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HYPOTHESIZING THE APTNESS OF SOCIAL MEDIA AND THE INFORMATION RICHNESS REQUIREMENTS OF DISASTER MANAGEMENT

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Abstract

In this article, the author first analyzes the social presence theory, media richness theory and task-media fit to investigate the suitability of various types of Social Media in disaster management. Then, on the basis of this analysis, use of social media is proposed to facilitate the communication tasks involved in the interaction between disaster management agencies and communities during disaster management. Next the author adapt a conceptual framework that integrates three types of communication (involving disaster management agencies and communities). The framework is further used as a springboard to develop a number of hypotheses to predict the aptness of rich and lean types of Social Media against the media richness requirements of disaster management tasks.

Keywords: Disaster management, Social media, Media richness, Conceptual framework

1 Introduction

This paper is based on my previous work that proposed three levels of interaction between disaster management agencies and communities during disaster management. These levels of interaction are reported as agency to agency (A-A), agency to community (A-C) and community to community (C-C) interaction (Ahmed 2011). It was further suggested that Social Media has the potential to facilitate the communication tasks involved in above mentioned levels of interaction. However, the suitability of particular types of Social Media for a given task is not yet elucidated. This paper analyses the theories of social presence and media richness to justify particular types of Social Media for a specific communication task of disaster management. Moreover, by using a rather loose interpretation of task-media fit, several hypotheses are developed with the aim to unfold the suitability of Social Media for disaster management tasks.

The rest of the paper is structured as follows: The following section outlines the role of communication media in disaster management. A framework reported in my previous work is now adapted and synthesized with various hypotheses before concluding this paper with the discussion on the research methodology and directions for the future research.

2 Role of Communication Media in Disaster Management

The media constantly act as transmitter of valuable information throughout the disaster management life cycle (Perez-Lugo 2004). It is further argued that this didactic function of the media varies only in content across various stages of disaster management. In order to ensure successful and effective communications involving disaster management agencies and communities, selection of an appropriate medium is critical. Similarly, it is also imperative to consider the aims and objectives of the communication process while selecting a rich or lean medium for message exchange. According to Dennis and Kinney (1998), the richness of medium is based on four factors (i) the ability of the medium to transmit multiple cues, (ii) immediacy of feedback, (iii) language variety and (iv) the personal focus of the medium. Moreover, Kaplan and Haenlein (2010) suggest six types of Social Media including (i) collaborative projects, (ii) blogs, (iii) content communities, (iv) social networking sites, (v) virtual game worlds and (vi) virtual social worlds (as shown in Figure 1).

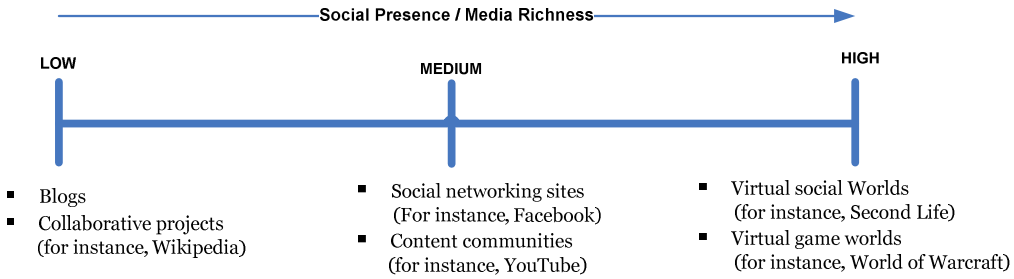

Figure 1. Types of Social Media (adapted from Kaplan and Haenlein (2010))

