Microblogging for Crisis Communication: Examination of Twitter Use in Response to a 2009 Violent Crisis in the Seattle-Tacoma, Washington Area

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ABSTRACT

This research-in-progress paper reports on the use of microblogging as a communication and information sharing resource during a recent violent crisis. The goal of the larger research effort is to investigate the role that microblogging plays in crisis communication during violent events. The shooting of four police officers and the subsequent 48-hour search for the suspect that took place in the Seattle-Tacoma area of Washington in late November 2009 is used as a case study. A stream of over 6,000 publically available messages on Twitter, a popular microblogging site, was collected and individual messages were categorized as information, opinion, technology, emotion, and action-related. The coding and statistical analyses of the messages suggest that citizens use microblogging as one method to organize and disseminate crisis-related information. Additional research is in progress to analyze the types of information transmitted, the sources of the information, and the temporal trends of information shared.

Keywords

Microblogging, crisis informatics, computer-mediated communication

INTRODUCTION

The development and increased use of social media tools over the past few years have changed the ways in which citizens communicate in times of emergencies. Citizens no longer only seek crisis-related information from emergency agencies but now actively provide it publically via information and communication technology (ICT) (Palen and Liu, 2007). New methods of citizen communication during crises have resulted in a research focus on "crisis informatics" or the citizen use of ICT during crises (Palen, Vieweg, Sutton, Liu, and Hughes, 2007). The purpose of this research-in-progress paper is report on a specific case of microblogging use for crisis communication during a recent violent crisis using qualitative coding and statistical analysis of the messages.

Related research on the use of social media tools during violent crises has been conducted on the 2007 Virginia Tech shooting that resulted in 32 people killed and on the 2008 Northern Illinois University shooting that resulted in 5 people killed. Researchers observed local and non-local citizens using social media sites as information-sharing resources in response to these two crises (Palen and Vieweg, 2008; Palen et al., 2007; Vieweg, Palen, Liu, Hughes, and Sutton, 2008). They found that although official communications from emergency agencies remained an important resource, the social media sites provided citizens with a means to create, disseminate, and share information with a wide audience instantaneously. Twitter was not included as a

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social media site to observe during these violent crises.

According to a recent Pew Research Center report, the number of online adults in the U.S. who use Twitter or a service like Twitter to share updates or to see updates of others has significantly increased from 11% in December 2008 to 19% in October 2009 (Lenhar and Fox, 2009). Therefore, Twitter will likely become an additional communication and information-sharing resource during emergency events. Hughes and Palen (2009) observed how Twitter became a source for information broadcasting and brokering during multiple mass convergence and emergency events. Starbird, Palen, Hughes, and Vieweg (2010) examined the use of microblogging during a flooding period of the Red River Valley region of the U.S. and Canada. Cases of information production, distribution, and organization were observed and analyzed.

EVENT OF STUDY

On Sunday, November 29, 2009, around 0800 local time, four police officers of Lakewood, Washington (located near Tacoma, Washington) were killed by a single attacker. The attacker was wounded during the attack and fled the scene of the crime. For almost two days, the Seattle, King County, Pierce County, and Tacoma police departments along with other agencies identified a suspect and conducted a search for the suspect across multiple locations. The suspect had a violent criminal history and was considered a threat to law enforcement and the general public. The suspect was killed in the morning of December 1, 2009 after encountering a police officer.

METHOD AND DATA COLLECTION

Twitter allows users to send messages, or tweets, of 140 characters via web-based applications, cell phones, various social media sites, and other sources. The local media and citizens turned to Twitter as an information-sharing resource in response to the shooting and during the course of the search for the suspect (Cook, 2009). Some Twitter users who commented on or provided information about the crisis started using case-insensitive hashtags as a convention for labeling crisis related messages. Hashtags are a user-driven method for categorizing tweets about a specific topic using the # symbol. Examples of hashtags created by users included #washooting and #lakeshoot. From following the discussion on Twitter, we observed that the #washooting hashtag became more heavily used than other hashtags. Also, the #washooting hashtag was used consistently during the crisis while other hashtags emerged and dissipated relatively quickly. Using the Twitter search API, we collected all publically available tweets (6013) with the #washooting hashtag from the morning of the shooting to several hours after the suspect was found and killed; the period under study covered 1123 November 29, 2009 to 2359 December 1 (local time). By focusing on only tweets with the #washooting hashtag, we were able to observe a continuous stream of crisis-related messages.

