, hurricanes). There is also some evidence of requesting community members to participate in a survey intended to collect the lack of self-preparedness for natural disasters. Users interested in the search and rescue of collapsed structures

request the emergency management agency for a training course to get prepared for future emergencies. A few users requested the agency to respond to questions on managing venue safety, especially in the context of evacuation of large confined crowd attending an event. Furthermore, user posts illustrated that two types of users are evident on the Facebook page of emergency management organizations. The two types are those who are preparing themselves and the community members on how to be resilient in future disasters and the staff members of emergency services agencies. Thus, the identification of a specific type of user – prepper – who believe that catastrophic conditions will prevail is a contribution of this study towards the types of users (Brandtzaeg 2012) identified in the literature on social media. However, these were not very apparent on FEMA's Facebook page. A possible explanation is that preppers are suspicious or distrustful of the Federal government. The Preppers on the ACT SES Facebook page communicate intensely to share their expertise in the field which provides a cultural identity for the organisation. For ACT SES, this might help in building relationship with the public and could attract a larger and more engaged volunteer base.

Users posted announcements about the community emergency response team training, covering basic lessons which are fundamental to self-preparedness in an emergency. There is evidence of interest by the US public in the national preparedness day on handling emergencies. Though some users praise the value of the community emergency response team's training, they also criticize the policies limiting the support of trained members to other - for instance, police or fire departments - in emergencies. a few users criticized the community emergency response team for ignoring users who request help and post updates on the lack of training lessons for emergency preparedness in certain areas. Users also posted about different disaster plans and the importance of self-preparedness since emergency agencies have an inevitable task during critical emergencies. Thus, self-preparedness is a crucial step in mitigating emergencies.

5.2 Theme 2: Emergency signalling solutions

This theme is primarily defined by status-update and criticism posted by users on the Facebook page of two emergency management organisations. Users posted content to educate others on the messages sent by an emergency broadcast system. There is some evidence of wireless emergency

alerts sent to mobile devices in an emergency (for instance, weather hazards). Those who have worked as emergency managers post information on the negative implications caused to the public when wireless service providers broadcast to all network users rather than sending alerts only to those who are in the affected area. Hence emergency alert systems should be properly tested before wide-scale implementation. Alternatively, the public should also be educated on how emergency alerts are being sent by wireless service providers. Users involved in emergency management post updates on the benefits of using wireless emergency alerts through cell phones since siren alerts won't work due to lack of power during emergencies.

Examples of user comments are:

it this was an actual test it would follow with instructions what not to do in case of a hurricane or a tornado or a dairy queen blizzard;	*FEMA, male*	*4 May 2015*
I'm very pro public alerting and notifications as an emergency manager. Some carriers push alerts out through their whole network in an area while others limit to the affected area. This has caused much confusion here locally and unneeded panic;	*FEMA, male*	*28 Feb 2015*

Some users are concerned about the uniqueness of the emergency alerts being easily distinguished from ordinary messages, whereas others are concerned about receiving alerts that are not relevant to their locality. Users criticized the emergency management agency for sending large numbers of alerts for an ordinary thunderstorm, rather than efficiently filtering and sending alerts only for dangerous weather hazards (for instance, a tornado) affecting specific areas. Several users strongly

criticized emergency alerts containing wrong information which was sent to the public. There is some evidence about criticizing a weather service app launched by FEMA since the content was outdated and the app was not compatible with popular smart phones. In this context, some users considered the weather service app useless, and others perceived the potential of this app for spying on citizens, confirming some members' lack of trust towards the Federal US government.

Examples of user comments are:

Problem is that they go crazy with alerts. I don't want a warning for a thunderstorm, I want a warning for something dangerous like a tornado	*FEMA, male*	*26 Feb 2015*
Big brother spy app; I downloaded this app, set it up for my country and state, it is sending out false information, I'm deleting this thing, it's not worth my time.	*FEMA, female*	*12 Feb 2015*

In general, there are mixed feeling among users with respect to the newly launched weather service app that can send emergency alerts on five locations at the same time in a country. Though very few users did praise the weather service app (for instance, "very informative app!"), a majority of users criticized the app in terms of false information sent to the public, non-compatibility with popular smart phones as well as the inability to inform the nearest camp in an emergency. Some users also criticized the lack of backup plan in case the weather service app failed during emergency communication. In contrast, there is some evidence about users posting information about specialised weather receivers that they have installed to receive emergency alerts relevant to specific areas. From the above analysis, it is understood a majority of users who have posted information on the Facebook page of FEMA and ACT SES were keen to receive emergency alerts, but the lack of sophistication in the implementation of emergency signalling solutions has generated criticism from the public.

5.3 Theme 3: Companion

This theme is primarily defined by recommendation, request, and opinion posted by users on the Facebook page of two emergency management organisations. Several users posted about how to get their dog certified as K9 handlers for search and rescue during emergencies. Users posted detailed recommendation on how to train dogs for barking in emergencies. Some users recommend trusting canines in any situation, especially in emergencies. Users also posted recommendation on how to get emergency management taskforce certificates for dog and master.

Examples of user comments are:

If you come across a dog staring at a pile of debris and not moving, trust the dog and start looking! Dogs are amazing indicators whose instincts we need to learn to trust;	*FEMA, female*	*27 Mar 2015*
get with a fire dept, get your cert, and then you go to school with your k9, you both get cert, and after a couple year, the best from each area get to try out for an opening by going through week long training	*FEMA, male*	*22 April 2015*

There is some evidence of users requesting step-by-step procedures that dogs must follow to get certified as a K9 handler. In response to user requests, opinions were also posted by some users explaining what is expected of K9 handlers for getting certified by an emergency management agency. There is also some evidence on the general opinion that every dog cannot be a search and rescue canine. Users also posted their mixed feelings on giving rewards to canines after they successfully accomplish their training tasks. Though some users are reluctant to agree on giving

rewards, others consider rewards as motivators and trust builders during training. Some users praise and refer to dogs as their best friend and bestow their love towards these canines. Thus, canines are considered the best companion for emergency responders. This theme is only applicable to those emergency management organisations that have a K9 unit that can support staff in emergency management.

5.4 Theme 4: Aftermath

This theme is primarily defined by criticisms, status-updates, requests, announcements, and recommendations posted by users on the Facebook page of two emergency management organisations. Widespread criticism is posted by the public since the emergency management agency did not extend their help to the needy after a flood. Some users have criticized functionaries of the State instead of the agency since they have deceptively raised the limit for held assets to qualify for individual assistance in emergencies. Other critical posts include denial of funds to families affected by emergencies as well as extending help to a group of individuals due to their sheer number, thereby avoiding help to individual families. There is some evidence of criticism regarding the payment of flood insurance when an area has been hit hard by drought in the past few years. In this context, some users considered payment of insurance premiums as extortion money. Users also criticized the national flood insurance programs for not extending help to public in emergencies. Some users criticized the emergency management agency for wasting taxpayers' money by funding their activities which has not been helpful to the public in emergencies. There is some evidence of criticism posted against senior staff in public administration for not offering help to citizens in emergencies. Users also criticised the emergency management agency because of the perception that the agency is rezoning flood areas to generate more taxable income from the public, which has resulted in people leaving certain states.

Examples of user comments are:

great job cowards…; a xxx contractor came over to my house, didn't even think about looking at our property	*FEMA, female*	*8 June 2015*

damage, and said nothing could be done for us. Screw that crap!		
How is a home liveable when you can't flush the toilet due to the septic tank being flooded; Government is supposed to be for the people	*FEMA, male*	*1 June 2015*

Another user update was on extending help towards a tenant affected by flooding, and at the same time experiencing damages for a property that far exceeded the insured amount. Users also updated on the procedural drawbacks in emergencies indicating a lack of coordination between a post-disaster structural engineering analysis team and a rescue/recovery team, which has been repeated in several emergency situations. There was also evidence of the lack of coordination between building inspectors and public administrators in the context of structural emergency for high-rise buildings. Some users requested the emergency management agency to re-evaluate the flood zone classification after a major flooding, whereas others post damages incurred to their houses during flooding and request the emergency management agency to act quickly in offering help. Users also updated the varieties of damages caused to the public in the event of a storm and requested help from the emergency management agency. There is some evidence of announcements posted by users on psychological help rendered to those affected by emergency related stress. Users also recommend renting out a temporary place, if the flood has damaged one's housing (for instance, black mould), and moving out quickly before rentals become expensive. There is little evidence of recommending the treatment of flood water for irrigation, in States experiencing massive drought. From the above analysis, it is understood that the content posted by users closely relate to the activities that typically occur after an emergency, which is encompassed in the theme – "Aftermath".

5.5 Theme 5: Gratitude

This theme is primarily defined by greetings and praise posted by users on the Facebook page of the two emergency management organisations. Majority of users posted greetings in response to

fire-fighters' help and sacrifice in maintaining the safety of others during emergencies, whereas others showered blessings on first-responders around the world. There is some evidence of users posting greetings specifically to certain fire-fighters or groups of fire-fighters, identified by their name and designation. Some instances of user posts indicated that mothers, grandmothers, and mothers–in-law of fire-fighters show their gratitude by mentioning the names of their loved ones and thanking fire-fighters for their altruistic service to society. Some mothers were proud of their son being a fire-fighter, and a few users urged fire-fighters to stay safe while they are involved in emergencies.

Examples of user comments are:

God bless the fire-fighters for all their sacrifice to keep us safe; Thank you Cap [Name] and all your fire-fighters, thanks to fire-fighters everywhere;	*FEMA, male*	*8 May 2015*
Forest fires are very frightening. I've been evacuated from my home 3 times. I am very grateful to the men and women of the US forest service; a fireman saved my life in 85. I thank them every chance I get. They are all heroes";	*FEMA, female*	*4 May 2015*

Some posts praised fire-fighters by recognising them as heroes, and thanked them for their brave service during emergencies, whereas others acknowledged fire-fighters' work in terms of offering help when people are trying to save themselves in emergencies. Some users posted their experience in terms of the help offered by emergency management staff in searching and finding out their loved ones during an emergency. A few user posts indicated that there have been mixed feelings

in choosing a day to celebrate the fire-fighting profession since fire-fighters were not taking part in an emergency just for the sake of receiving applause from the public. Some users considered emergency management professionals deserving of great respect from the public. There is also evidence about users considering fire-fighters as their blood-relatives acknowledging the long service of senior fire-fighters who have recently retired from service, as well as those who have passed away. User posts indicated that emergency management staff have a tough job to perform during emergencies, and request government officials to acknowledge fire-fighters contribution with great gratitude. From the above analysis, it is understood that content posted by users show gratefulness towards emergency management staff which is encompassed in the theme – "Gratitude".

5.6 Discussion

The themes identified in the previous section are discussed here under the broader phases of emergency management: pre-crisis and post crisis phases. I will deal with each one in the following sections.

5.6.1 Pre-crisis Phase:

With respect to the theme - "Self-preparedness", there were many aspects of information being posted in the form of status-update, recommendation, announcement, and criticism which imply risk awareness and communication, challenges in communicating risks to the public, organisational identity, relationship building, openness in communication, coordination and collaboration among local and international emergency management agencies and social identity. There is some evidence of requests being posted by users which illustrates information seeking. Communicating information to the public is one of the major tasks of agencies in disaster management (Zhang et al. 2016). The literature also indicated that users seek information to satisfy a need or when a gap arises in users' current knowledge (Silver & Matthews 2017). It is also evident that before an emergency, social networking sites have been used to send preparedness messages and to educate the public (van Gorp, Pogrebnyakov & Maldonado 2015). Data analysis indicates that providing training to the public is one of the critical elements in the preparation for emergencies. This is in consensus with a previous study where the authors suggest that "practice

drills" are an essential component in emergency preparedness (Johanston & Lilja 2016). Further, there has been evidence of individuals preparing supply kits to survive in emergencies.

