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Research-in-Progress

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Abstract

Recent crisis incidents that have happened at university campuses show the critical importance of information sharing and communication during emergencies. Social networking sites (SNS) are potential communication media which can be used by students' during such events. This research-in-progress articulates the motivational factors (perceived risk, perceived reward expectations, perceived trust in information accuracy, and perceived usefulness) determining the intention to use online social networking sites during emergencies. The paper ends with the research plan and methodologies to be used as well as the possible implications of this research. This paper will contribute to our understanding of the students' use of SNS at campus emergencies, while implications will be of great interest to university administrations and emergency departments.

Keywords: Social networking sites, campus emergency, behavioral intention to use, risk, reward, trust, usefulness.

Introduction

Like all communities, university communities are also vulnerable to emergency situations. Recent emergencies happened in various university campuses showed the critical importance of emergency management, particularly emergency response, at university campuses. Examples of such emergencies include manmade disasters, such as Virginia Tech University (2007) and Northern Illinois University (2008) shootings, and natural disasters such as Union University tornado (2008) and the snow storm that hit Buffalo, NY and all schools in the region on October 2006. Such emergency situations clearly show that notification of the community to the largest extent and within the shortest time possibility are of critical importance to reduce the adverse impacts of the emergencies.

University communities usually have a diverse population, which includes domestic and international students, faculty, staff, and visitors which varies in terms of culture, language, socio-economic, and health status (e.g., disabled people). Facilities in a university campus are also diverse in the sense that there are many types of buildings, including lecture halls, libraries, research and computer labs, residence halls, administration and service buildings, etc. This diversity makes a university campus more special and unusual community, as compared to a regular social community. As a special and unusual community, a university community should have the adequate resources and capabilities to react and survive to emergency situations without much support from external authorities, although it is a part of the external community and co-exists with it (Baldwin 2008). As the major population of the university communities, students play critical role at emergencies, because the success and performance of the emergency response is dependent on their (1) collaboration with emergency response workers by complying with the warnings and facilitating the evacuation efforts, as well as (2) collaboration with the other people through communication and dissemination of critical information.

It goes without saying that information and communication technologies (ICT) play a significant role during the response stage of an emergency. In addition to enabling the coordination of the response efforts (such as emergency notification and evacuation), ICTs also facilitate the response and relief efforts of community members even without being on the geographical space of the disaster or the unexpected event (Palen and Liu 2007). One of the most widely deployed ICTs by university administrations, especially after the Virginia Tech massacre, is the *emergency notification system (ENS)*. Such systems, typically using SMS and E-mail infrastructure, facilitates sending timely messages to warn university campus community and to help university police or other responders in responding to the situation (Foster 2007). One drawback of these systems is that SMS delivery is not guaranteed, as a recent study suggests that 5.1% of the SMS messages are not delivered at all (Latimer 2008). Another drawback of such systems is that they can only notify people who are subscribed to the system. According to a recent survey regarding the use of emergency notification systems at the University of Maryland, 41% of the students surveyed reported that they were not subscribed to the SMS emergency notification system (Wu 2009). And also, some of the university community, including parents, visitors, suppliers' employees, etc., is not able to subscribe to the system. Such being the case, it is possible for some people on campus not receive the emergency notification message. This may create a risky situation for emergency responders, if the complete evacuation of the campus or a campus building is necessary. The last but not least drawback of ENSs is that only one-to-many communication is possible. The users do not have an option to interact with the system, but can only receive the message sent by the system. Thus, the receivers who may not rely on the system will seek to confirm with the friends whether the message is correct, which may create problems and delays in the dissemination of the critical information and emergency response and evacuation. That is why it is of great importance to create additional media choices in order to utilize during emergency communications and notifications and to reach more people during emergencies.