During the manual coding of the 6013 tweets, we developed a message classification scheme similar to the scheme developed by Qu, Wu, and Wang (2009) for coding online forum messages in response to the 2008 Sichuan, China Earthquake. They identified four main categories of messages: information-related, opinion-related, emotion-related, and action-related. We identified an additional category in our coding: technology-related. Messages containing various types of content were coded in multiple categories. For example, one message might provide information as well as an opinion about the information shared; this tweet was coded as both information-related and opinion-related. The types of authors, or Twitterers, of tweets were also categorized. During the qualitative coding of tweets sent in response to a flooding period, Starbird et al. (2010) developed classifications of author types including: unaffiliated individual (citizens), local media, national media, alternative media, public service agency, blog, faith-based organization, newscrawler, flood specific service, unknown author type, and other service/organization. In our study, we followed the same categories with the exception of the flood specific service category.

RESULTS

Author Characteristics

There were 1668 unique authors of the 6013 Twitter messages. Unaffiliated individuals (citizens) accounted for the vast majority (91.5%) of the authors. The rest of the author types were predominantly local and national media organizations (4.5%). Unaffiliated individuals authored 82.3% of the total tweets, followed by local media organizations (8.3%), other services/organizations (4%), and alternative news sites (3.3%). Clearly unaffiliated individuals dominated the Twitter stream of #washooting messages.

Based on publically available geographic information listed on user profiles, close to 60% of the unaffiliated individuals are local to the Seattle-Tacoma, Washington area or in peripheral geographic regions (Washington State, Oregon, Idaho, and British Columbia, Canada). The rest of unaffiliated individuals are non-locals or do not list a geographic location.

Types of Tweets

Information Related Tweets

Table 1 shows the detailed breakdown of the number of tweets per tweet type along with the percentage of total tweets per tweet type. 79% (4753) of the tweets contained information-related content. We observed that 95% (4512) of the information-related tweets (or 75% of the total tweets) contained information sharing activities.

Type of Tweet (non-exclusive categories)	**Number of Tweets**	**Percent of Total Tweets**
Information-related	4753	79.0%
Opinion-related	1012	16.8%
Technology-related	231	3.8%
Emotion-related	224	3.7%
Action-related	53	0.9%
Other	135	2.2%

Table 1. Number of tweets per tweet type and percentage of tweet type of sample

Examples of information-sharing tweets include the following:

> NewsOrganization: Four police officers shot to death in Lakewood in apparent ambush #washooting
>
> Individual: Renton Ave. House blockaded with SWAT since 4 PM #washooting
>
> Individual: Breaking: KOMO [a local news organization] reporting police action in Renton... flashbangs being detonated #washooting

Almost half of the information-sharing tweets provided URLs to photos, local and national news websites, audio files, videos, and other types of resources. We observed numerous links directing users to social media resources including Wikipedia articles about the shootings and the suspect, a Google Map detailing locations of possible sightings and police activity, Facebook memorial pages set up for the four killed police officers, alleged Twitter and Facebook accounts of the suspect, a news organization's interactive timeline and map (via Dipity.com), and a Google Wave created by a local news organization. We also observed that numerous Twitterers shared information and directed others to sites with online streaming police scanners.