In addition to individual emergency preparation, family and community preparation is of utmost importance, and some evidence was found concerning the dissemination of calendars of training activities for users to prepare themselves for future emergencies. This is in consensus with a previous study (Levy, Koch & Royne 2017) where the authors suggest different forms of specialised and general training, in addition to protection and evacuation plans for individuals and families, along with an emergency preparedness checklist to assist in emergencies. A few certified members of community response teams post their willingness to provide altruistic services to society in the event of critical emergencies when there is a shortage of emergency management personnel. Posting selective information about oneself (for instance, in the form of status-update) on a public social networking site entails identity construction for users (Bergstrand & Stenmark 2016).

Plans to secure high-rise buildings in an emergency with the support of other stakeholders specialised in building structures, demonstrates coordination and collaboration in successfully managing an emergency. This study is in consensus with the theory of coordination (Jarzabkowski & Feldman 2012) and also with one of the core principles (Unity of Effort) of the National Disaster Recovery Framework (Wilkins & McCarthy 2011) in terms of collaborating with stakeholders in emergencies. Thus, the theoretical implications of user-generated content embedded in the theme - "Self-preparedness" are Risk Awareness and Communication, Coordination and Collaboration, Information seeking, Relationship Building, Identity Construction, and Social Conflict. In general, risk awareness and communication and the provision of information through the Facebook page of emergency management agencies have significant value for users; whilst agencies can respond and accomplish the resolution of user requests and concerns in a timely manner. Based on the above discussion, the theme – "Self-preparedness" is classified under the pre-crisis phase of crisis management.

Our analysis indicated that user-generated content entails benefits and costs for emergency management agencies. Though benefits are very limited in terms of appreciation of alert services,

challenges were the most prominent and were evident through criticism posted by users. Thus, risk awareness and challenges in communicating risks to the public are the theoretical implications of posting status-update and criticism on the Facebook page of emergency management agencies. This finding concurred with a previous study where authors have examined micro-blogging sites to establish the significance of alerts in an emergency (Ahmed & Sargent 2014).

Some users and emergency managers appreciate the informative nature of alerts which concurs with the core principle (public information messaging) of national disaster recovery framework (Wilkins & McCarthy 2011) in terms of standard procedures for communicating information in emergencies. On the other hand, in the context of recent emergencies attributed to terrorism (Conrado, Neville, Woodworth & O'Riordan 2016), none of the posts have indicated any sorts of homeland security or the extent of threat level prevalent in a society. In general, communicating risk through the Facebook page of an emergency management agency has significant value for users; whereas agencies can respond and resolve user concerns in a timely manner. This is subject to the availability of network connectivity during emergency situations and cannot be generalised to every emergency management situation.

Though broadcasting alerts before an emergency helps public and emergency mangers to plan and take precautionary steps to mitigate the effect of an emergency, the inefficiency in broadcasting alerts in terms of delivering right messages at the right time in the right area, has raised severe criticism from users. Though users are keen to receive emergency alerts, some users have lost faith in wireless emergency alerts due to the drawback of communicating information to the affected region at the right time, and hence rely on alternative weather receivers for timely alerts. The literature confirms that issuing timely alerts to the public is one of the important aspects of communication in emergency management (Wukich, 2016). There is also some evidence on indicating the type of warning method used (mobile alerts instead of siren alerts). Based on the above discussion, the theme – "Emergency Signalling Solutions" is classified under the pre-crisis phase of crisis management.

Recommendations on flooding posted by users to network connections concur with one of the core principles (Unity of Effort) of national disaster recovery framework (Wilkins & McCarthy 2011)

in terms of acknowledging the expertise of stakeholders in emergencies. Further, there has been some evidence on users posting announcements on psychological help offered to those affected by disasters which is in line with a previous study (Chou, Zahedi & Zhao 2014), who attribute recovery for victims and communities in the short-term recovery strategies of emergency management. This also concurs with one of the core principles (Psychological recovery) of the national disaster recovery framework (Wilkins & McCarthy 2011), in terms of extending support and treatment for the successful recovery of communities affected by emergencies. Thus, the theoretical implication of posting criticism, status-update, announcement, and recommendation is risk awareness and communication, which concurs with the study of Zhang et al. (2016) in the context of communication in disaster management.

Several users are interested in obtaining emergency management taskforce certificates for their canines and themselves to participate in emergencies. This is in consensus with a previous study (Chou, Zahedi & Zhao 2014) where the authors attribute stakeholder training and associated certificates to the preparedness phase of emergency management. There is some evidence of users posting recommendation on canine training as well as how to trust your dog in emergencies. In addition, users also post opinions on what is being tested in a certification and give detailed explanation on the test based on others' request. Posting requests entails information seeking which agrees with a previous study on information-seeking (Silver & Matthews 2017). Though there is some evidence of disagreement among users regarding the way canines are being awarded in return for their accomplishments in training, a majority of users praise canines for their instinct in facilitating emergency recovery procedures. The willingness of users to participate in emergency management along with their canines indicates co-ordination and collaboration, which concurs with a previous study (Ahmed & Sargent 2014) on the use of social media for collaboration between emergency management stakeholders.

Users posting recommendation and opinion in the context of training canines for emergency management entails the creation of an identity of altruistic help among network connections. Thus, identity construction (Bergstrand & Stenmark 2016) is an implication to users who post on the Facebook page of emergency management agencies. For the agency itself, additional support from potential stakeholders and their canines will greatly reduce resource shortages that may occur

during critical emergencies. Helping others in emergencies is an integral component of natural disaster management (Chou, Zahedi & Zhao 2014) and in this study, users show their willingness to prepare themselves along with their canines to take part in future emergencies. This concurs with the core principle (Partnerships and Inclusiveness) of national disaster recovery framework (Wilkins & McCarthy 2011) in terms of collaborating with stakeholders in an emergency so that all available resources are utilized for a speedy and successful recovery. Based on the above discussion, the theme – "Companion" is classified under the mitigation phase of emergency management. Though literature (Chou, Zahedi & Zhao 2014) has widely identified elements in all phases of emergency management, to-date none of the studies have identified the significant role that canines play in emergency management. Hence, the development of this theme from the user-generated content (recommendation, request, and opinion) posted by users on the Facebook page of emergency management agencies is one of the contributions of this study.

5.6.2 Post-crisis Phase:

There has been widespread criticism posted by users on the recovery activities of emergency management agencies. The user posts include lack of empathy by state administrators, extending help to only certain group of people, unreasonable flood insurance payment, as well as limited help extended to public in emergencies. Some of the criticisms posted by users were due to the lack of social support (Chou, Zahedi & Zhao 2014) from the stakeholders of emergency management. Most of the users have posted updates on the damages incurred to them after an emergency, in terms of individual property damage and extensive damage to crops which concur with a previous study (Chou, Zahedi & Zhao 2014), where recovery of properties is encompassed in the short-term recovery strategies of emergency management. Users also criticise emergency management agencies for the lack of response to public requests and for restricting the support of trained members to other departments in an emergency. Social conflict is an implication to users in terms of posting criticism on public social networking sites, which is in consensus with a previous study on managing wildfires (Chauhan & Hughes 2017).

On the other hand, posting requests to stakeholders during emergencies entail information seeking, which concurs with a previous study (Silver & Matthews 2017) on searching for

information to satisfy a need. With respect to user implications, posting criticism entails social conflict which concur with the study of Chauhan & Hughes (2017) on issues arising among stakeholders in crisis management. There is some evidence of the lack of co-ordination between departments in the context of recovery efforts for high-rise buildings. It was also evident that the lack of co-ordination has resulted in potential conflicts between departments. From a theoretical perspective, this finding deviates from the theory of coordination (Jarzabkowski & Feldman 2012) and coordination and collaboration in disaster management (Ahmed & Sargent 2014). The finding of lack of coordination also deviates from one of the core principles (Timeliness and Flexibility) of the national disaster recovery framework (Wilkins & McCarthy 2011) in terms of resolving conflicts among stakeholders and efficiently coordinating recovery activities to minimize loss in emergencies. From the above discussion, it is evident that the principle of timeliness and flexibility is the least followed principle among other core principles of the national disaster recovery framework (Wilkins & McCarthy 2011). Based on the above discussion, the theme – "Aftermath" is classified under the recovery phase of emergency management.

Users acknowledged the good work that has been done by fire-fighters in emergencies. This is evident through the greetings and praise posted on the Facebook page of emergency management agencies. By posting greetings and praising fire-fighters, users were able to build network connections. Thus, relationship building is a theoretical implication of posting greetings and praise on social networking sites which concur with the study of Ahmed & Sargent (2014) on disseminating information to a wide-range of audience and establishing network connections. Further, posts on fire-fighters by close parents (mothers, grand-mothers, and mothers-in-law), praising the role of fire-fighters in emergencies indicate social provisions, which could lead to the subjective well-being of fire-fighters. This concurs with a previous study where the authors establish social provisions in the context of social networking sites (Skopp et al. 2016). Thus, relationship building, and social provisions are the theoretical implications of posting greetings and praise on the Facebook page of emergency management agencies. The support and help extended by the fire-fighters to the community have helped them to create an identity for their altruistic work. User implication eventuating from posting greetings and praise include the creation of a sense of belonging in the emergency management community. Thus, this study has shed light

on using social provisions to establish the support that emergency management staff receives from the public and their close relationships.

On the other hand, an ontology was developed to evaluate natural disaster management websites in which "recognition of heroes" is one of the elements in the mitigation phase of disaster management (Chou, Zahedi & Zhao 2014). It was also evident that greetings and praise were posted in few words, and in some posts, fire-fighters were identified by their name and designation. This concurs with a previous study (Chou, Zahedi & Zhao 2014) in terms of "credits to the heroes". In the context of types of heroes, analysis suggest that there have been mixed feelings in terms of celebrating a day for the fire-fighter's profession, since fire-fighters offered their altruistic support to help people in emergencies rather than expecting reciprocal benefits. It was also evident that fire-fighters were successful in the evacuation of elderly users on time, which occurred repeatedly in emergencies. This concurs with the one of the core principles (Timeliness, Flexibility, and Pre-Disaster Recovery Planning) of national disaster recovery framework (Wilkins & McCarthy 2011) in terms of standard procedures for a speedy recovery in emergencies. Based on the above discussion, the theme – "Gratitude" is classified under the recovery phase of emergency management.

With respect to contributions, this study opens a new research stream by examining user-generated content posted by users on the social networking site of two emergency management agencies. The themes identified in this study align with the disaster management framework (Ngamassi, Ramakrishnan & Rahman 2016) and the core principles of the national disaster recovery framework (Wilkins & McCarthy 2011) which reconfirm the findings of this study. The alignment of themes also highlights the usefulness of Facebook, a public social networking site, in the distinct phases (pre-crisis, crisis, post-crisis) of crisis management. The overarching themes identified in this study indicate that Facebook has been used primarily in the preparedness (pre-crisis) and recovery (post-crisis) phases of emergency management. There has been very limited evidence of content posted during emergencies and a snapshot of user post is "*I have a very bad disaster here at 4300 Trueland, We need help like yesterday; We are flooded in Edinburg" (FEMA, male, 21 June 2015).* This concurs with literature on the use of technologies in the different phases of emergency management (McCormick 2016).

