How People Affected by Disaster Use the Internet: A study of Facebook Usage during the 2014 Hazelwood Mine Fire in Victoria.

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Abstract

This study examined how people affected by a 2014 mine fire in the Australian state of Victoria utilised Facebook. The aim was to ascertain if there are certain common things people affected by disasters do on the Internet regardless of where they live, what Internet tool they are using, or type of disaster they are facing. Content analysis was done on a Facebook page about a Victoria mine fire to determine if it was used in a manner similar to how an Internet forum was used following a 2008 earthquake in China. Results revealed that the Facebook page was used to share information, seek information, criticise, express anger, show support, and in other ways similar to how the Chinese Internet forum was used. These findings reveal that commonalities may exist in the way people use the Internet in response to disasters. This illustrates the need to develop a model of how people use the Internet in disasters and test the model by examining disasters in various countries.

Keywords: *social media, Australia, China, Facebook, fire*

Introduction

How ordinary people who are not disaster management professionals use the Internet in times of disaster is a topic that has received significant research attention. For example scholars including Sinnappan, Farrell and Stewart (2010) and Acar and Muraki (2011) have examined how people used Twitter during disasters. In these particular studies, one issue remains under-examined: whether there are commonalities in how people affected by disasters use the Internet. For example, whether there are there certain things disaster affected people do on the Internet regardless of where they live, what Internet tool they are using, or type of disaster they are facing. This was the issue the current research examined. This paper describes a study that analysed people's use of the Internet in two very different disasters: a 2008 earthquake in China and a 2014 mine fire in Australia. The aim was to ascertain whether commonalities exist in how people in the two countries used the Internet when responding to a disaster. The paper opens with a review of literature on how ordinary people use the Internet in disasters. The research questions are then outlined, the methodology is described, the findings presented, and implications as well as limitations are discussed.

Literature Review

Since the Internet's rise in popularity in the 1990s, researchers have sought to understand how people use it in response to disasters and crises. An event that spurred research on this topic was the 2001 World Trade Center attacks. Rainie (2001), for example, found that after the attacks, people used email and forums to grieve and discuss. Spiegel and Butler (2009) also found that blogs were used to share experiences and news. Researchers have also explored how people impacted by the 2004 Indian Ocean tsunami and 2005 Hurricane Katrina used the Internet. Ramos and Piper (2005) revealed that those affected by the tsunami used blogs to provide information on missing people and share observations. Macias, Hilyard, and Freimuth (2009) discovered that hurricane survivors used forums to provide emotional support while Barak (2010) found that the Internet was used to share resources, express emotions, locate the missing, and obtain mental health support, during five disasters that occurred between 1998 and 2009.

The popularity of social media websites has prompted research on how these websites are used to respond to disasters. Most of this work has focused on Twitter. Sinnappan et al. (2010), for example, revealed that during 2009 bushfires, Victorians tweeted to announce fire locations, seek information, and express emotions. Kongthon, Haruechaiyasak, Pailai, and Kongyoung (2012) found that during floods in 2011, Thais tweeted to

ask for help, provide information, and complain. After the Fukushima disaster, Acar and Muraki (2011) discovered that Twitter was used to express uncertainty and seek information to reduce uncertainty.

Despite the numerous studies that had been completed, Palen et al. (2010) argued that more research was needed because gaps exist in our understanding of how people use the Internet in disasters. One issue which is still not well examined is whether commonalities exist in how people affected by disasters use the Internet. For example, whether there are certain similar things disaster affected people do on the Internet regardless of where they live, what Internet tool used, or what type of disaster they are facing. Understanding this question can help construct a theoretical model of how people use the Internet during disasters. The current research heeded Palen et al.'s (2009) call and sought to identify commonalities as well as differences in how the Internet is used in different disasters.

Method

To determine if there are common things disaster affected people do on the Internet, the first step was finding a study on Internet use during a disaster that was done in a unique setting. A conference paper by Qu, Wu, and Wang (2009), on how people used an Internet forum following an earthquake in China, was one such study. The researchers examined how Tianya, China's 12th most popular website, was used after a 2008 earthquake in Sichuan. Tianya is a forum where a user can start discussion about an issue by writing a statement that other users can respond to. The statement and the responses it may elicit are called *threads*.

