

Towards Producing a Questionnaire on Disaster Information Spread in Twitter during Disasters

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Abstract The social media such as Twitter is useful as communication and information tools in emergency preparedness and response phase. In Japan, just after the 2011 Great East Japan Earthquake, Twitter is flooded with various kinds of information such as fact, self-experience, warning, status update, and even rumor. The misinformation spread cause confusion and doubt in an already tense situation. How people perceived the information influence one decision to the information diffusion. In this paper, we will discuss the questionnaire development to investigate what kind of information people perceived and why they make the decision to retweet the information on Twitter.

1 Introduction

In recent years, communication during catastrophic events such as Haiti Earthquake [1], The Hurricane Sandy [2,3], Deepwater Horizon 2010 [4] and The Great East Japan Earthquake [5,6,7] are heavily relied on social media with the aid of smart phone technologies. Even before the rapid use of microblogging services such as Twitter, citizen utilized Flickr, Wikipedia, MMS videos, and post messages on web-based discussion sites where the terms of “citizen reporter” [5] and “citizen-to-citizen communication” [8] emerged. These terms referred to citizens as the first respondents in the event who generate and disseminate information in disaster setting.

Although the user-generated

information provided by citizens proved to be useful in coordinating humanitarian relief and contribute to the public awareness during and aftermath the disaster, information overload raised an important issue. In the case of The Great East Japan Earthquake on 2011, what mattered most was the tsunami and nuclear crisis triggered aftermath the big earthquake. Just after the earthquake strike, Twitter was flooded with various kind of information reporting self-experience, warning, fact, safety status and even rumor and hoax messages [6,9,10]. The misinformation spread through social media such as Twitter raised an issue to be concern [6,11,12,13] because of the wide spread of information through social media may lead to more serious problem not only to the victims and

emergency professional, but to the whole society in general.

Thus, with the motivation to understand user behavior of information diffusion online, particularly in disaster situation have leads us to conduct a preliminary survey on this issue [14]. The previous survey questions asked related to general retweet behavior towards the spread message. Based on the findings from previous survey, the act of searching for more information and validating the information before spread may help to reduce misinformation spread. Furthermore, there is no doubt that the person who retweet the messages also influence the reason on why one continue to perform retweet in their own network. Another important factor is the content of the retweet messages itself. User tends to perform retweet on the content of the retweet messages which attract their interest.

Therefore, with the aim to understand why misinformation spread during disasters, we plan to conduct new survey using questionnaire to investigate how people perceived the content of the message (tweet) affect their information spread decision-making in disaster situation.

The rest of the paper is organized as follows. Section 2 explains the background of the study. Next, in section 3, we describe the questionnaire development. Finally, we conclude our paper in section 4.

2 Background of the study

2.1 Disaster communication through social media

There are four phases of Emergency Management Information System (EMIS) which are: mitigation, preparedness, response and recovery [15]. Disaster communication is a part of emergency management which refers to immediate in dealing with real incident [16]. There is no doubt social media is beneficial during preparedness and response phase in emergency [17,18]. Several studies focused on the utilization of social media for mass collaboration in response and rescue for emergency management professional during emergencies [2,17,19]. Nevertheless, citizen supplying information is also crucially useful [8,15] because citizen around is the real “first responders” to reach out those affected people for aid purpose [18]. The government utilizes Twitter for information exchange with citizen in disaster-related preparation, response and recovery stage during 2012 Hurricane Sandy [3]. One of the reasons on why people are motivated to use social media during disaster is because of the desire to help [5]. In case of The Great East Earthquake, Twitter was utilized extensively because of its ability to be used inside and outside disaster affected areas to obtain information and communicate aftermath the disaster [6,7]. Because of the disruption of telecommunication networks, the Internet is the best way to spread disaster-related information fast.

When crises occur, the frequency of interpersonal communications are increasing where in online context, people will use their everyday tools, such as social media for seeking and disseminate disaster-related information [4]. In terms of social media as information source, the centrality of mass media increases as the ambiguity in social environment increases [7]. Information dissemination activities are crucial for disaster preparation, warning response and recovery [18]. Hence, since social media has become an essential tool for disaster communication, here, we tackle the misinformation spread issue, through the study approach of human behavior on information diffusion using Twitter.

2.2 Twitter as disaster communication tool

The social media and social network site such as Google+, Twitter, LINE and others provide a platform for everybody to generate and share text, picture, video and website link in their own online network. In Japan, the social media shift to Twitter happened after the catastrophic disaster of 2011 The Great East Japan earthquake. The government agencies and public organizations opened their own Twitter account as a mean of disaster communication channels after the quake [20]. The amounts of tweets are increasing just after the earthquake and 1.8 times larger than usual [7, 21]. Using Twitter as our basis to study information diffusion in disaster situation, we further review what kind of disaster-related information people post in Twitter during

and aftermath the 2011 catastrophic earthquake which trigger tsunami and nuclear crisis in Japan.