From a theoretical perspective, the components of Activity Theory examined in this chapter are outcome, community and division of labour. Outcome is indicated by the overarching themes in emergency management which are “Self-preparedness”, “Emergency signalling solutions”, “Companion”, “Aftermath”, and “Gratitude”. The differences in communication culture between SES ACT and FEMA are reflected by the community component (i.e. the active involvement of volunteers in emergencies): ACT SES is perceived as more open and approachable and this trust manifests in vastly superior volunteer numbers as well as less critiques online. The division of labour is indicated by the coordination and collaboration between different emergency management organisations locally, interstate and internationally.

In terms of the research questions proposed in this study, the patterns of communication evident on the Facebook page of the two emergency management organisations are status-update, criticism, request, opinion, recommendation, and praise. With respect to communication culture, user posts indicate that risk awareness and crisis preparedness in the pre-crisis stage were mostly seen in the user posts of dataset2 (ACT SES) rather than dataset1 (FEMA).

Data analysis also indicated that coordination and communication with the stakeholders of emergency management were seen mostly in the user posts of dataset2 rather than dataset1. Some of the other significant tasks mentioned only in the user posts of dataset2 were: immediate response of the staff to emergency recovery efforts which included the search for missing people in addition to natural disasters; participating and offering support to community activities and education events; promoting diversity among staff members; frequent updates on changing weather conditions; risk awareness, education and communication; extensive coordination and collaboration among local, regional and international emergency management agencies; communicating the funding received by the organisation to the public. Other tasks include staff sharing information on personal events (Birthday celebrations and engagements) which indicates openness in communication. Further, professional identity (dedication and commitment) of the staff members and organisational identity (multi-cultural approach) was also evident in the user posts of dataset2.

Thus, based on the above findings, ACT SES has a very open communication culture compared to FEMA aswell as a collectivistic approach to communication. With respect to consequences, benefits include risk awareness and communication, coordination and collaboration, information seeking, relationship building, social and organisational identity, and social provision. Social conflict and challenges involved in communicating risk and its awareness to the public are the detrimental consequences. The third research question on controlling the flow of information on social networking sites by organisations will be addressed in the next chapter based on the interviews of administrators of emergency management organisations.

To overcome the limitations, designers of Facebook may consider incorporating other add-on features that would empower Facebook to be used as an appropriate tool in the response phase of emergency management. From a practitioner's perspective, administrators and policymakers can utilize public social networking sites as a channel for risk awareness, communication and education for the public while preparing for future crises. The lessons learned from this study in terms of the usage of public social networking sites during different phases of emergency management, could be utilised by government and private agencies world-wide, to plan and enhance their services in specific areas of emergency management, through the implementation of third generation web tools.

5.7 Conclusion

This study contributed to Activity theory by developing key themes from user-generated content posted by users on Facebook, a public social networking site. An analysis of user-generated content identified in this study implies that Facebook is primarily used by users for risk awareness and communication, co-ordination and collaboration, relationship building, and information seeking in the context of emergency management. Users entail the benefits of identity construction and social provision; whereas social conflict is a detrimental outcome.

These findings could help administrators and policy makers of emergency management identify the extent to which the core principles of disaster recovery are accomplished using public social networking sites in terms of pre-disaster recovery planning, partnership and inclusiveness, public

information messaging, unity of effort, and psychological recovery to maximize the success of recovery in a disaster.

Chapter 6 – Findings from the Administrators of Emergency Management Organisations

This research, which examines communication patterns and their benefits and challenges, organisational communication culture, information control and overarching themes in emergency management, was conducted in two phases. Phase 1 used Thematic Analysis to examine the communication patterns and their benefits and challenges, communication culture, and overarching themes in emergency management. In Phase 2, interviews were used to test the results of Phase 1 and strengthen findings by combining methods (Bloomberg & Volpe 2016). This chapter reports the results of interviews conducted with the administrators of seven emergency management organisations. A copy of the interview questionnaire and verbatim transcription is included in Appendix 1. The types of user-generated content identified by the administrators are discussed below. The details of organizations whose administrators were interviewed are discussed in chapter 1 and 3 of this study.

6.1 Communication Patterns

Praise: All seven administrators of emergency management organisations agreed that praise appeared on the Facebook page of their organisation, but they had varied understanding of what 'praise' actually meant. A few administrators considered praise in terms of feedback received for the emergency preparedness training lessons conducted by the organisations which was related to the education side of disaster control. Some administrators considered praise as the amount of traffic or number of likes on a post or story posted on their Facebook page. Praise was also received for those posts that indicated the improvements made in handling current emergencies as compared to past situations. For some administrators, praise meant comments received from other emergency management organisations in demonstrating good governance when member countries conducted emergency management programs. Users also praised organisations for sharing timely updates on upcoming typhoons and floods from credible sources, as well as for connecting the public to emergency response networks for a speedy recovery in emergencies. Praise was also posted about staff on duty, tasks performed by staff during emergencies, and for spreading sound emergency management practices. Though the majority of praise was received on the Facebook page of

emergency management organisations, very few administrators have received praise face-to-face in their personal life for their emergency management work which was not posted on their organisation's Facebook page.

Announcement: All seven administrators of emergency management organisations agreed that announcements were posted on the Facebook page of their organisation. Users post announcements in emergency situations. Advertisements were also posted and hence administrators employed a filtering strategy to remove non-relevant content. Announcements were posted in the form of emergency management training advertisements. A few administrators took this as an opportunity to promote an emergency management learning task before the training advertisements were displayed to the public on their organisation's Facebook page. Further some administrators believed that just like newspapers, emergency management organisations do not have to announce how they are supporting the public in emergencies, since the public is already aware of the emergency-related activities of such organisations. Other announcements include posting details of real-time satellite images of typhoons, floods and low-pressure areas. Emergency preparedness training announcements, workshops, and international conference announcements, NGO and government sponsored Disaster Risk Reduction program announcements, and hazard related announcements (e.g. earthquake) were other examples of announcements mentioned by the administrators of emergency management organisations.

Self-experience: All seven administrators of emergency management organisations agreed that self-experience was posted on the Facebook page of their organisation. A few administrators shared that other emergency management teams across the region watched their Facebook page to learn strategies that were successfully implemented in emergencies. For example, some administrators shared their experience of implementing early warning systems, conducting emergency management programs and shared participants' feedback about the programs. A few administrators also shared their experience on strategies that failed in emergencies. Thus, sharing the self-experience of emergency management staff helped other stakeholders in handling future emergencies effectively.

Status-update: Five out of seven administrators of emergency management organisations agreed that status-updates were posted on the Facebook page of their organisations. An update includes frequent posts on the details of weather analysis received from radars. Live updates were continuously posted during the recovery of emergency situations. Other forms include updates on a rescue, updates received from other organisations which were then posted on the Facebook page of organisations, updates on early warning and evacuation strategies in the context of an impending typhoon. The updates posted by users during an emergency (e.g. cyclone Pam) were verified and approved by emergency management administrators to stop the spread of false information. Though updates were frequently posted by users, some of the administrators of emergency management organisations were concerned about the reliability of updates posted during emergency situations. Hence some administrators verified the authenticity of updates before posting it on their organisation's Facebook page.

Request: Five out of seven administrators of emergency management organisations agreed that requests were posted on the Facebook page of their organisation. Some requests were for voluntary event participation by the staff of emergency management organisations, whereas other requests were for Disaster Risk Reduction (DRR) trainings. Requests were also posted for emergency management advocacy or public support, training communities or the public in preparation for future emergencies. Some users have posted photos from regions affected by earthquakes and have requested staff to post such photos on other social networking sites such as Instagram. These photos give details of services offered to the public by the staff of emergency management organisations. Specific training requests for Cardio-Pulmonary Resuscitation (CPR) were posted by a few users. Some administrators commented that due to their passion and dedication in the field of emergency management, all requests were given the same consideration irrespective of it being a multi-million-dollar project or a small-scale initiative for emergency management organisations. In the context of professional studies relevant to emergency management, some users posted requests to conduct interviews of emergency management staff. On the other hand, very few administrators considered user clicks on the Facebook posts as requests. It was also evident the majority of requests were focused on the preparedness phase of emergency management.

Criticism: Four out of seven administrators of emergency management organisations agreed that criticism was posted on the Facebook page of their organisation. A few administrators shared that occasionally tornadoes changed directions from their predicted paths and this led to criticism posted by users who had evacuated their houses with young and elderly family members. Some administrators suggested that organisations should be prepared to receive criticisms from users and this should be taken positively in terms of the power of social media. Some minor criticisms posted by users included whether vulnerable persons, people with disabilities, or elderly people had been invited and provided with emergency management trainings. Similarly, some users posted their disappointment over the rehabilitation and recovery programs implemented after a typhoon. Other constructive criticisms posted by users who were not involved in emergency management included suggestions on the need for emergency management organisations to focus on additional issues such as Human Rights issues that may not be directly linked to emergency management.

Recommendation: Five out of seven administrators of emergency management organisations agreed that recommendations were posted on the Facebook page of their organisations. Recommendations were on 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 emergency preparedness kits, and the type of insurance to undertake for emergency assistance.

Greetings: Five out of seven administrators of emergency management organisations agreed that greetings were posted on the Facebook page of their organisation. Greetings took the form of well-wishing, occasionally from the attendees of previous emergency management training camps or those who attended Disaster Risk Reduction Conferences organized by the emergency management organisations. Greetings were rarely received on New Year's Day and other annual festivals. Some administrators shared that greetings were mostly posted on administrators' personal Facebook page due to the professional nature of posts on the emergency management organisations' Facebook page.

Condolence: Three out of seven administrators of emergency management organisations agreed that condolences were posted on the Facebook page of their organisation. A few 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 which indicated how much they cared about emergency management staff. Any incidents in which staff got hurt was also taken as a learning experience by administrators to carefully handle future emergencies since administrators shared the view that if organisations could not take care of their staff on duty, then they were unlikely to attract volunteers. Condolence messages posted by emergency management organisations on the loss of life of emergency management personnel while on duty received great attention from the public. Table 6.1 below summarizes the findings in terms of communication patterns on the Facebook page of emergency management organisations. The "x" in the table given below indicates the presence of content and NA indicates the absence.

Table 6. 1 Administrators response on 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

6.2 Administrators' response to Theoretical Implications

According to the administrators, major theoretical implications of information posted on the Facebook page of emergency management organisations are Information Seeking, Information Sharing (risk communication), 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 of emergency management organisations agreed that Information Seeking was evident on the Facebook page of their organisation. A majority of the administrators agreed that users were mostly seeking information rather than posting

information. Some examples include community leaders seeking training opportunities or users seeking educational resources in emergency management while undertaking a master's programme. Some administrators use the information posted on the Facebook page to reach other emergency management organisations. During a disaster, administrators who were members of a group of thirty-member countries collected information from the Facebook page of their emergency management organisation to support affected regions. A few administrators agreed that among the postings, one third of the readings gets shared, mostly the important ones. Further, two-way communication among users was found to increase, once the administrators started posting follow-up comments on users' postings. According to some administrators, Information Seeking also implied users' interest to learn more about an article or an emergency management activity posted on the Facebook page of organisations.

Information Sharing (risk communication): Six out of seven administrators of emergency management organisations agreed that Information Sharing was evident on the Facebook page of their organisation. Users expect information posted on the organisations' Facebook page to be reliable. A few administrators of an emergency management department (e.g. the firefighting division) shared information on survival and fire prevention tips on their organisations' Facebook page. Others believed that by giving online recognition to those users who posted information on the organisations' Facebook page, the frequency of user postings could be tremendously increased. Administrators also agreed that by posting credible information, the public reaction was largely positive. On the other hand, user reputation was damaged by posting non-relevant or fraudulent information.