Qu et al. (2009) began by scanning 4300 threads created during the first week after the earthquake. They found that those affected by the earthquake created threads that could be classified into several categories. Having identified these categories, they examined whether the categories could be found in 100 random threads. After this analysis, the list of categories was refined and used to examine an additional 50 threads. After this analysis, the researchers agreed that the categories were indeed representative and they then proceeded to examine 2266 threads. They concluded that those affected by the earthquake created threads that could be classified into the 16 categories detailed in Table 1.

Table 1
Threads Created on Tianya Forum After the 2008 Sichuan Earthquake

Type of Thread
Information sharing: information provided to forum readers.
Information seeking: question is posed to forum readers.
Information gathering and integrating: information compiled in accessible format for readers.
Criticising: individuals, government, or others criticised.
Other opinion: opinion provided or sought without criticising.
General action: action proposed to the general public.
Individual action: individual declares that action has been taken or will be taken.
Coordinating action: attempt to organise group action.
Expressing emotion: feelings such as anger expressed.
Emotional-support: emotional support is demonstrated.
Sense-making: attempt to interpret or understand the disaster is made.
Moderation: post about how forum is moderated.
Norm-shaping: an attempt to shape forum behavior.
Flaming: anti-social attack on a person or group.
Trolling: anti-social message taunting readers.
Off-topic: message unrelated to disaster.

The researchers also found that most threads created in response to the earthquake were information-related (37.3%). The rest were opinion- (32.1%), emotion- (14.2%), action- (10.7%), and moderation- related, norm-shaping, or anti-social (5.7%). They also found that most information and opinion-related threads were created at the beginning of the disaster while most action and emotion threads were created later. The researchers speculated that immediately following the earthquake, people would have been interested in learning what happened. Hence the prominence of information threads. Qu et al. (2009) also suggested that, as the disaster progressed, people would have become more comfortable expressing emotions, calling for action, and criticising.

The researchers found that the most viewed and replied threads concerned information integrating and information gathering. Opinion-related threads ranked second in views and replies. The third category was action-related, and emotion-related threads ranked fourth. Threads that aimed to reshape forum norms ranked last in views. To explain why some threads were more popular than others, Qu et al. (2009) suggested that people valued threads that provided information and were less inclined to value threads where people simply expressed emotions.

A limitation of the China earthquake study is that it only examined threads created in the week after the earthquake. Therefore, it provided only limited insight because disaster, response and recovery efforts can last many months. Analysing how Tianya was used months after the earthquake could have provided more insight regarding Internet use during disaster. Despite this limitation, the study is a good starting point for understanding what people do on the Internet in response to a disaster.

The second step to determining if there are common things disaster affected people do on the Internet was finding a contemporary disaster that could be analysed using the framework developed in the China study. This would allow the current research to see whether thread categories identified in China could also be found where people used the Internet in response to a disaster in another country.

To ascertain whether the findings from China were relevant to other contexts, a recent disaster was chosen to be examined. This disaster was the 2014 Hazelwood mine fire in the Australian state of Victoria. The fire began on February 9 and transformed into a disaster when it spread into a large coal mine operated by a multinational company. A key threat from the fire was posed by toxic fumes which placed local towns at risk. In response, residents in these towns were advised to stay inside, schools were closed, and voluntary evacuation was provided for vulnerable individuals. As the fire burned for weeks, residents grew frustrated and created a Facebook page titled 'PROTEST: Disaster In Latrobe Valley to pressure the government and GDF Suez'. The page was used to organise a day of protest that was attended by over 1200 people (Green, 2014).

Five research questions were drafted, to determine whether findings from the China study also applied to how people used Facebook as a response to the Hazlewood mine fire. Research question one was: on a Facebook page created by people impacted by the 2014 Hazelwood mine fire disaster, were information related, opinion related, action-related, emotion-related, sense-making, community building, and anti-social threads present? Research question two was: were there other threads present that were not identified by Qu et al. (2009)? Research question three was: what thread(s) was/were most prevalent at the beginning of the disaster? Research question four was: what thread(s) was/were most prevalent in the later days of the disaster? Research question five was: what thread(s) was/were most prevalent on the page and which was/were least prevalent?

On a forum, the clicks threads received give insight into which threads users preferred. On Facebook, a thread's popularity is measured by how many people click the 'like' icon, how many times the thread is shared, and how many responses it receives. The following research questions six, seven and eight were drafted to assess thread popularity on the Facebook page: Which thread(s) received the most likes?; Which thread(s) was/were shared the most?; Which thread(s) received the most responses?