Online *social networking sites (SNS)* (e.g. Facebook, MySpace, Orkut, Twitter, etc.) are one of the most promising alternative communication media during the emergency response at university campuses. Online SNSs and blogs provide significant contributions of our understanding of community, while boundaries of the geographical communities are expanded by the virtual communities (Cao et al. 2009; Chau and Xu 2007). University students spend a significant amount of their time on these websites in order to communicate and socialize. According to a recent survey of college students in the US, 68% of the students surveyed use SNSs at least one hour a day (Pryor et al. 2007). In some cases, students check their Facebook profile multiple times in an hour (Kern 2008). Research also shows that SNSs are not only used for friendship and socialization purposes in normal life, but also used for information gathering and sharing during emergency situations (Hughes et al. 2008; Palen and Liu 2007; Vieweg et al. 2008). One of the advantages of SNSs over ENSs is that they enable users to interact with the system. Once the users receive the message via SNSs from their PCs, laptops, or mobile devices, s/he will be able to rapidly share it with the friends in the list. And also, through discussions and sharing the updated information (including photo and

video sharing) regarding the situation, people will be more aware of the situation and facilitate the work of emergency responders or other personnel in charge. Another advantage is that SNSs can enable the exponential reach of the critical information to the related community. For example, people who are not subscribed/joined to a Facebook group related to the university's emergency communication may still receive the message from the friends on the list. However, this may not possible in ENS case. And also, SNSs do not have a limit to the emergency message; whereas only 160 characters can be sent via an SMS. The last but not least is that, at some universities, people who are not affiliated with the university cannot subscribe to ENSs. However, people at large (including parents, suppliers, etc.) can get access to the Facebook group of the university emergency communication, thus easily and quickly receive an emergency notification message.

The purpose of this research-in-progress is to examine the university students' use of online SNSs during campus emergencies and whether such sites are their media choice during such unexpected events. For the purposes of this study, a campus emergency is defined as "an event that disrupts the orderly operations of the institution or its educational mission" (Zdziarski et al. 2007). Large scale demonstrations, a possible serial killer, tornadoes or approaching hurricanes, urban unrest, snowstorms, etc. are examples of campus emergencies as they are greatly likely to affect an educational institution's functioning (Zdziarski et al. 2007). Therefore, any emergency alert information, information update, and information exchange, which are related to such incidents, are within the scope of the current study. Another purpose of the study is that it develops a theoretical model that identifies several factors (perceived risk, perceived reward expectations, perceived trust in information accuracy, and perceived usefulness) which lead to the students' behavioral intention to use SNSs during campus emergencies. The findings of the current study will have implications for emergency responders and university administrations, as the study will attempt to validate whether the identified motivations lead to SNS use during emergencies. The theoretical model will help such policy makers in shaping their strategies regarding emergency response and notification as they will have a better sense regarding students' perceptions on the issue.

The remainder of this paper is organized as follows. Next section is devoted to the literature review, in which we provide related work done on the topic and the gaps in the literature which lead us to conduct this research. Following this section, we propose the research model and hypotheses with theoretical arguments. Finally, we provide explanations on the methods to be used to collect data and test the structural and measurement model proposed in the paper. The paper ends with the conclusion and discussions on the possible contribution and implications of this research.

Literature Review

Related Work

In their seminal work, Boyd and Ellison (2008) define online social networking sites as "*web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system*". They argue that, since their inception (started in 1997 with SixDegrees.com), social networking sites have been used for networking purposes not only by people from businesses and organizations but also by students.

There are several studies in the literature on the students' use of SNSs in daily life. Sledgianowski and Kulviwat (2008) examined the antecedents influencing the adoption and use of SNSs. They found that there is a significant direct effect of the perceptions of playfulness, critical mass, trust, and normative pressure on the use of SNSs. Another research study focusing on university community examined the role of online SNSs on offline socializing structures and in person life of students. Findings of this study reveal that online SNS use (i.e., Facebook) encourages peripheral friendships (Barkhuus and Tashiro 2010). Ellison et al. (2007) examined the impact of the intensity of SNS use on social capital of university students. They found that intensity of Facebook use was significantly related to all types of social capital (i.e., bonding, bridging, and maintained social capital). Jacks and Salam (2009) examined the antecedents of computer-mediated friendship networks usage. Findings based on 118 Facebook users suggest that perceived intrinsic value, perceptions of homophily, perceptions of emotional support, and stage of life have significant impact on computer-mediated friendship networks usage.