Relationship Building: Six out of seven administrators of emergency management organisations agreed that relationship-building occurred on the Facebook page of their organisation. Administrators claimed that conducting emergency management training helped the staff of emergency management organisations to build relationships with attendees. Some administrators shared the view that local public cannot handle emergencies by themselves. Hence building trust among the public is vital which helped organisations to receive requests and monitor emergency situations even from international clients. International conferences relevant to emergency management also resulted in building relationships among users who were physically disabled and

helped them to unite together for future interactions. Organisational visits of members of government, non-government and private institutions working on disaster risk reduction management helped to build relationship among community members. Further, some of the community members were given honorary membership in other disaster risk reduction management organisations through immersion programs. Young community members could build relationship through online groups which was further extended through offline interactions.

Knowledge dissemination: Six out of seven administrators of emergency management organisations agreed that knowledge dissemination was evident on the Facebook page of their organisation. Administrators responded to users' questions on how to prevent mould in their houses after a flood. This was followed by writing a detailed blog by administrators which helped to disseminate knowledge to the public. Other examples include how to work with government organisations and prepare family evacuation and preparedness plans. Users also posted articles on community-based Disaster Risk Reduction, which were easily disseminated and hence those users were given honorary membership in specific communities. Knowledge was also disseminated by offering new courses on emergency preparedness and recovery, posting information on how to use GIS to map locations, cross-posting articles, and how to provide better living standards for children in big cities during emergencies.

Coordination and collaboration: Five out of seven administrators of emergency management organisations agreed that coordination and collaboration was evident on the Facebook page of their organisation. A few administrators indicated that participation in public events resulted in collaboration based on responding to publics' queries on emergency management. Organisations also read the posts of other emergency management organisations leading to information sharing (risk communication) and coordination among themselves. For example, the Zerocasuality project and the Agos project were launched by the Philippines government to combine government action and citizen involvement to prepare the communities for future disasters. Some administrators indicated that collaborative platforms (e.g. Agos project) facilitated coordination and collaboration between government agencies and the public. It also offered help to communities during the preparedness, response, and recovery phases of emergency management. The collaborative platform enabled the flow of critical and actionable information that supported ordinary citizens

to extend help during emergencies. Other examples of coordination and collaboration include communicating with organisations (e.g. Red Cross) for help and posting emergency related information using appropriate hash-tags for efficient sharing of information. A few administrators indicated that some organisations used designated social networking sites (e.g. Rappler) only for disseminating information related to emergency management and thus acted as an information portal for Disaster Risk Reduction Management. Only one of the administrators shared the view that caution must be exercised while attempting to coordinate and collaborate using the information (which are not verified by the administrators of relevant emergency management organisation) posted on social networking sites due to the authenticity of posted information.

Identity Construction (organisational & Individual): Five out of seven administrators of emergency management organisations agreed that Identity construction was evident on the Facebook page of their organisation. Some administrators agreed that the public considered emergency management organisations as an eye in the sky which protected them from emergencies. This created a positive reputation for the emergency management organisations. A few administrators suggested that identity construction was the main objective of their organisations' Facebook page. This was accomplished through resilient community building and working with vulnerable communities for a sustainable society. This also resulted in the visibility of emergency management organisations. On some occasions, individual staff members of organisations received credit for the work they have accomplished during emergencies which resulted in the construction of individual identities. Organisations also created an identity by posting credible information that they received from other organisations (e.g. the Bureau of Fire Protection) for public awareness and knowledge. This was referred as online credibility by some administrators which also resulted in the visibility of organisation in the online public space.

Social Provision: Three out of seven administrators of emergency management organisations agreed that Social provisioning was evident on the Facebook page of their organisation. Administrators 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, this implies the assurance that help can be sought from communities during emergencies. It also provided an opportunity for the community members to

assist those in need during emergencies. Emotional support was also provided by organisations to fellow responders and community workers during disasters. Administrators also agreed that networks established through Facebook provided social provision to those affected by disasters.

Social conflict: Four out of seven administrators of emergency management organisations agreed that social conflict occurred on the Facebook page of their organisation. Administrators agreed that very rarely online discussion on the best practices in emergency management led to social conflict. Occasionally, there could be disagreement on the administration of emergency management tasks between staff members of emergency management organisations. Such discussions were taken offline, and if it persisted were settled through private messaging. A few administrators agreed that online conflict could be a common problem in emergency situations, when multiple opinions were posted by experts in handling specific emergency situations. Further, if non-relevant discussions were started on Facebook, such issues were diverted and discussed elsewhere for settling the issue. Though social conflict was found only to a certain extent, a majority of the administrators have not witnessed social conflict on their organisations' Facebook page. Table 6.2 summarizes the findings in terms of theoretical implications to users. The "x" in the table given below indicates the presence of implication and NA indicates the absence.

Table 6. 2 Administrators response to 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

6.3 Administrators' response on Practical Implications

According to the administrators, major practical implications of information posted on the Facebook page of emergency management organisations are Pre-disaster recovery planning, Unity of Effort, Partnership/Inclusiveness, and Public Information Messaging, whereas a few administrators agreed on Psychological Recovery, and Timeliness and Flexibility. The implications are explained below.

Pre-disaster recovery planning: All seven administrators of emergency management organisations agreed that posts on pre-disaster recovery planning were evident on the Facebook page of their organisation. Administrators agreed that users requested for training courses in pre-disaster recovery planning and other types of courses offered by the emergency management organisations which could prepare them for handling future emergencies. It was also suggested by administrators that due to the implementation of pre-disaster recovery planning strategies and effective

communication of such information to the public, the loss of life has drastically reduced in comparison with past emergencies. It was also anticipated by administrators that though today's natural disasters are more devastating than earlier ones, the number of casualties were limited due to the implementation of pre-disaster recovery planning strategies. For some administrators, the pre-disaster recovery planning helped them to communicate and reinforce to the public what they already knew and provided additional guidance on how to prepare for future emergencies. The administrators also communicated information on the natural disasters that have happened in their area of responsibility, which 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). Some of the good practices on pre-disaster recovery planning (advocacy) were also shared by administrators on a weekly schedule, which included strategies to protect the environment to mitigate future disasters.

Unity of Effort: All administrators of emergency management organisations agreed that posts on unity of effort were evident on the Facebook page of their organisation. For some administrators, unity of effort included the participation of the public from remote areas in emergency preparedness tasks (e.g. earthquake shake drills) by collaborating with emergency management organisations. This also added to the popularity of the organisations among the public. Users who participated in the emergency preparedness tasks also posted information on how they collaboratively accomplished tasks during training sessions. Some users posted information on how emergency management organisations accomplished unity of effort during their information campaigns, extended help to other emergency management organisations and collaborated with other organisations by posting credible information (e.g. flood advisory) on internet platforms (e.g. Agos) for effective disaster response. Unity of effort was also represented by highlighting the efforts of other emergency management organisations.

Partnership/Inclusiveness: Six out of seven administrators of emergency management organisations agreed that posts on Partnership and Inclusiveness were evident on the Facebook page of their organisation. Some administrators agreed that partnership and inclusiveness were accomplished even during pre-and-post-disaster management. By partnering with other organisations, administrators received help from emergency management experts without

incurring financial overheads. Through inclusiveness, emergency management agencies took care of vulnerable communities (e.g. people with disabilities) by identifying those groups with the help of other stakeholders in emergency management. Through partnership, some administrators could liaise with publicly funded international agencies to design emergency preparedness activities. Partnership between emergency management agencies also resulted in building intra-agency memberships. For very few emergency management agencies, partnerships were only formed between their counterparts working in member countries.

Public Information Messaging: Six out of seven administrators of emergency management organisations agreed that posts on public information messaging and the use of technology were evident on the Facebook page of their organisation. Administrators agreed that posts on new types of technologies (e.g. personal tornado detection devices or smartphone messaging using Bluetooth) that could be used during disasters were communicated on their organisations' Facebook page. Some administrators were also involved in the testing of new products that could be used in emergency management. The drawback of public information messaging systems was also discussed; these included limited accessibility of the messaging systems in remote areas and lack of knowledge on how to use the system for some stakeholders. Further, service providers of public information messaging systems posted messages on Facebook and communicated text messages to all users during emergencies. Some public information messaging systems (e.g. Agos platform) were used to crowd-source and communicate critical information from the emergency site for immediate community action. Furthermore, the messaging systems also helped civic volunteers to respond to public emergency calls.

Psychological Recovery: Four out of seven administrators of emergency management organisations agreed that posts expressing Psychological Recovery were evident on the Facebook page of their organisation. A few administrators were successful in receiving accreditation for offering courses on post-traumatic stress disorder, suicidal prevention, and suicidal awareness. Support on psychological recovery were also offered by posting videos, online content and sharing the experience of other communities (e.g. flood victims and rehabilitation tasks) on social networking sites by government agencies and other credible sources. The public also shared their

stories describing disaster experiences (e.g. Great Tsunami of 2004), which helped the recovery of affected people by providing emotional support.

Timeliness and Flexibility: Four out of seven administrators of emergency management organisations agreed that posts on timeliness and flexibility were evident on the Facebook page of their organisation. Some administrators considered timeliness and flexibility in terms of the response efficiency of organisations during emergencies (e.g. response time of five minutes and less than thirty 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 these organisations' Facebook pages. The staff also focused on providing humanitarian aid and acted instantaneously without delay during emergencies. According to administrators, some organisations used the internet platform (e.g. the Agos platform) to coordinate and share disaster related information and to receive help and aid from other emergency management organisations. For those organisations that have international and local collaborators, staff members of the collaborating agencies were already available on the emergency site which facilitated emergency response in terms of timeliness and flexibility. Table 6.3 given below summarizes the findings in terms of practical implications to users. The "x" in the table given below indicates the implication and NA indicates the absence.

Table 6. 3 Administrators response on 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

6.4 Discussion

This chapter reports the results of interviews conducted with the administrators of seven emergency management organisations. According to the administrators of emergency management organisations, the communication patterns evident on the Facebook page of organisations included praise, announcement, self-experience, status-update, and request followed by recommendation, greetings, and criticism. Thus, the interviews helped to test the findings of Phase 1 of this research in terms of types of user-generated content and its implications to the stakeholders of emergency management organisations. Based on the above findings, the rationale to choose interviews as a method to strengthen the findings of this research is justified.

In terms of the third research question on how the flow of information is controlled on the Facebook page of emergency management organisations, a few administrators employed filtering strategies to remove the non-relevant or inappropriate content. For other administrators, although they allowed emergency management training advertisements on their organisation's Facebook page, it was presented after an emergency management learning task that would educate the public

and the viewer of advertisement. Administrators were also keen on verifying the authenticity of the posts from the public since false information or rumours could tarnish the reputation of the organisation. Hence it was suggested that administrators should adopt a workflow for verifying and approving the content for posting on the Facebook page of emergency management organisations. With respect to the flow of information on the Facebook page of organisations, few administrators shared that the public should be allowed to post constructive criticism on the organisations' Facebook page for improving the services of emergency management organisations.