2.3 Disaster information

The classical meaning of information from Information Theory [22] is “a measure of one’s freedom of choice when one selects a message” while communication is “all of the procedure by which one mind may affect another”. The basic meaning of information evolve with theory of semantic information by Fred Dretske (1981) includes consideration of meaning and relating to receiver’s background knowledge which may produce belief [23]. In terms of disaster information in our context, we consider the disaster-related tweets post and spread as information; as it conveys meaning to the receiver in a way that it may affect one choice to accept the information and continue to spread it within their network, particularly, in online network.

Tweets act as social sensors to detect earthquake events [21]. In disaster situation, people post early warning tweets to create awareness, anxiety-level messages, report their self-experience, opinion and advice, safety status, fact or informative messages from government or organization and help request in Twitter [6,9,10]. These kind of disaster-related information are undeniable useful at disaster preparedness and response phase during emergencies. However, among these information, misinformation and rumor occur, and got high number of retweet by users [24]. Consequently, if the inaccurate information is widely

circulated, it may influence people to change their belief and opinion [12]. Given a bundle of information scattered around us, what kind of information people are likely to share during disasters?

2.4 Information sharing decision making

Drawing from rumor psychology literature, rumor arises in contexts of ambiguity, danger or potential threat that help people to make sense and manage risk [25]. With the potential of social media on the widespread of misinformation online, several studies from psychology background focus on what makes people make decision to spread disaster-related tweets [12,13,26]. They examined the relationship between important, anxiety-provoking, familiar, fluency of the message, distance and feelings with the likelihood to share disaster information in social media platform.

From previous literature, individual's decision response to threat during emergencies influenced by cognitive process [10,27]. Another studies state that cognition and emotion are factors influenced information sharing and decision making during disasters [1,12]. Besides, in Twitter, what makes people retweet is closely related to why they retweet [28]. In disaster situation context where uncertainty, urge need of updated information and to prepare for the worst case, negative kind of information and anxiety-provoking tweets gain people's attention to spread these kind of information to create awareness.

When we mention decision making, we believe that cognitive process and how people perceived the information affect their information decision-making. In Twitter, the act of spreading or forwarding the tweets can be easily done using retweet function. Since our focus of research is to understand people information diffusion behavior in disaster situation, several factors related to our study such as constrain of time and cognitive resources, pressure and trust from rumor psychology and emergency management background [25,27] were considered in the development of the questionnaire.

3 The Questionnaire Development

3.1 Objective

Our previous work revealed that content of the retweet messages is the important factors on why people perform retweet in general. However, people decision making to retweet in ordinary and disaster situation might be different in context of the environment condition. Therefore, the objective of the questionnaire development in current research will injected factors of human decision making in disaster situation in terms of retweet behavior, which caused misinformation spreading during disasters.

3.2 Hypothesis

Our research work driven us to the following hypothesis:

- People likelihood of information spread during disasters is higher than in ordinary situation.
- Several factors surrounding

individual cognitive process in disaster setting affected their information decision making.

Based on Gladstein and Reilly study (1985), stress is necessary condition for the perception of threat [27].

3.3 Experiment setting

We will use the real misinformation tweets spread during 2011 The Great East Japan earthquake as the stimuli for the survey. The purpose of the questionnaire is to investigate how people perceived different kind of tweet content and their likelihood to spread it in two group condition. The first group is the control group which act as in ordinary situation, answering the questionnaire without time pressure. Whereas the second group is the disaster group, we will ask respondents to imagine themselves in disaster situation with time pressure which may lead to stress in decision making of information diffusion.

The questionnaire design in 7-likert scale on user's likelihood to spread different kind of tweets and the reason on why they want to spread it. We will also include open-ended questions to collect user's opinion regarding the misinformation spread issues during disasters.

3.4 Sampling and Analysis

In this research, our focus is on the participation of public, the citizen who has no official role and wants to know what happen and wants to help in terms of disseminating disaster information, including whom may or may not directly affected in disaster. As the youth

generation is dominant as active social media users, in this survey, our targeted respondents are the university students.

For the analysis, we will conduct statistical analysis such as exploratory and confirmatory factor analysis to develop decision-making model of disaster information spread during disasters.

4 Conclusion

The issue of the misinformation spread aftermath the disasters is one challenge during disaster response, not only for emergency professionals, but to the public as well. While people continue to spread rumors corresponds to disasters, research to understand what kind of information people perceived as important to spread and individual decision making of information diffusion in disaster situation, can be fruitful to enhance the effectiveness of social media use during disaster response. The continued work in this area, the social media use in emergencies and by looking at rumor psychology background, we will develop a framework on how to control misinformation distribution through social media in the future.

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