Literature is also sprinkled with several studies with a focus on the use of SNSs during emergency situations at university campuses. A recent research study suggests that online social interaction is of great value in disaster response situations. Findings, based on the data collected from 50 groups created in Facebook in the context of

Virginia Tech shooting, show that through collective intelligence created at the SNSs, information accuracy is achieved to provide critical information to the victims, their families, and the university community (Palen et al. 2009; Vieweg et al. 2008). Hughes et al. (2008) examined the level of online activity happened during and after several disasters (such as 9/11, Hurricane Katrina, Virginia Tech shooting, Southern California wildfires) as the indication of social convergence. Results, which are based on the data collected from online SNSs (such as Facebook, Twitter, Wikipedia, and blogs), indicate that online behavior is highly effective in disaster response through helping activities, mostly in the forms of providing information about personal and property safety as well as sources of relief. Palen and Vieweg (2008) examine how collaborative interactions and collective behavior on a SNS supported crisis-related response. Findings suggest that such websites helped several groups of people (i.e., people directly affected by the event, and people peripheral to the event) in gathering, seeking, and sharing information regarding the unexpected events. Using action research methodology, White et al. (2009) investigates the use of SNSs by students and their acceptance as a potential tool in the context of emergencies. They conclude that social network sites are viable solutions to information dissemination and communications during emergency situations.

Motivations and Assumptions for the Study

As articulated above, there are various research studies on the use of social networking sites in routine contexts. A body of the literature focuses on the issue from a daily life perspective and attempts to create theoretical models including social network site use (or intention to use) as a research construct. Although these studies provide some insights on the antecedents of SNS use, these factors may not be applicable in emergency situations. In fact, emergency environments have several characteristics which do not exist for the routine environments, such as unpredictability, limited response time, interruption of operations, and threat to safety and well-being (Zdziarski et al. 2007). It is greatly likely that perceived value and benefits of the students' SNS use will be different from the routine environments. That is why further investigation is needed for identifying the factors influencing the use of social networking website use, particularly in the context of campus emergencies.

Although there are several studies on the SNS use in the context of campus emergencies (Hughes et al. 2008; Palen and Vieweg 2008; Palen et al. 2009), these studies are typically qualitative in nature. For instance, some of these research studies collected data from online SNSs and conducted qualitative analysis, such as action research and content analysis. The data and sampling is often a limitation since formal large scale surveys have not been carried out. These studies are usually from the domain of disaster research and focus on the issue from a more sociological perspective. The data collection usually happens within a short amount of time, as the data is perishable and disappears quickly. Thus, studies with such data are usually exploratory in nature. And also these research studies focus on how online social networks enable social convergence, collective problem solving, and information accuracy during and after the disasters, lacking a perspective which attempts to answer the question of what factors affects the usage of online SNSs at emergencies.

By considering the non-routine environment of emergencies, this study will present a theoretical model on the factors influencing the use of SNSs. Unlike the prior research which usually focused the issue in a sociological lens, the current study will focus more on the issue from the perspective of information systems and management and benefits from the technology acceptance model which is detailed in the next section. The study will specifically focus on the issue in the context of campus emergencies and investigate the perceptions of college students regarding their motivation to use the SNSs. Recall from the very first paragraph of this paper that the most critical and important goal of the emergency notification is to notify as much people as possible in the shortest time possibility. As discussed in this paper, SNSs have this potential to a large extent. Thus, our objective is to identify and validate the factors which determine the use of social networking sites by students in the case of emergency situations.

As for the assumptions of the current study, we expect that students will be using their PCs, laptops, as well as mobile devices to log in to their SNS profile. Considering its popularity and potential, we assume that students will be using Facebook during emergency situations. Actions, which are regarded as the 'SNS use', are anticipated to be logging in to the Facebook profile, checking status updates, incoming messages, and wall posts, and responding to them, chatting with friends, joining and participating in groups, etc. All of these activities should indeed be for information gathering, sharing, and exchange related to an emergency situation. The critical information regarding the emergency situation is likely to be gathered from any source (from a friend via a phone call or text message, email, etc., or from the university sources via text alerts, website, etc.), but exchanged using the Facebook platform.

Another assumption is that SNSs are parts of a multi-modal communications strategy. Some universities are already using SNSs as an additional communication channel in emergency communication, as some of the ENSs vendors offering systems that are integrated with SNSs. Our focus is to identify and validate the perceptions of students regarding their basic and critical motivations to use SNSs during emergencies. The ultimate goal is to encourage emergency authorities and university administrations to deploy SNSs as an additional emergency communication channel.

The next section details the theoretical arguments and provides the hypotheses to be tested.