The interview also revealed that self-experience was another type of content that was considered significant by all the seven administrators which was not present to a greater degree in the user posts of dataset1 and dataset2, collected in the phase 1 of this study. All administrators agreed that there were many announcements posted by users and some of them should be filtered since they were commercial advertisements not relevant to emergency management. The analysis also revealed a new type of information (condolence) posted occasionally by users when unfortunate incidents resulted in loss of lives for emergency management staff members. Although criticism was widely present in the user posts of dataset1 collected during the phase 1 of this study, administrators claimed that there was only limited evidence of criticism on their organisation's Facebook pages. Hence, the management of EMOs should devise social media strategies on 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. It could also be further investigated whether recommendations, announcements, self-experience, and encouraging the posting of public opinions could lead to less criticism posted on the Facebook page of emergency management organisations.

The above analysis indicates that communication was prevalent in the preparedness and recovery phases with very limited communication in the response phase. Further, communication on the Facebook page of emergency management organisations indicates that social information (i.e. status update, request, criticism, opinion, recommendation, praise, announcement, self-experience, and greetings) was the most significant, when compared with personal and professional

information. Among the three types of social support (informational, material and emotional), informational (i.e. updates) was the most prevalent social support in the preparedness phase.

Information seeking was one of the implications in terms of requesting for educational or training resources by community leaders. Administrators suggested that information posted on the Facebook page of emergency management organisations was helpful to those users who visited the pages. Alternatively, administrators could refer users who needed more information to visit the Facebook page of emergency management organisations. This implies information dissemination (risk communication) as an implication of posting information. Administrators receive requests to handle emergencies even from other countries and users post such information on the organisations' Facebook page. This aspect indicates that the organisation could build trust with other stakeholders which imply relationship building. Organisations also publish details on the precautionary measures to follow in the recovery phase of disasters. This implies knowledge dissemination. Administrators also agreed that the participation of organisations in public events or the use of computer-based collaborative platforms for managing emergencies facilitated coordination and collaboration between government agencies and the public. Thus, coordination and collaboration are an implication of posting information. Organisational identity is an implication eventuating from posting such information. Administrators also suggested that in the event of a disaster, organisations closest to the disaster were most likely to help since organisations have developed an attitude to help each other for a fast and efficient recovery. This implies social provisions.

With respect to negative implications, an erroneous posting about the direction of a tornado by an organisation resulted in criticism from the public. Thus, with respect to theoretical implications, the interviews established that Information Seeking and Sharing (risk communication), Relationship Building, Knowledge dissemination, Coordination and Collaboration and Identity Construction (organisational and individual identity) were the major implications. Only limited evidence was found with respect to Social Provision and Social conflict.

From a practical perspective, pre-disaster recovery planning was identified in terms of requesting for training and courses that can be offered in preparation for a disaster. Training sessions (e.g.

shake drill) were even offered at remote locations with the support of partner networks, which indicated unity of effort. Due to the lack of training and emergency preparedness in earlier days, one of the greatest risks was loss of life, which has drastically reduced over years. From the administrators' point of view, Partnership/Inclusiveness was demonstrated by receiving help from other experts in the field, supporting vulnerable communities and establishing inter-agency memberships. Collaborative training sessions also resulted in building relationship with partner network members and hence relationship building was evident in administrators' response. To craft messages on Facebook, administrators employed the concept of social currency which implies making the posts interesting to users to lead the discussions. Public information messaging is another practical implication where users post and promote new technological innovations (e.g. Bluetooth) in emergency management. Thus, with respect to practical implications, the interviews established that Pre-disaster recovery planning, Unity of Effort, Partnership/Inclusiveness, and Public Information Messaging were the major implications. Only limited evidence was found with respect to Psychological Recovery, and Timeliness and Flexibility.

The study shows that the benefits eventuating from posting information are coordination and collaboration, identity construction (organisational and individual), information dissemination (risk communication), relationship building, social provisions, and information seeking, whereas social conflict is a detrimental implication.

This finding concurs with one of the main social media strategies (risk communication) of emergency management organisations. Users on the Facebook page of emergency management organisations could connect to a network of users and easily create risk awareness and communicate the same for disaster preparations. The social information (recommendations, announcements, self-experience, and updates) posted on organisations' Facebook page also helped in building a reputation (organisational identity) for the organisation in the context of disaster preparedness. With respect to challenges, the process of filtering content is a major task since users post information which is non-relevant (advertisements and pornographic materials) to emergency management on the organisations' Facebook page. Further, suspicious postings must be checked for the authenticity of content. One of the administrators maintained two channels for communication, an open Facebook page for public communication and a closed Facebook group

for internal communication after significant increase in the number of active users and to protect from vulnerabilities that could damage the reputation of organisations. From a theoretical perspective, the main components of Activity Theory examined in this chapter are the guidelines on posting content on the Facebook page of emergency management organisations. Hence, administrators of organisations should implement workflow to remove inappropriate or non-relevant content.

In terms of technological drawbacks during emergency communication, this study found risk communication was sometimes sent to all users on the mobile network rather than to users only in the region affected by emergencies. Another organisational communication barrier found in this study was the reluctance of certain organisations to provide access to data from their social networking sites. Privacy requirements could be one of the barriers for organisations to share information with other stakeholders.

This study opens a new research stream by examining user-generated content posted by users on Facebook. Though data has been collected primarily from emergency management organisations, this approach can be used by researchers to establish benefits and challenges from spontaneous primary data in other domains. Hence researchers in the field of management can adopt this approach to classify information and establish benefits and challenges. It is evident from this study that Facebook has been primarily used in the preparedness phase of emergency management. Hence, administrators of emergency management organisations who use Facebook should re-examine the practical use of different types of SNSs to choose the best tool in the different phases (pre-crisis, crisis, post-crisis) of natural disasters to maximize the benefits to stakeholders.

6.5 Conclusion

This chapter presents the results of the interview conducted with the administrators of seven emergency management organisations. The research question on benefits and challenges to the stakeholders, communication culture in the three phases of crises, and how organisations control the flow of information on their organisations' Facebook page are addressed in this chapter.

Regarding the flow of information on the emergency management organisations' Facebook page, administrators suggest having a workflow that would review and approve the content posted by the public so that inappropriate or non-relevant content (advertisements or pornographic material for example) could be removed without affecting the reputation of the organisations. The next chapter will discuss the overall findings from the two phases of this study, elaborate on the recommendations of this study and highlight further research issues.

Chapter 7 – Discussion and Recommendations

In this chapter, the overarching themes, patterns of communication and its consequences, communication culture, and information control evident on the Facebook page of emergency management organisations and their benefits and challenges for the stakeholders of crisis management are discussed in practice and theory. Further, recommendations and future research directions are also outlined to conclude this study.

To address the research questions on themes, the overarching themes evident across the collected posts are "Self-preparedness", "Emergency signalling solutions", "Companion", "Aftermath", and "Gratitude". The themes indicate that risk communication and crisis preparedness which are activities in the pre-crisis phase were evident in the communication culture of emergency management organisations. It was also evident that the second organisation has an open communication culture in comparison with the first organisation.

To address the research question on communication patterns, communication evident on the Facebook page of emergency management organisations include status updates, criticism, and requests followed by opinion, recommendation and praise. According to the administrators, announcements and self-experience were present in addition to request, status-update and praise which were apparent on the Facebook pages of emergency management organizations. Administrators of emergency management organisations found it difficult to accept that criticism was found on their Facebook pages. In the context of emergency management, the theoretical implication of status updates are coordination and collaboration, relationship building, risk preparedness and communication (information dissemination), identity construction, and organisational identity, whereas leading a change through coordinated efforts, risk awareness of a disaster resilient community, challenges in communicating risk to the public, building partnership, local capacity and capability to increase disaster resilience, creating individual empowerment and responsibility, volunteering to conduct emergency preparedness program, understanding strategic land use planning are practical implications.

Criticism from users stems from a perceived lack of interest among some officials in conducting emergency preparedness programs, insufficient support after an emergency, lack of support extended for coordinated efforts, inefficient use of public funds in an emergency and unreasonable flood insurance premium. Thus, social conflict is a consequence of occasional lack of coordination and leadership among the stakeholders. The challenges involved in communicating risk to the public are a practical implication. Hence, it is important for the emergency management organisations to develop a risk communication strategy that would empower publics to understand the risk to themselves and to the community.

In general, users in the first dataset criticized the organisation and its services during emergencies. Occasionally, some politicians were also criticized by users for diverting monetary benefits during emergencies. Considering the second dataset, users criticized government policies and initiatives but also behavioural issues on the part of the public when (not) paying attention to emergency warning signals. These users were not criticizing the organisation or its staff, showing that the second organisation has maintained a good reputation among the users. Maintaining good reputation among the public is essential for volunteer based EMOs to attract new recruits and retain existing volunteers who are experts in crisis management. Thus, in terms of situational crisis communication theory (Frandsen & Johansen 2017), based on the communication patterns evident on the Facebook pages of two organisations, ACT SES has maintained its organisational reputation.

Analysis of user posts indicates that theoretical implications of requests are information seeking, risk awareness and communication and coordination and collaboration. The practical implications are importance of risk preparedness, empowerment, taking responsibility for preparedness to handle future crises effectively and capabilities (e.g. communication devices) that support disaster resilience. User posts in the first dataset indicates a lack of cordial relationship and communication between the public and the agency in terms of extending help to the public in emergencies as well as lack of strategic land use planning. Technological barriers in communication, support received from canines during emergency recovery efforts and adopting resilience strategies by insuring assets were other discussions in the first dataset.

In the second dataset, user posts indicated that emergency management staff requested support from the public for sending photos taken during emergencies to develop situational awareness of past emergencies. Other than natural disasters, the second emergency management organisation was involved in disseminating information on missing individuals and encouraged the public to post comments and come forward to give evidence if they had any information about missing individuals. The organisation also requested to maintain the privacy of individuals affected by emergencies while sharing information. Apart from their principal activity, the second emergency management organisation was also involved in logistics operations during emergencies which was disseminated by staff via Facebook.

From the analysis of data on the Facebook page of FEMA and ACT SES, it is evident that those who contribute content on the Facebook page of ACT SES exhibit horizontal individualism by extending individual help (i.e. voluntary service) to the community members during emergencies. Another characteristic that makes this evident is open communication exhibited on the Facebook page of ACT SES. Open communication, as defined by Martins and Terblanche (2003) refers to the open sharing of information and a more horizontal style of communication which rejects hierarchies. On the other hand, it is evident that data posted on the FEMA Facebook page exhibits a lack of open communication and a sense of inequality in the conversation between the public and organisation's staff members which reflects vertical individualism. In most cases, responses from FEMA in response to public queries were very limited which reflects vertical individualism. Thus, ACT SES has a very open communication culture compared to FEMA.

Identifying an open communication culture which reflects the characteristics of horizontal individualism is an original contribution since studies that have examined communication culture from the user-generated content posted on the social networking sites of EMOs are sparse. The specific open communication culture of ACT SES is characterised by:

- Communicating information on participation and offering support to community activities and educational events at schools.
- Communicating information on diversity across EMOs staff members.

• Communicating information on coordination and collaboration among local, regional and international emergency management agencies.

• Communicating information on personal events such as birthday celebrations and engagements.

• Communicating information on the funding received by EMOs to the public.

The benefits of an open communication culture for EMOs are:

• Increasing the volunteer base of EMOs through Community engagement and support at educational events.

• Empowering young generation at an early stage on emergency self-preparedness and communicating risk and awareness to the elderly community members through them.

• Receiving support and expertise from international agencies during major disasters and extend support to local and regional agencies during future emergencies.

• Ensuring inclusivity and multi-cultural support required in emergency situations especially for supporting minority community members.

• Ensuring transparency and maintaining the reputation of EMOs.

