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## Information Seeking and Sharing During a Flood - a Content Analysis of a Local Government's Facebook Page

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**Abstract:** In times of floodings and other natural disasters, timely and adequate information to the concerned public is vital to delimit damages, avoid panic, or sometimes even to save human lives. Lately, social media, such as Facebook, have become a vital and powerful channel for crisis communication, as a result of its remarkable diffusion. Recent disasters have shown that people turn to local government's Facebook pages for information in a time of crisis. So far, few studies exist about what kind of information citizens seek and share on Facebook when a flood occurs. The purpose of this study is therefore to identify both the citizens' requests for information from local government during a flooding event as well as the information that they share. An exploratory study of the communication on the City of Calgary's Facebook page during the flood in June 2013 was performed. Content analysis of user posting was applied in order to identify recurrent topics. The results show that people in the early (acute) phase search for instructive information that would help them decide how, when, and where to evacuate. Information on road closures, preferably in the form of maps, was also a common request. Moreover, there were frequent requests for adjusting and reassuring information on the quality of the drinking water. Throughout the event, many also displayed an altruistic behavior as they wanted to know how they could volunteer or donate utilities to the victims. This was the most predominant theme in the user postings along with expressions of gratitude to the city's mayor, emergency workers and volunteers. It is also apparent from the number of user postings that people turned to the Facebook page to seek for and share information in the initial stage of the flood.

**Keywords:** Social media, Facebook, Disaster management, Flood, Crisis Communication, Content analysis.

### Introduction

There is an ongoing debate whether natural disasters such as floods, droughts, heat waves, and tornados are in fact increasing in number and severity, and if so, if climate change is the reason for it (IPCC 2012). Regardless of the conclusions, there is a constant need to improve disaster management to prevent, predict, and handle the events that do occur. In 2013 alone, a number of severe floods took place. Major floods developed, for example, in eastern Australia in January, in Central Europe in late May-early June, in North India and Alberta, Canada in June and in Colorado, USA in September (FEMA 2014; GDACS 2014).

Once a flood or any other natural disaster strikes or is highly likely to occur, it is essential to reach as many of the public as possible with timely and accurate information to protect people and property, avoid panic or even to save human lives. Prior to the Internet, traditional media such as printed newspapers, television and radio were the main sources of mass communication in a time of crisis. Lately, social media such as social networks (e.g. Facebook), blogs and microblogs (e.g. Twitter) have emerged as complementary channels for crisis communication (Coombs 2012). Social media with its user generated content and high degree of interactivity have enabled individuals to "freely send, receive, and process content for use by others" (Aula 2010:43), also during the course of a disaster. However, there are also challenges involved in the use of social media as channels for crisis communication, such as how to control that mis(and dis)information and rumors are not spread (Coombs 2012) or how to know what information the public request.

Although there is a growing body of research about social media and crisis communication, few studies have analyzed the information content from the users' perspective. In the light of the frequent flooding events, this study redresses this lack by providing a basis for developing guidelines to be used in local governments' crisis communication on Facebook as well as for future studies in the area. The aim of the study is to identify predominant information needs in the course of a flooding event, or more specifically to investigate *what kind of information the citizens share and request at a local government's Facebook page during a flood.*

### Literature review

There are still relatively few studies that have focused on the information content of local governments' Facebook pages during a flood. However, research about social media for crisis communication in general has

rapidly gained ground in recent years. The literature review is divided into two sections: social media usage in crisis communication and information seeking during a disaster.

#### *Social media usage in crisis communication*

Few innovations can match the rapid diffusion of social media, such as Twitter, Facebook, Instagram and lately Google+. Especially Facebook has had a remarkable uptake, both among individuals and in recent years also among organizations. In some countries more than half of the population is Facebook users; e.g. Sweden and UK (Internet World Stats 2013). Facebook has become deeply interwoven in the daily lives of many people. Especially young people often visit Facebook every day or even log in habitually every time they open a web browser (Denti et al. 2012). Although there are differences between countries and ages, the trends are clear that social media are becoming ubiquitous, a development that is facilitated by the increased use of smartphones.

In the wake of the massive popularity among the public, governmental agencies are recognizing Facebook's importance as a communication channel. Organizations strive to reach their target groups and to be "where they 'live' online" (Hanna, Rohm & Crittenden 2011, p. 265). Governmental agencies at national, regional and local levels are therefore now incorporating social media with their daily operations. The simplified opportunities to ask questions, request or present information, give comments and criticism can help increase citizen participation and e-democracy (Aula 2010; Bertot, Jaeger & Grimes 2010) and strengthen the organization's identity and relationships with their stakeholder (Ayu & Abrizah 2011).

