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The Utility of Twitter for Communication in Natural Disasters

When disasters strike, the consequences can be deadly – according to the World Health Organization, 90,000 die from a natural disaster every year, and close to 160 million feel their impacts annually (Natural Events). In order to protect as many people and minimize damage, accurate, correct communication from officials and organizations is essential. However, what is the best method of communicating these risks? In this paper, I will argue that modern social media systems such as Twitter allow for efficient, salient communication by government bodies during crises, as Twitter's platform has several features which can be well-purposed for this sort of communication. First, I will provide a background on previous research into general citizen use of microblogging for political organization, in order to illustrate the effectiveness of such platforms for communication and organization. I will then look into prior research on government usage of media, in order to motivate the interest of government in using such a platform. Next, I will examine other earlier research into the use of Twitter by citizens in natural disasters, to illustrate that these platforms are already being used for crisis communication in one direction, and compare this with the reverse direction for my research. After that, I will be examining as a case study of tweets during the immediate aftermath of Hurricane Harvey by the national and regional FEMA accounts in this time period, @FEMA and @FEMARegion6, which

showcases several examples of Twitter features beneficial for communication during disaster events.

Prior research by Wendy Su investigated the utility of micro-blogging websites as a communication media for protest and activism, and to what extent in a highly censored, restricted society, micro-blogging technologies allow for community formation and increased democracy. This researcher found that even in a political environment highly censored and controlled by the state, the microblogging platform in many cases presented an effective communication medium (Su, 2). The platform allowed for some examples of mass organization even in an environment where such grassroots political organization is not in general viewed favorably(Su, 2). This demonstrates that such platforms can be an effective way to disseminate information, although Su's research focused more on communication through microblogging platforms by citizens in order to communicate demands to government, whereas this research will be focusing on how government can use such microblogging platforms to directly engage with and disseminate information to the constituent citizens (Su, 2).

Rivenburgh's research into global media events is also useful for understanding the nuances of government communication in this sort of scenario. Rivenburgh focuses on how governments attempt to control media narratives around planned global media events, or GMEs, in an attempt to boost their image (Rivenburgh, 187). This is frequently attempted by either attempting to rehabilitate a negative reputation, or to gain increased visibility on the world stage (Rivenburgh, 188). Rivenburgh also argues that in the case of planned GMEs, these events are most effective for countries with low-visibility, but an overall positive reputation (Rivenburgh, 189). While natural disasters are not media events in the sense that they are

planned like the Olympics or a World's Fair, they nevertheless frequently attract considerable coverage, and a government's handling of such a disaster can significantly influence the global perception of the nation. For example, a disaster can influence the perception of how effective or competent a government is, to what degree it cares about its citizens, and how resilient its infrastructure and support systems are. Therefore, while it is not something orchestrated to cultivate a narrative, natural disasters from a government perspective present both a challenge and opportunity to significantly impact a government's image in media. Therefore, government agencies such as FEMA have a vested interest in effective communication to influence the media narrative around their response.

There is also a significant amount of prior research conducted on how important micro-blogging platforms such as Twitter can be useful in crisis events like natural disasters. For example, Vieweg et. al. in their 2010 paper conducted a study of how Twitter data could be used to improve situational awareness for emergency responders, attempting to determine how information can be effectively extracted from user's tweets in order to help these organizations respond to situations on the ground in a more informed way (Vieweg et. al., 1087). They did this by developing a framework for such information extraction, focusing on how tweets can include location updates, provide situational updates, and direct geo-location information (Vieweg et. al., 1083-1087). They particularly found that microblogging platforms like Twitter can improve situational awareness through location data, as these tend to be relatively easily extractable from posts on such platforms (Vieweg et. al., 1087).

Clearly, this platform has a great deal of significance during natural disaster events. However, what has been less examined is the role not of individual citizens and their use of the

platform for bringing issues to the attention of officials, but rather the use by officials of these platforms to effectively communicate best practices, important updates and warnings, and relief efforts to those living in areas affected by natural disasters. To examine how officials use these platforms to communicate with the affected public, I've chosen to use tweets from @FEMA and @FEMARegion6 around Hurricane Harvey. In late August and early September of 2017, Hurricane Harvey caused significant damage throughout the United States South. The storm caused 103 deaths, and about $125 billion in damage, becoming the "second-most costly hurricane to hit the U.S. mainland since 1900" (Huber). Clearly, with this level of damage and loss of life, Hurricane Harvey qualifies as a major natural disaster. However, since this took place a few years ago, the tweet flow around this issue has effectively ceased, making this ideal for a retrospective case study. Within the United States, emergency management in natural disaster situations since 1979 has been primarily coordinated by the Federal Emergency Management Agency, a subdivision of the Department of Homeland Security, and is commonly abbreviated FEMA. In addition to the national coordinating agency, there are 10 regional offices, each serving a different section of the country. Since the bulk of the damage caused by Hurricane Harvey was in the coastal Texas region, the relevant regional office for FEMA would be Region VI, which manages disasters in Texas, along with other states in the Central Southern part of the United States. This makes these organizations primary official communicators during the disaster for the government in reaching those affected by the hurricane. Tweets for this case study were selected for demonstrative examples after running a Twitter search for tweets between August 17 and September 3, 2017, as this was the approximate period of this disaster.