In conclusion, the activities of two organisations differed widely in terms of community services other than their principal emergency management activities. This raises the issue of whether it is beneficial for emergency management organizations to make use of social networking sites during crises/disasters? The answer depends on the communication cultures of the two cases, which are very different: FEMA appears to be less open and has a more confrontational relationship to its user-base. This is reflected by its institutional decisions concerning public engagement. In particular FEMA does not accept volunteer labour. As a result, FEMA's use of its Facebook page probably acts more as a drain on resources than a gain. In contrast, ACT SES uses a more open and collegial communication culture and actively seeks to attracts volunteers.

On the Facebook page of FEMA, status update, criticism and request accounted for 89% of the collected content whereas on ACT SES, status update, announcement and praise accounted for 82%. The communication patterns indicate that though Australia and USA are classified as individualistic cultures, criticism and request were widely posted only on the Facebook page of FEMA. On the other hand, announcements and praise were posted on the Facebook page of ACT

SES. This indicates that in spite of the individualistic cultural influence from the environment where these organisations operate, organisational effectiveness in communication through posting announcements and praise have mitigated criticism from the public for ACT SES. This also helped the ACT SES to maintain their organisational reputation.

With respect to benefits and challenges, benefits include risk awareness and communication, coordination and collaboration, information seeking, relationship building, identity (individual and organisational), and social provisions, whereas social conflict and challenges involved in communicating risk and its awareness to the public are the detrimental consequences.

With respect to control of information on the Facebook page of emergency management organisations, administrators are keen on filtering content and administrating workflow for approval of the content since users post information which is non-relevant (advertisements and pornographic materials) to emergency management on the organisations' Facebook page. Further, multi-vocal communication from stakeholders (i.e. public) are encouraged by the administrators since the content posted in an emergency has imminent value for mitigating the effect of emergencies. Data analysis also indicated that the majority of content shared on Facebook was social rather than personal or professional information. In the next section, the theoretical implications are discussed.

7.1 Theoretical Implications

Activity Theory (Engestrom 2001) was used to support the process of posting content on the Facebook pages of emergency management organisations to support the research questions on benefits and challenges to the stakeholders of crisis management and information control on the Facebook pages of emergency management organisations. The different components in the context of this research are illustrated and explained below.

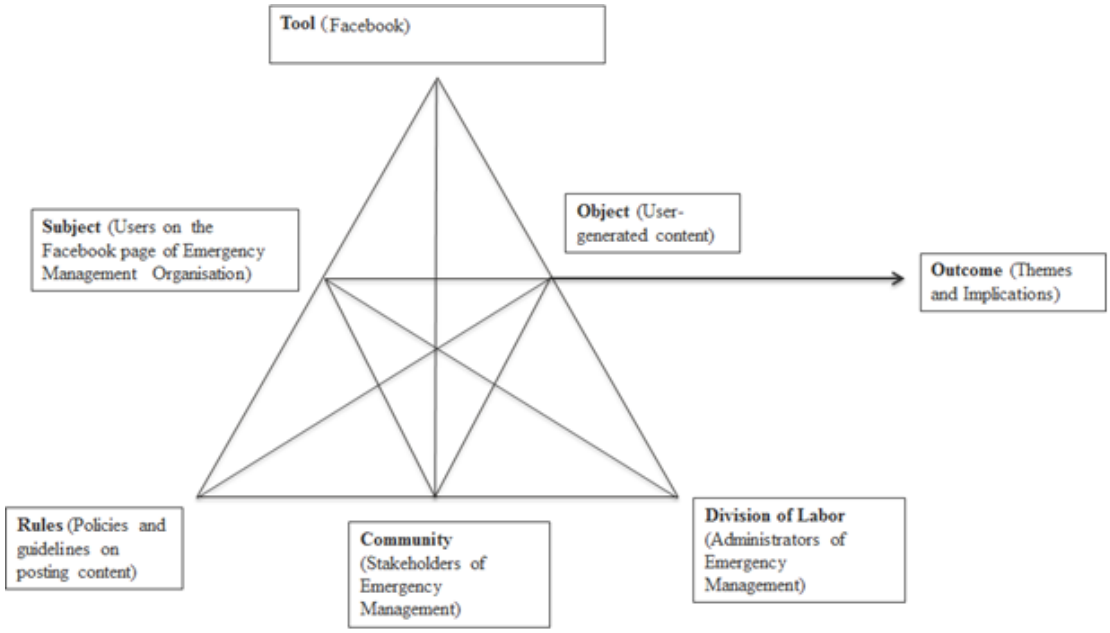

Figure 7. 1 Collective Activity System

1. *Subject to Tools:* Subject includes the users who post content on the Facebook page of emergency management organisations. In this study, it includes the organisations as well as the public who post different types of content such as request, criticism, and status-update. Facebook is considered as a tool and the organisations considered in this study have an open Facebook page for the public to post comments.

2. *Subject to Rules:* Users post different types of content on the Facebook page of emergency management organisations. Some users may post fake emergency incident information which could raise unnecessary alarm among the public. Hence administrators should check the validity of the information before approval and remove the information which does not adhere to organisations' policies. For some critical information, it was also necessary to conduct background check from the user community. It should be noted that criticism posted by users must be carefully monitored and administrators must take it offline if it becomes viral among a community of users. The drawback of keeping the Facebook page open requires administrators to closely monitor the content posted by the public to filter unwanted content (e.g. pornographic content and advertisements) that may damage the

reputation of organisations. This involves additional manpower to administer the Facebook page which is a concern with majority of administrators.

3. *Subject to community:* In an emergency, users who are near disasters are likely to have the most updated information that might facilitate the response or recovery efforts of emergency management personnel or rescuers on the ground. This is evident in the form of updates posted by users on the Facebook page of emergency management organisations. In some instances, organisations post images about a disaster and request other community members to give additional information about when and where such an incident has happened. This also incurs the crowdsourcing power of social networking sites.

4. *Subject to Division of Labour:* Users post information about how different departments participate and collaborate in an emergency. Users suggest that it is advisable for fire-fighters to contact structural engineers while rescuing people from collapsed structures. In another instance, emergency management staff collaborates with other agencies (i.e. state-wide agencies) to handle an emergency which indicates division of labour.

5. *Subject to object:* Users post different types of content on Facebook. Some of the content includes praise, updates, request and criticism. The motivation to post content includes the benefits eventuating from such content to stakeholders. Some of the benefits include risk awareness and preparedness, social provisions, relationship building, information seeking, and, knowledge dissemination whereas challenges include social conflict and additional manpower required to manage the social networking sites of emergency management organisations. The different types of content can be harnessed online using intelligent systems to generate situational awareness in an emergency which could facilitate the response and recovery of disasters.

To the best of my knowledge this is the first study that has examined user-generated content (object) through the lens of Activity Theory in the context of emergency management. The object (user-generated content) considered in this study can be further classified into different types of user-generated content (i.e. personal, professional and social), which are

categories in the information classification framework developed in the literature review chapter (i.e. Chapter 2). Thus, this study contributes to Activity Theory by distinguishing the object component into 3 major categories of user-generated content which are personal, professional and social information. The analysis shows that personal and professional information were very limited, hence the majority of user-generated content was in the social information category. Another benefit of using Activity Theory is its flexibility in segregating active stakeholders into separate activities. For example, if there are considerable amount of engagement (i.e. posts) from other stakeholders such as law enforcement agencies, Rural Fire services, and Ambulance services each of these can be considered as a single activity which provides input into the second activity to establish the benefits and challenges of posts to the stakeholders of crisis management.

Social interactions on SNSs lead to the creation of digital identities (Bozkurt & Tu 2016). Information posted by users on SNSs appears in two modes — profile information and activity information (Gupta & Kaushal 2017). Profile information includes succinct information such as name or date of birth which have a semantically specified meaning, whereas activity information includes contextual information, such as comments. Identity has been defined in terms of explicit and implicit identity (Bolander 2017). Explicit identity is a result of posting profile information, whereas implicit identity was accomplished by posting activities or conversations. Users establish social identity by posting information on SNSs. Moreover, one of the key consequences for users to post or restrict information on SNSs is identity construction. The creation of an identity by posting information is a benefit for users on SNSs. This was also reconfirmed by the administrators of emergency management organisations where organisations create an identity by posting critical information on emergency related tasks. The findings of this study suggest that stakeholders (individuals and organisation) create an identity by posting information on the Facebook page of emergency management organisations. On the other hand, interaction among participants, referred to as social interaction, leads to rewards and costs (Liu, Min, Zhai & Smyth 2016). Rewards result in the creation of positive value for participants, whereas challenges lead to negative value. Participants are more likely to engage in actions that result in the creation of positive value or rewards that lead to user benefits. These notions are in consensus with building relationship among

network connections. The findings of this study also demonstrate that social conflict is a major challenge faced by the users of Facebook in the context of emergency management.

In general, the findings of this study show that the benefits eventuating from posting information are risk awareness and communication, coordination and collaboration, social identity (individual and organisational), relationship building, social provisions, and information seeking, whereas social conflict is a detrimental consequence. Users on the Facebook page of emergency management organisations could connect to a network of users and seamlessly spread knowledge on disaster preparedness. The information posted on the organisation's Facebook page also helped in building reputation for the organisation in disaster preparedness. With respect to challenges the process of filtering content is a major task since users post information which is non-relevant (such as advertisements and pornographic material) to emergency management pages. Further, suspicious postings must be checked for the authenticity of content. One of the administrators started a closed group in addition to the public Facebook page after a significant increase in the number of members and to protect from previous security vulnerabilities that could damage the reputation of his organisation.

7.2 Recommendations

This study opens a new research stream by examining user-generated content posted by users on public social networking sites. Though data has been collected primarily from emergency management organisations, this approach can be used by researchers to establish benefits and challenges from spontaneous primary data in other domains. In practical terms, this study's ambition is to contribute to minimizing the loss of human life and protecting assets in emergencies, thereby facilitating long-term sustainability. This study also validates the generalizability of information classification for social networking sites in the domain of emergency management. Hence, researchers in the field of incident or crisis management can adopt this framework to classify information and establish the benefits and challenges. The benefits of the information classification framework include a systematic classification of information on social networking sites that can be used in domains other than crisis management; identify the type of information that is most prevalent in a domain and its benefits and challenges to the stakeholders; compare the

different types of information to establish if there is any cause-and-effect relationship among the different types of information; identify information and take precautionary measures to limit the reputational damage caused by certain type of information (e.g. criticism) in a domain.

The communication patterns evident in this study can be used as a training dataset for big data processing infrastructure and machine learning algorithms that can support disaster-related damage assessments. This could extend the work of Enenkel et al. (2018) in which the authors found a correlation between online activity and disaster-related damage in the post-disaster phase. Further, Enenkel et al. (2018) found that major beneficiaries of content contributed by the public on social networking sites were the emergency management organisations. Our study extends the work of Enenkel et al. (2018) by examining the benefits of posting content on social networking sites to the public as well as emergency management organisations. User-engagement proposed in the work of Kim et al. (2018a) has been reconfirmed in our study during the interview of administrators of emergency management organisations. One of the strategies for user-engagement include providing online recognition in the form of stars for the best content contributors on the Facebook page of emergency management organisations. Our study also reconfirms existing literature on the information dissemination aspects (Kim et al. 2018b) and the general role of social networking sites in disaster response (Tim et al. 2017). The recruitment of volunteers for emergency services using social networking sites has been discussed in the work of Hugelius et al. (2017) and our study recommends that the open communication culture of emergency management organisations is a potential factor that positively affects volunteer recruitment which is evident in the case of ACT SES. Maintaining a good reputation among the public is essential for volunteer based EMOs to attract new recruits and retain existing volunteers who are experts in crisis management. This finding is supported by situational crisis communication theory which classifies crisis types into victim, accidental and intentional crisis. Organisational reputation will be heavily damaged in the context of intentional crisis type and hence administrators of emergency management organisations should consider proactive ways to retain the reputation of emergency management organisations in such circumstances.