Analysis

Qualitative and quantitative content analysis was used to analyse the Facebook page. Qualitative content analysis can be ideal when a researcher does not know beforehand what will be found and is interested in generating detail rich data. Quantitative content analysis is appropriate when there are pre-determined themes and researchers want to ascertain how much they occur in the data (Creswell & Clark, 2007). This study's aim was to learn whether people were using the Australian Facebook page in ways identified and not identified in the study of the earthquake in China. Hence, the two approaches were appropriate.

The unit of analysis was a Facebook thread, which is made up of the starting message a user posts and the responses it elicits. These responses included images, text, video, likes, or shares. During data collection (March 4-20, 2014), 239 threads were identified as suitable for analysis and then entered into Hyperresearch software that helps analyse multimedia data sets. Two independent coders randomly selected 20 threads and analysed them to see if they fit into categories identified in the China study or completely new categories. After this initial analysis, the coders met to discuss their findings and found that initial inter-rater agreement was 96%. Discrepancies were resolved, before coders reviewed the remaining 219 threads, and final ratings were reached by consensus.

Results

The first research question assessed whether the Facebook page created by people impacted by the 2014 Hazelwood mine fire disaster contained information-related, opinion-related, action-related, emotion-related, sense-making, community building, and anti-social threads. Analysis showed that all these threads were present on the page. Table 2 lists how many were found for each category. Table 3 shows user interaction on the page while table 4 shows examples of each type of thread from the Facebook page.

Table 2
Threads Identified on Facebook Page

Type	Number	Type	Number
Information sharing	57	Expressing emotion	21
Information seeking	19	Emotional support	16
Information gathering and integrating	2	Sense- making	5
Criticising	34	Moderation	20
Other opinion	7	Norm shaping	5
General action	11	Flaming	1
Individual participation	19	Trolling	1
Coordinating action	21	Total threads	239

Table 3
User Interaction with Threads

Type	Number
Most liked thread: Emotional support	Liked 49 times
Most shared thread: Coordinating action	Shared 12 times
Most commented thread: Information seeking	44 comments posted
Average (mean) likes per thread	7 Likes
Average (mean) times thread shared	1.8 Shares
Average (mean) comments in response to thread	9 Comments

Table 4
Thread categories and types

Category	Type	Example
Information-related	Information sharing	“I have been advised there is a breakfast tomorrow morning at Sunrise Restaurant in Morwell from 7.15 for small businesses. It is going to be a forum Who ever would like to attend needs to RSVP”
	Information seeking	“Would someone please advise me with what is happening with the education side of this crisis?”
	Information gathering and integrating	“I spent all day yesterday looking into camps caravan park and cabins and have a list of places that have been offered you do NOT need to be morwell resident nor do u need a hcc and yes we can take our pets you can stay 1 night up to a week choice is urs.. feel free to comment or inbox me if u need help”
Opinion-related	Criticising	“The first responsibility of a government is to protect its people and that is not happening in Morwell.”
	Other opinion	“If anyone says GDF Suez is just a huge multinational company that does not care remind them that it is owned and operated by people who have homes and families. We need to remember that people caused this problem and only people can solve it. We just need to find an effective way to communicate, person to person.”
Action-related	General	“Can everyone please go to aca.ninemsn.com and share their stories about how we are being treated by the gov GDF and epa ect I think it could help alot if we all did.”
	Individual participation	“Today show have called I will be on just after 6am to talk about disaster in the Valley Tuesday Morning.”
	Coordinating	“A bunch of people have sent me leaks about what is happening in the Hazelwood mine, in the hospitals and in the communities around the fire - I am writing these leaks up for a new article about this disaster - if you are one of these people I need you to message me.”
Emotion-related	Expressing	“I'm in Moe and were sick to, its just not in morwell its on a large scale, and they sweeping it under the carpet'only morwell' NO WAY!!!!!!”
	Emotional support	“You have all been working so hard on this devastating issue. This will be a long, hard fight and we have to stand together.”
Community building	Moderation-related	“Come & join this page, we are the same people moving to a permanent page before our event page disappears like last time.”
	Norm shaping	“If you think you have put a comment on this page that attacks another member of this page please remove it.”
Anti-social	Flaming	“I don't like you I don't trust you and I sure in hell don't believe anything you say.”
	Trolling	(Actual trolling comment was removed. Below is the response it elicited). “I suggest threatening to smash woman in the side of the head with a lump of timber isn't a good reflection of your thought process.”