Daft and Lengel (1986) state in their media richness theory that the key objective of communication medium is to resolve the ambiguity and to reduce the uncertainty of communication. It is further argued that various sorts of communication media differ in the degree of richness - degree of richness refers to the amount of information allowed by media to be transmitted in a given time (Kaplan and Haenlein 2010). Considering the degree of richness, some media are more effective than others in resolving ambiguity and uncertainty (Daft and Lengel 1986). Despite high degree of media richness, the use of rich medium does not guarantee effective communication at all time. In some cases, lean

media could result in effective communication as compared to their richer counterparts (Sheer and Chen 2004). In case of disaster management communication; where uncertainty and unavailability of required information are not the only problems, relatively lean media could be an appropriate preference to control several and in most cases conflicting interpretations of information. In short, the selection of media should be made by considering the information richness requirements of the communication. In general, communication in disaster management endure either dearth of required information or surfeits of unwanted and rather conflicting information (Lee and Bui 2000; Mansouriana, Rajabifardb, Zoeja and Williamsonb 2006; Zlatanova, Oosterom and Verbree 2004).

In order to categorize disaster management communication based on their information richness requirements, this paper agrees with the categorization proposed by Daft and Lengel (1986) in their media richness theory. According to them, messages can be categorized into two main categories including uncertain and equivocal messages. Uncertain messages lacked sufficient information and can be exchanges by obtaining and sharing the required information. On the other hand, equivocal messages are those which have multiple and possibly conflicting interpretations of available information, posting a challenge for participants to arrive at one shared meaning of the information (Dennis and Kinney 1998). According to Suh (1999), lean medium is sufficient to exchange an equivocal message whereas rich medium is recommended to resolve uncertain situation. This paper underlines the information richness requirements of tasks (shown in Figure 1) and the information richness capability of various types of Social Media (shown in Table 1).

Information Richness Requirements		**Social Presence / Media Richness**		
		Low ▪ Blogs ▪ Collaborative projects	**Medium** ▪ Social networking sites ▪ Content communities	**High** ▪ Virtual social worlds ▪ Virtual game worlds
A – A Interaction	Coordination and collaboration (UC)	*Poorly fit: $H1_{(a)}$*	*Partially fit: $H1_{(b)}$*	*Strongly fit: $H1_{(c)}$*
A – C Interaction	Education (UC)	*Poorly fit: $H2_{(a)}$*	*Partially fit: $H2_{(b)}$*	*Strongly fit: $H2_{(c)}$*
	Information dissemination (EV)	*Strongly fit: $H3_{(a)}$*	*Partially fit: $H3_{(b)}$*	*Poorly fit: $H3_{(c)}$*
	Issue warnings (UC)	*Poorly fit: $H4_{(a)}$*	*Partially fit: $H4_{(b)}$*	*Strongly fit: $H4_{(c)}$*
C – C Interaction	Communication (EV)	*Strongly fit: $H5_{(a)}$*	*Partially fit: $H5_{(b)}$*	*Poorly fit: $H5_{(c)}$*
	Moral support (UC)	*Poorly fit: $H6_{(a)}$*	*Partially fit: $H6_{(b)}$*	*Strongly fit: $H6_{(c)}$*
	Communication with the world (UC)	*Poorly fit: $H7_{(a)}$*	*Partially fit: $H7_{(b)}$*	*Strongly fit: $H7_{(c)}$*

Legend: *UC= Uncertain, AM = Equivocal*

Table 1: Task-Media Fit With the Associated Hypotheses

3 Proposed Framework Along With Associated Hypotheses

By amalgamating the conceptual framework presented in my previous work and the hypotheses developed in the above section, the following Figure (Figure 2) shows an updated view of the conceptual framework along the implications of proposed hypotheses.