The themes identified in this study are aligned with the core principles of the national disaster recovery framework (Wilkins & McCarthy 2011). The alignment of themes also highlights the usefulness of Facebook in the preparedness and recovery phases of emergency management.

This concurs with the literature on use of technologies in different phases of emergency management (Haddow, Bullock & Coppola 2017). It is also evident that major types of user-generated content posted by users are social information when compared with personal and professional information. There has been very limited evidence on content posted during emergencies and examples of user posts are – "*I have a very bad disaster here (region), we need help, like in the past; we are flooded (region)"*. Hence administrators of emergency management organisations who use Facebook must re-examine the practical use of different types of SNSs to choose the best tool in the different phases of emergency management which would maximize the benefits to stakeholders.

On the other hand, designers of Facebook may consider incorporating other add-on features that would empower Facebook to be used as an appropriate tool in the response phase of emergency management. Such features should enable stakeholders of emergency management to disseminate information on the nearest availability of basic resources (food, water, and medicines) to the people of the affected region during the response and recovery phases of disasters. One of the recent features enabled on Facebook during the response phase of a disaster is Facebook Safety Check (Yadav & Rahman 2016). This feature was enabled during the Nepal Earthquake in 2015 and more recently during the Manchester Attack in 2017 which enabled people to communicate their safety status in emergencies to network connections. Another feature that is being tested is for the Safety Check to be community-activated, empowering the public to activate this feature during emergency situations.

It was also found that user posts did not indicate any evidence of long-term recovery strategies (housing, infrastructure, public healthcare) in emergency management. From a practitioner's perspective, administrators and policymakers can utilize public social networking sites as channels for risk communication and awareness in emergencies. It must be noted that the agency studied here handles emergencies which are primarily flooding and wildfires. But for critical emergencies such as terrorist attacks, information control must be exercised particularly in the response phase of emergency management. This may limit the benefits of any situational information disseminated through social networking tools by enabling opportunistic decision-making for users with bad intention (e.g. terrorist). Information control is supported by the

Communication Privacy Management Theory which describes the decision of individuals to conceal or share information based on perceived benefits and costs. The lessons learned from this study in terms of the usage of public social networking sites in the phases of emergency management could be utilised by government and private agencies world-wide, to plan and enhance their services in the specific phases of emergency management through the implementation of third generation web tools (e.g. Internet of Things).

7.3 Improving Emergency Management

The findings of this study indicate that shared community responsibility is one of the major strategies that must be promoted among stakeholders in emergencies to accomplish disaster resilience. The findings also reveal that the areas that need improvement are lack of individual empowerment, strategic land use planning, and emergency broadcasting capabilities to support disaster resilience. Further, there has been limited evidence of partnership between local and global emergency management organisations, which is one of the strategies for leading a change in disaster resilience. Hence, administrators of emergency management organisations must devise policies to address these issues which could contribute to the long-term sustainability of societies. On the other hand, communication patterns on the Facebook page of emergency management organisations include status-update, criticism, request, opinion, recommendation, praise announcement and self-experience. Hence 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 emergency management organisations. This would also lead to improved disaster resilience in the long-term, through proper pre-disaster planning strategies. Examining the communication patterns also suggests a social media strategy for the administrators to review criticism in relation to other types of information. Hence it must be further investigated whether more detailed or timely announcements, recommendation or opinions will lead to less criticism being posted on the Facebook page of emergency management organisations. By understanding the major types of user-generated content, disaster resilience specialists (i.e. personnel who assist in recovery or counselling) could be scheduled based on user activity and messages on the SNS. Further, to develop situational awareness of disastrous situations from communication patterns on social

networking sites, it is important to motivate users to post rich user-generated content. Some of the strategies that organisations can adopt include online recognition in the form of stars or ratings visible to the entire community of users in a network, which motivates users to post content during the initial phases of crises which are vital in the management of crises.

7.4 Limitations and directions for future research

This study has been conducted only on the Facebook page of two emergency management organisations. Hence, a similar study on video (i.e. YouTube) and micro-blogging (i.e. Twitter) social networking sites of emergency management organisations would help to understand different communication patterns prevalent. Another limitation is that the content posted by the public and the organisation's staff members were not coded separately. One of the reasons for this was that the organisation's post contributed only to 7% of the total collected posts. The subjects (FEMA and ACT SES) studied in phase 1 were not interviewed in the phase 2 of this study which is yet another limitation with respect to accomplishing either data, method, investigator or theoretical triangulation. Several attempts to obtain consent from organisations were not successful due to the lack of systematic policies and procedures for approval in the organisations.

Further, this study has been conducted in organisations in the Global North and in order to generalize results, it would be necessary to conduct this study in different cultural context, such as the Global South, in order to glean new types of user-generated content and the motivations and consequences of posting such content. Further, data collected and analysed in this study were publicly accessible on the Facebook pages of two organisations. Certain kinds of information may be more widely posted privately. Hence examining communications in micro SNSs (within an organisation for examples) and comparing the results with this study's findings would further enrich our understanding the interplay of digital platforms and emergency organisations in the developing field of crisis informatics.

Appendix

Appendix 1 Interview Questions and Verbatim Transcription

- Interview Questions to administrators of the Facebook page of Emergency Management Organisation.

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
    i) Self-experience

3. Explain in a few words by including examples from the Facebook page of your Emergency Management Organisation to justify 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
g) 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 to justify 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 the Facebook page?

9. Thank you.

Interview of ADPC staff member on 17 August 2016

Greetings, casual chat on Weather and the recent flooding in Philippines.

ADPC >> Luckily most of the storms have missed Thailand. We have been pretty lucky. We got some really bad rains a month ago or so, we actually received the most amount of rain in one day for the past 20 years since then it is pretty calm than Philippines and Myanmar.

Jayan >> Do you have the questionnaire or shall I read out the questionnaire which will be much faster? ADPC >> I have the questionnaire in front of me. So if we want to talk about it that is fine.

Jayan >> Introduction of the project, project members and ethics approval from RMIT

ADPC > Are you allowed to tell me how many other organisations are in this study or is this confidential?

Jayan>> We are looking at ACT in Canberra, another one is UNISDR, I have contacted the public information officer. He has given the consent but for the interview I am looking for the dates. We do look at CDP in Philippines and couple of them, but you have been the first in giving the consent for the interview. It takes a bit of time when there is a disaster since organisations are more into helping the people.

ADPC >> we didn't do too much on disaster response and our time is little bit free than.

Jayan >> Q2. explain about the types of information, request for training, praising staff for their help during an emergency, updating the status of an emergency, posting about typhoons in the next 24 hours that we call as announcements, offer not help as criticism, best insurance policy for recommendations, sometimes post with hello, dear etc, in one of FB posts on a member who has lost his life defined as condolences, post on experience they have on field defined as self-experience. This is what has been found in the FB pages of emergency management organisations.

ADPC >> Yes I took some time to review the document before. Just going down the line requests for training we don't see too many of those, sometimes if we post information about the training, those posts tend to be pretty high with the significant number of clicks. People are not requesting for the training but if we post something about it, it tends to get a lot of traffic. I can use an example let me find one example. Give me one moment. Tu tu tu….. I have to. Aaah…should be here….. We have a course on community-based disaster risk reduction and just for example we had a course go out on 24 of July and it got 26 likes and 3 comments. Xxxx I can't see the comments right now.

Actually just in general, our training offerings tend to generate quite a lot, quite a lot of traffic. Now we sort of pretty small organisation, so when I say a lot of traffic, that can be between 10 and 20 clicks, if it gets close to 50 clicks, that is quite a strong quite a strong post for us. Ah… so that's all I can say for request. I can't recall too many people asking for help, but actually posting info. Praise this is one that we see quite often. Whatever we share, some of the initiatives that we have done, people usually usually comments… great initiative, good job, those two are the posts, Ah.. status-update we don't see as many as we would like… from the Facebook group there tends to more people reacting to posts, than xxxx post we do have great amount of announcement but there are, we try to filter out announcements that are specifically kind of, that we would categorize as advertising, in other words, a lot of time people would cut and paste, share a post, just describing a training, and we have created group roles that you can see on the page, that stipulate like, you can post about trainings but you have to open the post with something that would actually teach the person something if they are already in the group , say like x amount of people died from disasters this year, or if you prepare for a disaster or xxx anything that would be some type of xxxx a learning resource, before you talk about your training, we try to recommend that, we actually don't see lot of people doing that. These just frustrates xxxx coming the advertiser. As you said criticism, I can't even recall a time we got any criticism, or other users have got any criticism for that they posted, I would say that's all. Xxx, Recommendations, not really as well, I can't really recall. Ah.. greetings, as far as greetings go, people do sometimes introduce themselves to the group, out of the large amount that we have 10,000 plus, it is also very rare. We found that, I can't recall when we did the study, but we did a study a year ago. To see what type of content that users would like, and most people say they like to read rather than actually post. So I don't know if they are shy, they are … self-conscious or something, they tend to like to read the material rather than post. So almost greetings, condolences, whenever we post about a disaster that is ongoing, people usually kind of engage like well-wishing say like ….xxx your sound okay, your switches, but nobody has posted like I lost a family member or I lost… xxx anything like that. Self-experience…not many. As I said before most people like to read, the content.

Jayan >> Thank you very much. We have done question no 2 and 3. Brief overview of Q4.

ADPC >> sure sure… I think the only thing that I have witnessed is information seeking or sharing. It usually tends to be people who are engaged in some type of master's programme and they are looking for a resource, xxx and not create a post about it. I have been monitoring the Facebook

group for ADPC for almost 2years now. So I couldn't like to get these specific examples, xxx however it doesn't happen so often. It is people looking for specific information usually based on their studies, say community leader who wants to get more involved in DR, they may usually look for training opportunities. Yah, I only seen it may be once where people got in xxx a discussion, not even an argument about some best practices, it does not happen that too often. I think we can leave it there. Again the whole, when I started the group we try to promote the discussion with in the group. However that hasn't taken off the amount that we wanted but we do see a lot of people continuing to joining the group, and group continuing to grow, and it might come down to people becoming more shy. That is the only information that I can provide in the theoretical category.

Jayan >> Let me explain the practical aspects.