The second research question asked whether there were threads on the Facebook page that did not fit categories identified in the China study. No threads were found that did not fit these categories. Although some unique threads were found, these were categorised as off-topic rather than new ways of using Facebook in response to a disaster.

The third research question assessed what thread(s) was/were most prevalent on the Facebook page at the beginning of the disaster. What was found was that the most prevalent threads during this period were action-related. Among the first 15 threads created on the page, 10 were action-related. Action-related threads from the page included:

> *Kindly knock next door and make sure they are ok. There are people isolated without any support - in particular the elderly.*
>
> *Can we kill two birds with one stone? A march after visiting GDF up collins st to the steps of parliament house?*

The fourth research question asked what thread(s) was/were most prevalent in the later days of the disaster. The majority of threads in the later days of the disaster, when the fire was declared under control on the 15th and 16th of March, were opinion-related. The following thread is an example:

> *This mine fire, and the sorrow that will stem from it, should simply be known as, "HAZELWOOD"." Never to be forgotten". "FUKUSHIMA", "THREE MILE ISLAND", "CHERNOBYL".*

The fifth research question asked which thread(s) was/were most prevalent on the Facebook page and which was/were least prevalent. Information sharing threads (57) were the most prevalent while trolling (1) and flaming (1) were least prevalent. The sixth research question looked at which thread(s) received the most likes. Threads where users expressed emotional support received the most likes such as this one that garnered 49 likes: "You are the people, one voice, united. Please be kind and support each other."

The seventh research question looked at which thread(s) was/were shared the most. Threads in which a poster sought to organise a course of action among people were shared the most. An example is this thread that was shared 12 times:

> *People of Latrobe Valley are you ready for the next step in the protest campaign = Take it To the (other) Big Smoke: 12pm Rialto Tower Melbourne. We had an impressive show off force last Sunday and got this Disaster National attention - now what are we going to do? Then march to Parliament*

The last research question asked which thread(s) received the most responses. Threads in which a poster asked a question received the most responses. An example is this thread that received 44 responses: "Hi everyone, besides the holes that were drilled in the mine that go under the highway, does anyone know is there much other tunneling of any kind."

Conclusion

The current findings suggest that there may be common ways disaster affected people communicate on the Internet regardless of where they live, what Internet tool is used, or what type of disaster they are facing. Those impacted by the earthquake in China and by the mine fire in Australia used the Internet to share or seek information, support each other, express emotion, try to make sense of events, and organise action. Despite the difference in cultures and in the years they were affected, the categories identified in the China study also describe how Facebook was used by those affected by the Australian mine fine disaster in 2014.

Differences however are evident in the types of threads occurring, when threads were created, and preferences that users showed toward threads. For example, action-related threads were more likely to occur on Facebook than on Tianya. On Facebook, action-related threads were more likely to be created at the beginning of the disaster while on Tianya, information-related threads were more evident at the beginning. Although the current research outlines commonalities, rather than differences between the Chinese and Australian disasters, many of these differences probably occurred because Facebook and Tianya were utilised in disaster and cultural contexts that differed considerably.

This study reinforces a potential to develop a model of how people behave on the Internet during disasters and then test that model by examining various disasters in different countries. At the time of writing, most research literature about social media in response to disasters had not examined hypotheses, models, or theories. For example, dozens of studies describe how people used social media in particular disasters but do not look at common patterns of social media use that transcend time, location, and disaster type. This study's findings

suggest that there may be cross-cultural similarities in how people use the Internet during disaster.

However, the findings from this research should not be viewed as a comprehensive explanation of how ordinary people across the world use the Internet during disasters. More research needs to be done in order to develop such an understanding. Future research can develop a more comprehensive understanding of this issue by addressing two weaknesses in this study. One weakness is that this study relied on one framework to analyse internet social media in response to disaster. Scholars in the future can conduct a meta-analysis of research into Internet use during disaster. From this analysis, a robust model of how people use the internet in disasters could be developed. This model could then be tested against various types of disasters, on various Internet tools (e.g., Twitter, Facebook) and in different countries. A second weakness lies in the method: content analysis only gives a partial picture of Internet use. Future scholars need to interview and survey people on how and why they use the Internet in disasters, to help develop a more comprehensive picture of what people do on the Internet in response to disasters.

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