Also in crisis communication it is important to use social media. Facebook, for example, might be particularly convenient for the users as they are presented with the news feed without having to search for crisis information on different websites (Bird et al. 2012). However, it is vital to have established a presence in these channels *before* a crisis occur (Coombs 2012). An already ongoing communication increases the credibility and authenticity of the organization's crisis information (ibid.). Earlier studies show that social media effectively can support information sharing and communication during a crisis (e.g. Tyshchuk & Wallace 2013). Social media may facilitate the public's engagement in information milling, in obtaining necessary aid, and receiving accurate information. The use of social media might also reduce the number of non-emergency requests by telephone, thus allowing for more efficient use of emergency resources (Tyshchuk & Wallace 2013). Also, social media like Facebook may enable two-way communication between disaster response teams and the public, where the latter acts as information brokers that gather and spread relevant information from different sources (ibid.). Well managed, Facebook communication can even strengthen an organization's relationship with its followers in a time of crisis (ibid.).

There are obviously also risks and drawback with the usage of social media for crisis communication. First of all, social media cannot replace other channels such as television, radio and governmental websites. Even if there has been a steady growth in social media users, many people are still not to be reached this way. Second, not all social media are suitable for crisis communication and also those that are, have their flaws as they were not initially intended for this type of usage (Reuter, Marx & Pipek 2011). In addition, Coombs (2012) stresses the need for having adequate resources to handle the increased requests for information that rises during a crisis, as the presence in social media also brings expectation for interaction. However, perhaps the greatest hazard is the risk of inaccurate information. The information flows need to be thoroughly monitored to detect incorrect or improper user postings that might cause rumors or criticisms (Aula 2010; Coombs 2012). Tyshchuk and Wallace (2013, p. 809) emphasize that:

*During extreme events, the public craves information and it is vital to provide accurate information to the public in order to facilitate the appropriate protective action. Emergency managers need to continuously monitor the information flow on social media, specifically the emergency relevant inquiries generated by the affected population.*

Erroneous information or rumours have occurred during earlier events, especially during the most acute phase (Bird et al. 2012). Oh, Agrawal and Rao (2013, p. 421) stress the need for prompt response systems, managed by the emergency response team, that "[...] refute the wrong information and provide citizens with timely, localized, and correct information through multiple communication channels [...]". However, there also seems to be a 'self regulating' mechanism in social media where the community assists the official moderators in

quickly correcting any wrong information (Reuter et al. 2011). Vieweg et al. (2008) call this “socially-produced accuracy”.

#### *Information seeking during a disaster*

Crisis and disaster information need to be timely, accurate, unambiguous and localized (Oh et al. 2013). An organization need to respond quickly, present consistent information (“speaking with one voice”) and to disclose all the information the stakeholders need to know (Coombs 2012). Crisis response content can be divided into instructing information, adjusting information, and reputation management (ibid.). Instructing information is vital when a crisis may endanger the lives of humans. They then need to know how the crisis might affect them and what they need to do for protection. Adjusting information helps people coping psychologically with the crisis by, for example, explaining what has happened. Reputational management finally, concerns the repairing of relationships that might be necessary after a crisis.

Relatively few studies have focused on the information content on Facebook pages in general, and particularly on the information content on governments’ Facebook pages in time of flooding. Ryan (2013) however, interviewed 27 citizens from two Australian communities that had suffered from two recent floods about how they got information and what information they were seeking. Four groups of information sources emerged; other people, media, the internet, and official agency channels. While the information-seeking behaviour regarding choice of source varied between the respondents that had suffered from a slow developing flood and the respondents that had experienced a flash flood, the information sought was similar. The prevailing need was to get information on what was happening and when the flood would peak, hit or reach the whereabouts of the interviewee and how this would affect them. Also, many people were concerned about their family and friends. Furthermore, people were seeking information regarding road closures, how workplaces fared and when the electricity would be functioning again (Ryan 2013).

Bird et al. (2012) performed an online survey of the use of Facebook pages during the floods in Queensland and Australia 2010/11. In line with Ryan (2013), they found that the most common reason for usage was to get information on their own community, followed by the wish to get information on family’s and friend’s communities. Two additional motives were to share information or to offer help (Bird et al. 2012). Practically all of the respondents in Bird et al.’s (2012) study found the information on Facebook useful. Bird et al. (2012) argue that Facebook (p. 32) “can be used to effectively and efficiently disseminate emergency information on: the occurrence of hazards; location of evacuation centres and road closures; fundraising opportunities; volunteering; and reassuring people about the safety of family and friends”.