ADPC > sure sure.. because with Asian Disaster Preparedness Center, we have a reputation for obviously disaster preparedness. We do have people looking for training courses on (a) Pre-disaster recovery planning, so planning before for disaster, we have people asking questions about mainly on courses and what type of training we can provide. In that regard what I would like to see more is people asking the group if a flood happens what I should do. Other users posting answer to that question. However we have not seen that. It is mostly people asking about the Training courses for what we offer as an organisation

Partnerships and inclusiveness we don't have too many people reach out to us to form partnership and inclusiveness. The Facebook, and for third c, for public information and messages, we usually see lot of posts on users promoting new types of technology that allow for communication during times of disaster. I have a quick look. Xxx some recent ones. And on august 6 there is some post about fire chat that has actually come out from my own research on social media. It a messaging, its a cellphone messaging xxx that uses Bluetooth to communicate. It is local, a local network that you create on blue tooth, and it has the capacity to message people from very long lengths, xxx instead of people using the system, someone shared a post about that. July 31 there was I believe one of our members from Pakistan talked about a government initiative using Twitter as a emergency alert system, so may be for messages he was promoting a government initiative he works for the government and that was what he was promoting it, using twitter as a emergency communication tool during emergencies as well. Xxx July 26, so we see lot of, when it comes to public information and messaging we see a lot of posts around new technologies that being

developed. Around this this type of communication, public information and messaging. And then as far as unity of effort we, the time that we can recall is largely a promotional sense, where if we there is some type of event going on, part of that event is promoting it that to people not in that area can participate. What comes to mind is the shake drill that was done in the Philippines, They had a xxxx a earth quake shake, it was basically at a certain time everyone was supposed to go under the table as if there was an earthquake, and xxx take a picture and share on Facebook, so we had a few posts from some of our members in the Philippines who were promoting that event and trying to get us involved. I would say that those, the participants that I remember posting about that she was actually a member of one of our social media training courses that we did there. So we did have a relationship with them. it sounds like we would say, a regular person in the group, we have past experience as well, may be that influenced her to post on our group page, more than she would just a xxx person, I am not sure xxx xxxx we have seen people advertising unity of effort on our information campaigns on our Facebook Facebook group. Psychological recovery, people supporting, I have not seen in our group. Timeliness and flexibility we have not seen that either. I know if you need some more places to do research, some more areas, there is a great Facebook group, xxx go online.. bear with me for a while …… …. …"typing on the computer"…… I believe it is the Fijian government that does lot of xxxx Facebook activity on their Facebook page. They do a lot especially on their recovery efforts after the tropical storms they were … if you search for Fijian government you could find there, right now it is lot on Olympics. You have to do little bit of digging, once you get closer to the event that happened, you will find it. Anyway we can continue.

Jayan>> We have done up to Q no 5.

ADPC >> Yeah. So we basically try to create messages that have, what we define as social currency which means that we create post in a way that people would find it interesting, and they would not only think that it is interesting, but their friends would think that it is interesting, as well, so by creating this…how can I say… creating a type of post that we think people will take interest in, and also take their friends put xxx interest in and it creates this creates like what to create like what to share on social media, more people will share, more people will see it, more people will click on it something like that. We always try to give people like interesting facts, we try to share, info graphics, video, so we try to present information in a non-technical way and that the majority of people will be able to understand because its kind falls back into risk communication or DR

communication. If it is understandable, people can understand how they can protect themselves, their loved ones in a disaster and then internalize that information and actually be able to learn from it. We always think about the what we call the so what factor so that basically means like presenting information in this interesting way but showing people why it is meaningful. So maybe same how Bangladesh for example how they have invested more in DR over the years and they had a tropical storm, I'm sorry, a cyclone that affected them in 1980s and x amount of people died and then they have the same storm like 20 years later and a very very zero xxx amount of people died compared to that because of what they did in DR. So try to tell a story and show people how DR or any little bit of preparedness can go long way and help to stay wise.

We also like to, go xxx for a quite long time we specifically crafted posts about a certain initiatives for example like community based disaster risk management. We would ask at the end like what type of activities have occurred in your community to help for preparedness. We try to add a question at the end however people did not respond to the question afterwards. So we have not been doing as much as of late. Again, again may be more people looking at the first couple of sentences, they click a link, or people like to read, or they are too shy, they don't have any examples, examples to add, so we have not been doing that as much as of late. But even so we always try to find ways to try to get people to engage in discussion. But however it has not been happening too much as of late.

Jayan >> Benefit for organisation

ADPC >> Yeah I xxx of this, we don't really have any like concrete examples of xxx of real impact of Facebook page. I am sure we can get some xxx reaction to study, some type of poll around it especially if you compare to like some of the initiatives of the Philippines government as xxxx people xxxx they created a whole system around getting people help but responding to the xxx people need and xxx resource twitter and Facebook, we don't have anything compared to that. But what we like to think is that we have created a network of over 10,000 people and by creating this network we are helping that network spreading knowledge of disaster risk management, xxx stay prepared. So just by creating this network we are helping that we are continuing to educate people and we always try to have some type of learning with lot of our xxxx we are helping to educate people and get to Facebook and get their final resources for disaster risk management.

Jayan >> so this network is one of the significant outcomes of using the Facebook so that you got all these people connected and share your knowledge to the most needy people in the society of emergency management, right?

ADPC >> Yeah, I don't know I would label them as the most needy, but we created a network of people with an interest in disaster risk management, and we can provide them with information that hopefully will either help them in a situation, or help them with their studies, or give them a place to go if they want to stay update with ADPC activities, and disaster risk management in general. Because one of the reasons why we wanted to create the group is we want to give only ADPC a place to close to about disaster risk management, also have a place for community members to help xxx to also post about it. That's why even though many people have been doing this, those that do receive that as an accomplishment.

Jayan >> Next cost on cost by posting information on Facebook.

ADPC >> No, no significant cost. The only cost that we would have to, I guess is the xxx time that it takes to manage it. We have about 2 people managing the account itself, one who writes the content, and i will edit the content and make sure that this is what we want to say, but it's not like, we have not spend anything on advertising, or we haven't had any trouble, anything like that, I will say that there was an incident when we created the group a while back where in order to promote a free conversion we did not have any type of a firewall or a filter. For people to post it was a free posting, and that worked for some time, until we have some 7000 people. But then due to some computer virus people were spreading pornographic materials on the website, and also ads like ray bans and …. Stuff like obviously xxx. So that where we decided to have, admins have to approve. I would not say that that affected ADPC reputation or something like that. Even that incident didn't incur any cost for us. But you don't want to associate with that type of material if you are a professional organisation. So that is the only time if something could have hurt the reputation it could have been that. Because it is social media and I find that people on social media understands xxx virus goes around, that type of stuff it was okay. Maybe it would be a different story if we were like a government organisation. But for us it was not a very big incident.

Jayan >> Any fake information posted? Or fake disaster information?

ADPC >> Yeah, so we all because, so part of the filter process, the reason why we came up with that was not only because of that incident but we also kind of wanted to be the gatekeepers of the information, because we were well aware of that false information is spread, me and the other

individual who runs the Facebook page, we always, if anything is directly related to an incident, we will always click on the link and kind of explore what the person is trying to share, and usually we look at the source of the information, so we always try to look for like, official announcements media xxx, any type of information that we believe can be trusted, that is what we will allow into the group page, if it is something that looks even the least bet, may be xxx or may not a person like that we don't post it, because it is funny that that wrong information is a great concern, however we don't see those incidences, incidence too often because most people if they do post something about that disaster is usually share it from a new source, it is not writing it themselves, or they have created some content some info graphics themselves, usually it comes from a UN organisation or International federation of the red cross, or a trusted source like that. We do still get plenty of advertisements that we delete, pornographic material also, xxx also that we delete, as I said before advertisements for training courses, or like other type of posts which are like just straight advertisements and they are shared from another person's page, and they don't leave any text, we don't allow those as well. So there is a fair amount of material which is not related to ADPC or disaster risk management. So we always try to do away with those. I misspoke for a second.

If something is related to ADPC we always allow it. As long as it is not an advertisement that is why we have a Facebook group and a Facebook page. The Facebook page is only straight ADPC, the Facebook group is we share a plenty of other materials from other organisations that is never a problem. It has to be relevant to DR, so of course people can xxx.

Jayan >> All the answers for open or closed group.

ADPC >> The, all these answers it would be, the group has not been open before nearly for a long time, so they are all from the closed group. We, I think you actually mentioned it, since its creation I believe it is been a closed group, just the ability for the people to post without us checking that is what changed around 7000 members. It is always, people are always been hard to request, access to join the group, the reason why we do that is because sometimes not too often there would be people who are pretty xxx with fake account, accounts just created they usually feature like a picture of a model, and something like that and it is obvious that it is not a real person. Xxx so those are pretty easy to spot. And then we decline. I have never declined a person from joining the group, like based on their experience or something like that. If it is a real person, we would allow them to join. So the fact that it is closed group rather than an open group, I don't think that makes a too much difference in terms of people joining.

Jayan >> Thank you. Appreciate your time. Any other questions.

ADPC >> No really, If you need any information about specific posts that you might find whether they were clicked on, shared, you could let me know if I can, if you need any extra information about them, from at least the beginning of this year, may be a little bit before, we been pretty focused on using buffer xxx application for social media management, that also provides some insights, and if you would like to know if it is part of the post it is really great it is very interesting and want to know how many people clicked on, you could let us know, if the information is available we can share it, feel free to continue to browse the Facebook group page to look for any information that you might need and then, yeah, You could keep us up-to-date how the research goes and if whenever your research is done and you find any ways to try to boost the people, I am not sure if you would find a way, but at least you find any information about getting more people to speak up in the group, we also love to hear about that, and again we are learning from this group not only for us but for the community, we would love to increase participation.

Appendix 2: Consent from organisations

Request for your consent

Jonathan Fowler <fowlerj@un.org> 6 April 2016 at 01:37
To: Jayan Chirayath Kurian <jayan.kurian@rmit.edu.vn>

Dear Jayan,

My sincere apologies for this delayed reply. Our team has been extremely busy with the production of the UNISDR annual report.

Please go ahead with the project related to our Facebook page. Given that it's public domain, meaning that you would be in a position to harvest the data with or without formal permission, we don't feel the need to post a disclaimer. We would welcome an opportunity to use your research results (both in-progress and finalised) to help us learn.

The Communications Unit can also help put you in touch with UNISDR staff for the rest of your research, as and when you need.

Please do not hesitate to contact me if you need further assistance.

Kind regards,

Jonathan Fowler
Public Information Officer
United Nations Office for Disaster Risk Reduction
UNISDR
Geneva

Appendix 3: Ethics notice of Approval

UNIVERSITY OF CANBERRA

9 May 2017

APPROVED - Project number 17-102

Mr Jayan Kurian
Faculty of Arts & Design
University of Canberra
Canberra ACT 2601

Dear Jayan,

The Human Research Ethics Committee has considered your application to transfer your research project titled ***"Benefits and Costs of User Generated Content on Social Networking Sites"*** to the University of Canberra.

Approval is granted until 8 May 2020.

The following general conditions apply to your approval.

These requirements are determined by University policy and the ***National Statement on Ethical Conduct in Human Research*** (National Health and Medical Research Council, 2007).

Monitoring:	You must, in conjunction with your supervisor, assist the Committee to monitor the conduct of approved research by completing project review forms, and in the case of extended research, at least annually during the approval period.
Reporting Adverse Events	You must, in conjunction with your supervisor, report any unexpected adverse events or complications that occur anytime during the conduct of the research study or during the follow up period after the research. Please refer these matters promptly to the HREC. Failure to do so may result in the withdrawal of the Ethics approval.
Discontinuation of research:	You must, in conjunction with your supervisor, inform the Committee, giving reasons, if the research is not conducted or is discontinued before the expected date of completion.
Extension of approval:	If your project will not be complete by the expiry date stated above, you must apply in writing for extension of approval. Application should be made before current approval expires; should specify a new completion date; should include reasons for your request.
Retention and storage of data:	University policy states that all research data must be stored securely, on University premises, for a minimum of five years. You must ensure that all records are transferred to the University when the project is complete.
Contact details and notification of changes:	All email contact should use the UC email address. You should advise the Committee of any change of address during or soon after the approval period including, if appropriate, email address(es).

Yours sincerely
Human Research Ethics Committee

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Appendix 4: Publications

Journal

Kurian, J.C., 2015. Facebook use by the open access repository users. *Online Information Review*, 39(7), pp.903-922.

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Conference

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