Opinion Related Tweets

We found that 16.8% of tweets (1012) contained opinion or commentary related content on the event. Users commented on law enforcement activities, news media activities, public response, and other aspects of the suspect search. Examples of opinion and commentary include the following:

> Individual: It's a shame @localnews is back to Disney cartoons instead of covering the shootings #washooting

> Individual: I can't believe the suspect's sentence was commuted #washooting

Technology Related Tweets

It was observed that social media technologies received numerous comments (231 or 3.8% of the sample) during the event. The majority of these tweets focused on Twitter and Google Wave.

> Individual: Google Wave was too slow and kept freezing my browser #washooting

> Individual: Twitter seems to be the only place to get info on #washooting Fast updates and great links

Emotion Related Tweets

Only 3.7% of tweets (224) contained emotional content such as personal emotional statements ("I am scared" or "I am nervous), prayers for the victims and demonstrated social support for law enforcement professionals.

Action Related Tweets

A minimal number of tweets (53 or less than 1% of tweets) were categorized as action-related. Actions included telling other individuals to be safe, to praise law enforcement, and to annotate online profiles with symbols of support for the fallen police officers.

Other Types of Tweets

Tweets categorized as "other" made up 2.2% (135) of the tweets. The majority of these tweets consisted of citizens conducting personal attacks on other citizens or content unrelated to the event.

Trends of the Types of Tweets

Over the course of the suspect search, the percentages of the types of tweets changed. In Table 2, the percent of the main categories of tweets (information, opinion, technology, emotion, action, and other) are displayed per 12 hour time period after the first tweet with the #washooting hashtag (1123 local time, 29 November 2009).

Time Period	Information (%)	Opinion (%)	Technology (%)	Emotion (%)	Action (%)	Other (%)
0-12hours	90.0%	6.8%	1.1%	5.6%	1.1%	0.0%
12-24 hours	86.6%	13.0%	3.1%	4.5%	1.3%	0.7%
24-36 hours	73.9%	18.3%	7.0%	2.7%	0.5%	3.7%
26-48 hours	74.6%	21.3%	1.0%	3.8%	0.5%	2.8%
48-60hours	80.1%	20.9%	2.4%	3.0%	0.0%	0.0%

Table 2. Percentage of tweet type (non-exclusive) per 12 hour time period

For all time periods, information-related tweets comprised the majority of the tweets with the largest percentage (90%) taking place in the first 12 hours after the first #washooting tweet. There was a marked increase in the percent of opinion-related tweets from the first 12 hour period (6.8%) to the fourth 12 hour period (21.3%). After the first 12 hour period of the #washooting stream of messages, we observed the following: a single individual's tweets and responses to these tweets from other individuals contributed to the majority of opinion-

related tweets and "other" tweets. Most of these tweets consisted of ongoing discussions about disagreements between authors, name calling, and personal attacks.

URLs

33.8% of tweets contained URLs directing users to other web-based information sources. Over half of the URLs directed users to local media websites. A considerable number of users utilized URL shortening services such as Bit.ly and Twurl for links; Twitpic, Tweetphoto, and Yfrog for pictures and video; and Ow.ly for files, pictures, and videos.

Retweets

Over half (55.8%) of tweets were categorized as retweets or tweets that are passed on word for word from one tweet author to another author's followers. In a stream of messages with a hashtag such as #washooting, retweets do not add additional information. However, when an author retweets information, the information is made accessible to his or her followers who may not be following the #washooting hashtag.

CONCLUSION

The coding and statistical analyses conducted on the 6013 tweets with the #washooting hashtag demonstrate that Twitter is used as one method for citizens, news media organizations, and other types of organizations to share crisis related information. In the tweets that were analyzed, citizens dominated the author types (91.5%). The majority (79%) of the messages transmitted were information-related. Tweet authors directed others to various social media sites, news websites, multimedia resources, and other sources of information. Twitter was also used to communicate opinions, emotions, and other types of content. During the course of the search for the suspect, different patterns emerged for all of the main categories of messages. Further research is in progress to investigate the specific types of information transmitted, the sources of the information, and the temporal trends of information shared. The goal of the larger research effort is to enrich our understanding of how microblogging is used during violent crises.

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