Tyshchuk and Wallace (2013) studied the use of social media during the 2011 Japan tsunami in a small Californian community that was also affected by the tsunami. A Facebook account was set up that was effectively used to disseminate warnings to the public as well as to correct inaccurate information provided by the national media. Also, social media were utilized to confirm information by placing inquiries. Furthermore, people sought information about how to get emergency aid. Tyshchuk and Wallace conclude that people during extreme events use social media to gather information about the risks and how to take protective actions. Earlier research thus indicates that Facebook may serve an important role in citizen-government communication, also during a disaster. Reuter et al. (2011) however, claim that Facebook is problematic in the sense that some organizations use it as a broadcasting service, and subsequently do not seize its potential for two-way communication.

Finally, while not studying information seeking during a disaster the study of Magnusson, Bellström and Thorén (2012) indicates some expectations on governmental information on Facebook in general. Their study of a Swedish municipality’s Facebook page showed that the users requested information from the municipality about different matters. The users also reported service breakdowns (e.g. water leakages), shared useful information and appealed for new (or existing) services. Moreover, it was common both that users praised the municipality and that they posted complaints. Furthermore, many of the posting were categorized as “identity or community building”.

## Method

The communication on The City of Calgary's Facebook page during the Alberta flood in June 2013 was selected as a suitable case to study. Although there are shortcomings in using a single case, Yin (1994) recognizes that single cases can serve as foundation for future studies of the same phenomenon in other organizations. The city of Calgary was chosen as it was believed to be 'information-rich' and "manifest the phenomenon of interest intensely" (Patton 1990:171). Calgary had recently experienced a severe flood that was intensely discussed on the city's official Facebook page. Data were collected by content analysis of user postings. Content analysis is well suited for identifying recurrent themes in textual material (like user postings) as it "takes a volume of qualitative material and attempts to identify core consistencies and meanings" (Patton 2002:453).

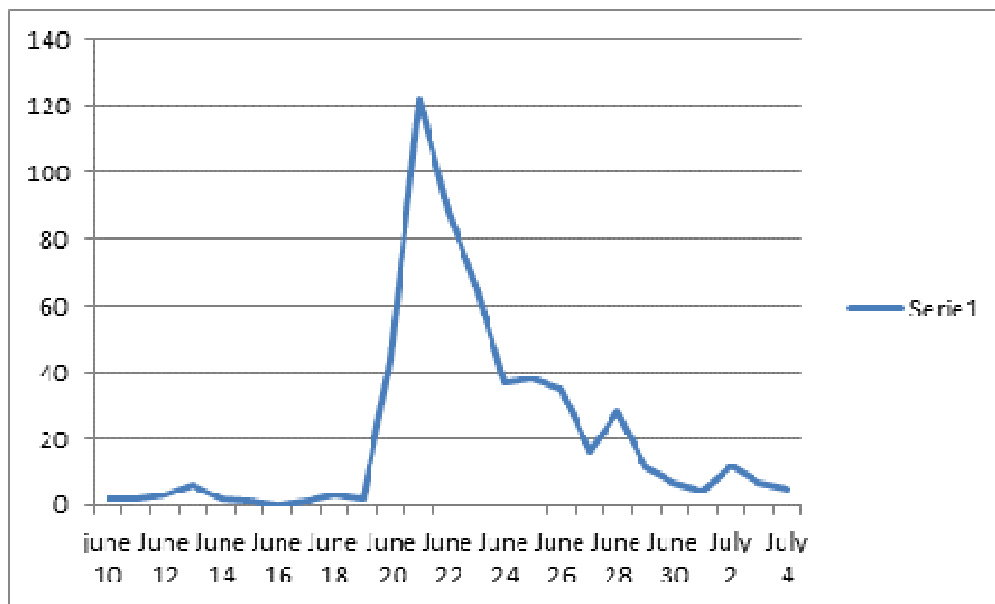
Postings from 15 days, from June 20 to July 4 were written out and analysed in an iterative coding procedure. The data sampling period corresponded to the period during which a local state of emergency was declared. An open coding process was applied in order to identify, code, classify and categorize the content into themes (c.f. Patton 2002). Depending on the content, a posting was categorized into one or several themes. Furthermore, other peoples' comments on the user postings were briefly read to check for significantly different themes. Also, the comments were briefly checked to see how the city responded to user postings.

## The City of Calgary/Alberta flood incident

In June 2013 the Alberta region in Canada suffered from weeks of heavy rainfalls. This culminated in flooding of several parts of Alberta, including the city of Calgary. A local state of emergency was declared in Calgary and twenty-six communities were evacuated, affecting 111, 000 inhabitants (The City of Calgary 2013). This was the largest flood in in the city's modern history (ibid.). On June 24, three days after a state of emergency was declared, there were approximately 24,800 people that 'liked' the city's official Facebook page and that thus were able to see the postings in their news feed on Facebook.