Looking at these tweets, one behavior which repeatedly occurs is the phenomenon of quote-tweeting, or resharing another user's tweet with added commentary. For example, in a tweet on September 2, 2017 the Fema Region 6 account quotes the official Twitter account of the Texas Game Wardens, showing rescues being conducted from flooded areas (@FemaRegion6, "People are helping"). By quoting other users, official accounts can help share valuable information without fully creating it themselves, as well as endorsing and linking to other accounts which might be able to provide further information. Another example of this quoting behavior is in an earlier tweet that day, where FEMA region 6 used previously shared information from the Texas Office of Homeland Security and Emergency Management, in order to more broadly share warnings about floodwater-contaminated food (@FemaRegion6, "Floodwaters can contain"). This linking behavior to other credible accounts is further visible by the practice of mentioning users, which means linking their username in a tweet. This is also a prominent behavior by these accounts during the Harvey crisis, such as a FEMA tweet on August 31 where they mention a volunteer search and response team (@FEMA, "Nebraska Task Force").

Another prominent behavior readily visible in these tweets are images. For example, one tweet includes images of the elderly being rescued from floodwaters (@FemaRegion6, "People are helping"), while another includes a prominently featured small dog being helped out of a flooded region (@FEMA, "Nebraska Task Force"). These are clearly emotionally evocative images, because of the clear extensive damage from the flood in the background, and the vulnerability of those being affected. However, in these images, we also see a view presented

of a response able to protect these people, which creates a positive image of the government response.

The Twitter platform also provides features for easily grouping content, which is useful for people looking for information on the disaster, through the hashtagging system. Many tweets from both accounts include #Harvey, which allows relevant information to be clustered together, such as the tweet warning of food contamination (@FemaRegion6, "Floodwaters can contain"). This is in addition to the ability of users to click on an agency's profile to get tweets solely from that account, further allowing for efficient grouping of communication.

While this relates less to particular tweets, the Twitter platform also provides some advantages for communication during natural disasters. For example, since Twitter has a very streamlined posting process for short messages, it is very easy to create near real-time updates as conditions change, something immeasurably valuable amidst a disaster. However, unlike other broadcast mediums like radio or television emergency broadcasts, which can similarly be leveraged relatively quickly, tweets are preserved, allowing people not listening at that moment to receive the information at a later date. Indeed, without an intervention by the agency to actively delete tweets, this information is preserved indefinitely, long after the original disaster.

To be clear, this platform is not without its limitations for usefulness of communication during crisis events. For one, internet access, while relatively widespread in the United States, can be quite limited during natural disasters, as cell towers might be knocked down or destroyed. In addition, unlike traditional broadcast media such as TV or radio, multiple users connecting to a server are competing for a connection. This means if a large number of residents impacted by a disaster attempt to access Twitter simultaneously, bottlenecking might

occur and limit the reach of such information. However, this is not a limit unique to Twitter or microblogging platforms; broadcast media also require a connection of some sort to receive messages, so this is not a significant weakness relative to other communication platforms.

Another potential limitation is that Twitter at that time only allowed tweets of 140 characters, which when attempting to communicate very nuanced information is extremely small. However, this is partially mitigated by the potential for including infographics, like a tweet on September 1 about how to clean up debris in the aftermath of the hurricane (@FemaRegion6, “Stay tuned”). This not only allowed for inclusion of multiple languages, but extremely detailed, organized information inside this diagram (@FemaRegion6, “Stay tuned”). As a result, while this length limitation can hinder some longer text messages from being spread on Twitter, the platform does allow for alternative ways of communicating more detailed information, that are often even more engaging than long text bulletins.

One more set of limitations comes from malicious users interfering with this form of communication during crises. For example, Twitter is a platform rife with misinformation, so misleading, useless, or actively harmful information can propagate on the platform, which is a barrier to quick, informative communication during a disaster. Additionally, while the hashtag is able to group content together, Twitter itself has no mechanism of detecting whether a tweet actually meaningfully engages with the content of the hashtag. This can be used as a method of political protest, such as in K-pop fans’ flooding of racist hashtags in support of #BlackLivesMatter (Petrusich). However, in the context of crisis communication, reliable, official sources like FEMA might be drowned out on hashtags like #Harvey by natural behavior by affected citizens. This drowning out could also be caused by conscious efforts to drown out

officials and make the information environment more chaotic. However, Twitter does provide certain filtering behaviors, such as only showing tweets from certain accounts, which can mitigate these issues to some extent, and for users looking specifically at official accounts, this may be less of an issue.

In conclusion, microblogging platforms like Twitter, which are an increasingly prominent form of media, present an incredibly useful tool for government communications to constituents during crisis events. Examining a case study of tweets by federal emergency management agencies in the aftermath of Hurricane Harvey, we see that tweets allow for connecting users with relevant response groups, creating vivid images in support of response efforts, and allow for both near-real-time and persistently available information. While this utility is somewhat limited due to the nature of internet-based communication, limited platform affordances, and hijacking by malicious leaders, on the whole this still gives government an effective tool for communication during natural disasters. Whether to improve their own image, to communicate with citizens efficiently, or even to aid in saving lives during a crisis, microblogging platforms like Twitter offer a useful tool for governments to communicate critical information to their constituents during natural disasters.

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