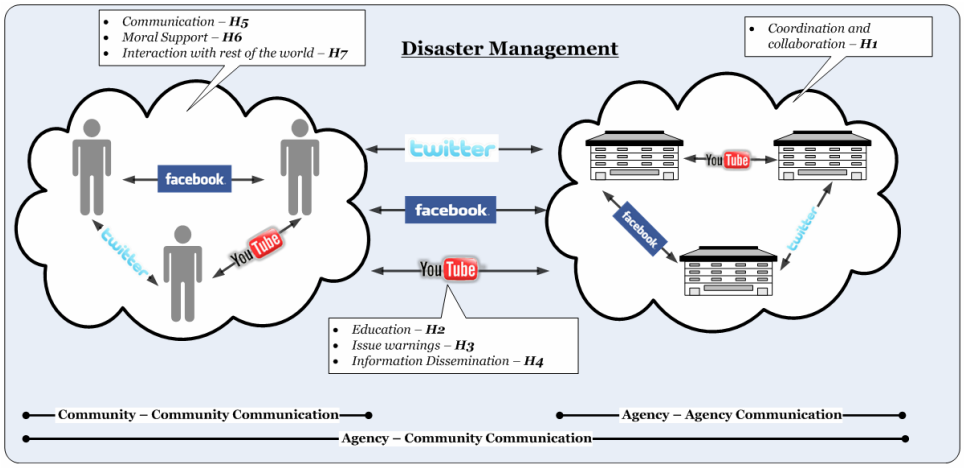

Figure 2: Framework for the use of Social Media in Disaster Management

4 Hypotheses

In developing the hypotheses, it is anticipated that various types of Social Media have varying capabilities to facilitate a range of communication tasks during disaster management. In disaster management, where most of the agencies work in their specific operational domains, the unavailability and deficiency of required information is considered as one of the main challenges. Hence, it is anticipated that in such situations, use of rich medium could be a better choice as compared to using lean medium.

4.1 Hypotheses Associated with "Coordination and Collaboration"

The following three hypotheses are developed to investigate the suitability of particular types of Social Media for the purpose of coordination and collaboration among disaster management agencies:

H1$_{(a)}$: *Types of Social Media that are low in media richness will poorly support the information richness requirements of coordination and collaboration of disaster management agencies.*

H1$_{(b)}$: *Types of Social Media that are medium in media richness will partially support the information richness requirements of coordination and collaboration of disaster management agencies.*

H1$_{(c)}$: *Types of Social Media that are high in media richness will strongly support the information richness requirements of coordination and collaboration of disaster management agencies.*

4.2 Hypotheses Associated with "Education"

Efforts to deal with disasters do not start only after a disastrous event. A lot of efforts need to be made during pre-disaster phase as well. Educating the communities about disasters is one of those efforts. In context of using communication media for education, it is suggested that a rich medium is better for education purposes (Roblyer, McDaniel, Webb, Herman and Witty 2010) as compared to lean media. The following hypotheses draws on the association between media richness and education:

H2$_{(a)}$: *Types of Social Media that are low in media richness will poorly support the information richness requirements of disaster related education of communities.*

H2$_{(b)}$: *Types of Social Media that are medium in media richness will partially support the information richness requirements of disaster related education of communities.*

H2$_{(c)}$: *Types of Social Media that are high in media richness will strongly support the information richness requirements of disaster related education of communities.*

4.3 Hypothesis Associated with "Information Dissemination"

Information remains critical throughout the entire disaster management life cycle. Several agencies pour a lot of information on communities and it is quite likely that the information coming from various sources would cause ambiguity for the information receivers. Similarly, there are ample chances that multiple and in most of the cases conflicting interpretations of the information would cause further confusion at the receiver end. Zlatanova, Oosterom and Verbree (2004) suggest that in most of the disastrous situations, the real problem is not the shortage of information but the real challenge is the proper handling of information that comes in huge volumes and from different sources. This paper anticipates that in order to minimize the ambiguity in the information, lean medium could strongly support the requirements of disaster related information dissemination to the communities. The following three hypotheses are built to unveil task-media fit in the above stated context.

H3$_{(a)}$: *Types of Social Media that are low in media richness will strongly support the information richness requirements of disaster related information dissemination to the communities.*

H3$_{(b)}$: *Types of Social Media that are medium in media richness will partially support the information richness requirements of disaster related information dissemination to the communities.*

H3$_{(c)}$: *Types of Social Media that are high in media richness will poorly support the information richness requirements of disaster related information dissemination to the communities.*

4.4 Hypotheses Associated with the "Warning Issuance"

Generally, disaster management agencies release warnings before an upcoming disaster. Availability, accuracy and completeliness of warnings play a critical role in preparing the communities for disaster. However, providing maximum information in limited time is one of the challenges faced by disaster management agencies. Therefore, this research argues that the use of richer media would be more suitable to propagate most of the warnings in limited time. The associated hypotheses are as follows:

H4$_{(a)}$: *Types of Social Media that are low in media richness will poorly partially the information richness requirements of issuance of disaster warnings to the communities.*

H4$_{(b)}$: *Types of Social Media that are medium in media richness will strongly support the information richness requirements of issuance of disaster warnings to the communities.*

H4$_{(c)}$: *Types of Social Media that are high in media richness will poorly support the information richness requirements of issuance of disaster warnings to the communities.*

4.5 Hypotheses Associated with "Communication"

Communication among community members may include individuals' estimations, predictions, concerns and recommendation related to the disasters. The overwhelming amount of information and several sources of information may cause confusion and ambiguity for receivers to interpret such information and draw any conclusion. Therefore, this paper suggests that types of Social Media that are low in richness could be a better choice as compared to the high richness types. The hypotheses developed for this purpose are given below:

H5$_{(a)}$: *Types of Social Media that are low in media richness will strongly support the information richness requirements of disaster communication among community members.*

H5$_{(b)}$: *Types of Social Media that are medium in media richness will partially support the information richness requirements of disaster communication among community members.*

H5$_{(c)}$: *Types of Social Media that are high in media richness will poorly support the information richness requirements of issuance of disaster warnings to the communities.*

4.6 Hypotheses Associated with "Moral Support"

Another use of Social Media by community members is to morally support other members of the community especially the victims of a disaster. A richer type of social medium has capabilities to perform this task more effectively. Thus the associated hypotheses are as follows:

H6$_{(a)}$: *Types of Social Media that are low in media richness will poorly support the information richness requirements of expressing moral support among community members.*

H6$_{(b)}$: *Types of Social Media that are medium in media richness will partially support the information richness requirements of expressing moral support among community members.*

H6$_{(c)}$: *Types of Social Media that are high in media richness will strongly support the information richness requirements of expressing moral support among community members.*

4.7 Hypotheses Associated with "the Communication with the Rest of the World"

It has been observed that the victims and those who are part of the affected community use various types of Social Media to communicate with the rest of world. Such communication could be targeted to portray the real situation of disaster, (b) contact family and friends to inform about your status and (c) seek help from the rest of world. This research anticipates that use of richer medium can strongly support the information richness requirements of affected community members to communicate with the rest of world. The hypotheses associated with it are as follows:

H7$_{(a)}$: *Types of Social Media that are low in media richness will poorly support the information richness requirements of community members to interact with the rest of the world.*

H7$_{(b)}$: *Types of Social Media that are medium in media richness will partially support the information richness requirements of community members to interact with the rest of the world.*

H7$_{(c)}$: *Types of Social Media that are high in media richness will strongly support the information richness requirements of community members to interact with the rest of the world.*

5 Methodology and Future Directions

This paper highlights the suitability of various types of Social Media in disaster management. It is also argued that information requirements of disaster management agencies and communities varies during various stages of disaster management. By investigating the suitability of various types of Social Media within the context of social presence and media richness, this paper further adapted the framework that highlight the types of interaction involving disaster management agencies and communities along with their associated hypotheses. In order to validate the proposed framework, this research will collect data by employing two methods. The first method will be the semi-structured interviews which will be conducted with five disaster management agencies. This study is intended to select a good mix of case agencies based on their expertise and operational domains. The interview questions would be developed to reveal the information needs of disaster management agencies during their communication with communities and with other agencies. Purpose of these questions will be to unveil the type of Social Media that served better in disaster management. The second method will be the focus groups with the community. Three focus groups will be undertaken with approximately 10 to 15 people per group. Each focus group will be based on group of people who have recently affected with or experienced any natural disaster. Such focus groups would be intended to investigate the use and significance of Social Media by communities throughout disaster management life cycle. The data collected from both methods will be transcribed in full and will be used for data analysis by using a qualitative data analysis tool such as NViVo. Findings drawn from the collected data would be used to revise the existing framework (if necessary) for the suitability of various types of Social Media and will enhance the resilience of Australian communities to better deal with natural disasters.

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