## Results and analysis

An intense communication took place with a total of 520 user postings identified (accessed in December 2013). The users' activity were most intense on June 21 and 22, see figure 1, and then reverted to approximately the same level as before the flood in a week. Several themes or topics for discussion were discerned in the user postings. The most recurrent themes are presented in table 1. However, two identified themes are not included in the table as they were considered not to be applicable to further studies, namely comments on a recent tax surplus and comments/questions regarding the city's website that 'crashed' due to the intense traffic. Moreover, it was considered not feasible to categorize postings containing only photos along with posting with an unclear meaning. Almost 14 % of the postings were therefore labelled as "other".



**Figure 1:** Frequency of user postings before and during the state of emergency

**Table 1:** Identified themes in user postings

Themes	Description
Road closure	Information on which roads and bridges that were closed and open
Public transports	Information on functioning of, and changes in, public transports
Power Supply	Information on power outage
Specific area information	General information on the status in a specific area
Evacuation	Information on proclaimed abandonment of homes and businesses
Re-entering home	Information on when to re-enter and how (rules and advice)
Drinking water quality	Information about the quality of the tap water
Water restrictions	Information regarding proclamations to save water and “violations” of these
Volunteering	Information on how to assist in the emergency response work, i.e. with carrying sandbags or in the clean-up
Housing	Information on places to stay for the victims of the flood
Donations	Information on how to donate food, clothes, money and other utilities
Pets or animals	Caring for pets and animals
School closure	Information on the closure or opening of schools
Workplace status	Information on whether the workplace is open and possible to reach
Praise	Expressing gratitude to the city and/or volunteers
General Greeting	Wishing people to stay safe and statements of fellowship
Complaints on the city	Expressing criticism of how the city handled the disaster
Complaints on others	Expressing criticism of the actions of others
Regular services	Information about governmental services (e.g. emptying of garbage cans)
Marketing of businesses and events	Businesses offering their services or information on up-coming events
Requests for help	Asking others for assistance (e.g. with evacuation)
Family and friends	Concerns about family and friends

An apparent theme, consistent with Bird et al.'s (2012) findings, was the desire to help fellow-citizens. One of the very first user postings asks, “Do you need volunteer labor to help sandbag?” Almost every fifth posting expressed a desire to help out (by volunteering, donating etc.). People especially wanted to know how they could volunteer in protecting and restoring the city. An interesting finding was that a successful grass root initiative that connected requests for volunteers with volunteers, called NYC Helps, was formed from a Twitter message and forwarded to the Facebook page. Dedicated forums were created also to offer housing and these were frequently referred to on the Facebook page. One was a Facebook group called “I have space!”. The group was formed early and attracted a large number of members in a short period of time. Several users also wanted to donate clothes, furniture, toys, other utilities or money. This topic too resulted in separate social forums as did initiatives to take care of pets and search for their owners.

Another common theme was to praise the city's emergency workers and volunteers. More than 10 % of the postings conveyed satisfaction with how the disaster was handled. In particular, many expressed their gratitude to and admiration of the mayor. Naturally, there were also complaints, although not in great numbers. Only about 2 % of the postings were critical of the city. People were more annoyed with businesses that raised their prices during the disaster or the conduct of other citizens. An issue that caused irritation was non-compliance with the water restrictions. The watering of lawns (!), use of fountains and washing of cars were criticized in the user postings:

*Love how there is a water restriction on right now AND my neighbour is washing his perfectly clean vehicle that has been sitting in his garage...can you say rude!!!*

About 15 % of the postings concerned infrastructure such as the closure of roads and bridges, power supply, public transports and the general condition in specific areas. Especially maps were requested. The results show that it is vital that this information is updated often and that the time of the update is clearly specified. Peoples' need for timely and reliable information on infrastructure was apparent also in the studies of Bird et al. (2012) and Ryan (2013).

Other areas of concern were the evacuation and re-entering of homes and businesses. People were also worried about the quality of the drinking water. Although the city kept reassuring people that there was no need to boil the water, the question was still raised frequently. This may exemplify the need for what Coombs (2012) calls 'adjusting information'. Further topics of concern were the status of regular services such as garbage collection and the closure of schools and workplaces. Mainly towards the end of the period there were also examples of enterprises marketing their business in relation to the recovery and clean-up efforts. Notably, only a handful of the postings came from people that requested help (e.g. with evacuating) or were concerned with the safety and whereabouts of family and friends (c.f. Bird, Ling & Haynes, 2012).

In addition to identifying themes, different usages also emerged. The predominant usage was to *request information* (nearly 45 % of the postings) while approximately one out of eight postings was *sharing information* (e.g. about road closure). Moreover, a small number of people used the Facebook page to *express opinions* on matters related to the flood, for example, how a recent tax surplus should be used. Several postings also had the character of *community building*. As mentioned earlier many praised the city and the volunteers, others posted general greetings to "stay safe" or statements such as "I'm so very proud to be a Calgarian". The phenomenon of using the local government's Facebook page to strengthen and confirm the community (and/or the own identity) was apparent also in the study of Magnusson et al. (2012). Furthermore, in line with the findings in Tyshchuk and Wallace (2012), there were also examples of people acting as *information brokers* or using Facebook to *confirm information*. Finally, it may be noted that users continuously kept on answering others' questions. The City of Calgary responded to some of the postings although not frequently, and particularly not during the first days of the flood.

### **Conclusions and discussion**

The results of this study support earlier studies regarding the need for information on infrastructure issues, such as road closure, power supply and public transports. Any city or municipality ought therefore to be prepared to quickly distribute, and frequently update, this type of information when a natural disaster strikes, preferable also in the shape of (correctly time stamped) maps. What were not mentioned in earlier studies were peoples' concerns about the quality of drinking water, perhaps because many countries are used to bottled water. The results of this study show that it is vital to provide information on drinking water quality recurrently. Organizations should also be prepared for questions regarding 'everyday life' such as if schools and workplaces are closed and for how long.

A striking finding is that people want to help out, rather than being passive observers. This supports the results of Bird et al.'s (2012) study. An interesting observation is that discussions and needs expressed on the Facebook page regarding how to help out, quickly became dedicated "spin-offs" into separate Facebook groups or similar. This self-organizing mechanism among the users most likely helped the city to keep its Facebook page manageable, while people interested in a particular topic easily could spread and find information in the dedicated fora. A conclusion of this study is thus that the public wanted nothing more than to help their fellow citizens and Facebook provided an efficient means to organize their efforts.

Although the majority of the postings requested information from the city, there were also many examples of information sharing and (fulfilled) requests for confirmation of information. As in the study of Magnusson et al. (2012), there were also plentiful examples of community building efforts that may serve not only to strengthen the citizen-government relationship (Tyshchuk & Wallace 2013) but also as 'adjusting information' that help people cope with the disaster (c.f. Coombs 2012). These examples illustrate the benefits of Facebook as a channel for crisis communication as does the significant increase in user postings during the first days of the event. However, this study also partly confirms the concerns of Reuter et al. (2011) namely that Facebook often are used by organizations mainly as a broadcasting channel rather than for two-way communication. Only a few user postings were commented on by the city of Calgary during the first 3-4 days. This shows that it is difficult to handle the onslaught of questions in a sudden disaster even if an organization ideally should be prepared (Coombs 2012). The city may also have decided to answer in other ways, e.g. in media interviews, in the city blog, at the website or as status updates on the Facebook page. Furthermore, other users often answered the requests for information. The city's strategy seems to have been to communicate mainly by status updates referring to postings on the city's website or news blog, thereby ensuring consistency or what Coombs (2012) calls "speaking with one voice". The numerous postings expressing gratitude to, and pride in the city's emergency management indicate that this was a successful approach.

### Limitations and further studies

There are several limitations to the study. First, the empirical data only consist of user postings during one event and from one organization's Facebook page. Other governmental Facebook pages in the area might have been equally, or more used for government-citizen or citizen-citizen communication during the event and contain other type of requests. Some themes may thus have been handled 'elsewhere'. Also, only user postings, and not comments on user posting or the city's status updates, were included for in-depth analysis. The empirical data were gathered several months after the event took place and some of the postings may have been removed, for example, if the content for some reason had been deemed to be inappropriate. Furthermore, the coding was performed only by the author. Finally, it is reasonable to believe that peoples' need for information, and thus the information content at governments' Facebook pages during a natural disaster will vary not only over time but also with the severity of the event and the preconditions in the local context (e.g. physical infrastructure, resources, demographics).

In order to suggest guidelines for organizations' Facebook communication during a flood, further studies are needed. The identified themes need be further grounded in empirical data. Also the content in the government's status updates and the reactions/comment on these ought to be analyzed to get a more complete picture. It may also be fruitful to compare the frequency of themes at a certain time with the timeline of the flood to see if it is possible to predict what questions will arise and when.

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