Research Model and Hypotheses

Figure 1 presents the research constructs and model proposed in this research-in-progress;

Figure 1: Research Constructs and Model
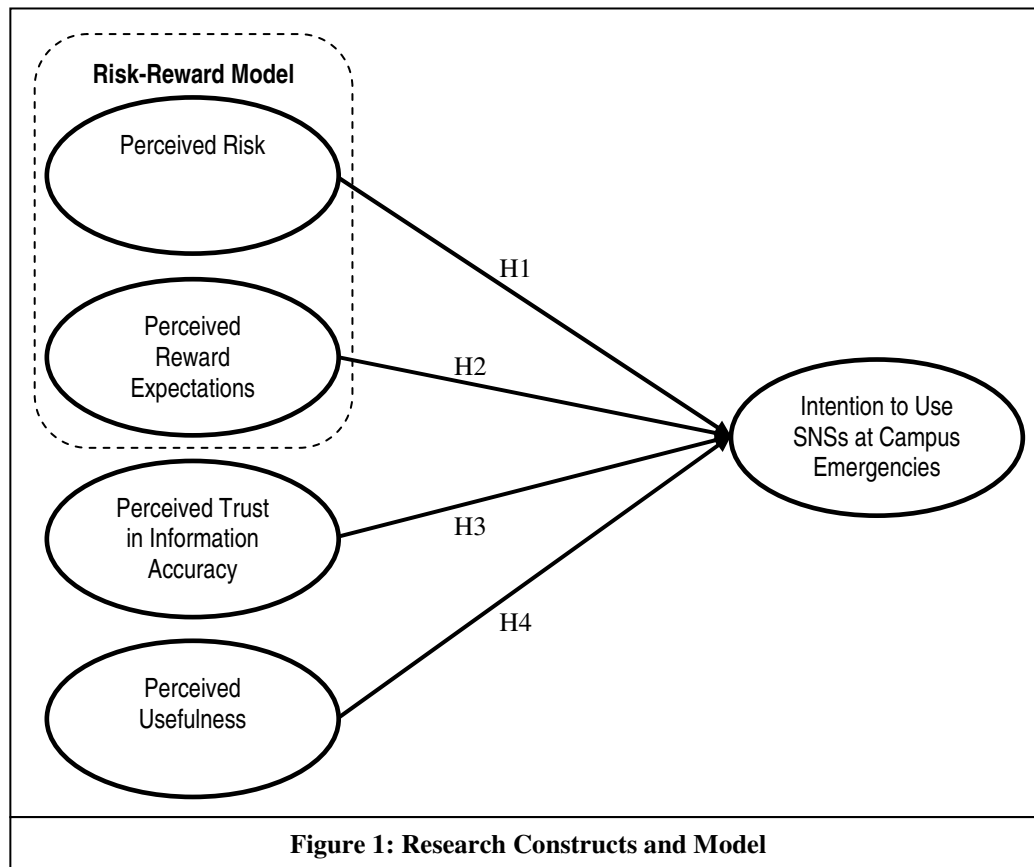
The key research construct in this paper, *intention to use SNSs at campus emergencies*, is derived from the technology acceptance model (TAM) (Davis 1986; Davis 1989; Davis et al. 1989), which is adapted from the theory of reasoned action (Fishbein and Ajzen 1975), and which is one of the most influential model regarding the technology acceptance (Schwarz and Chin 2007). Basic premise of the TAM is that actual system use is determined by the behavioral intentions to use the system, which is a function of attitudes towards using the system. Perceived usefulness and perceived ease of use are two particular beliefs which drive the attitudes. An extension of this model, unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al. 2003), includes some constructs, such as performance expectancy and social influence, which are typically determined by extrinsic motivations. A limitation here is that behavioral intention to use SNSs is typically driven by intrinsic motivations. Another limitation is that TAM model or its extensions considers the technology use on a professional setting, which may not be applicable in online social networks setting (Jacks and Salam 2009). In addition, other supporting theories are needed to explain the behaviors which determine SNS use in emergency context, as emergencies have different

characteristics from the routine environments as well as behaviors, because different motivations lead the person to behave.

For the reasons mentioned above, we utilized the theories of motivation in order to explain the behavioral intentions to use SNSs. One theory considered is *self determination theory* (Ryan and Deci 2000). Intrinsic motivation, which is elucidated by this theory, explains what people will do without external inducement (Malone and Lepper 1987). Jacks and Salam (2009) indicate that intrinsic, rather than extrinsic motivational elements lead to use of SNSs, which is also valid in emergency context. We also consider *cognitive motivation* as it focuses on perceived rather than actual outcomes which influence the behavior (Weiner 1992). This view suggests that a person is motivated to behave if he/she has some kind of reward expectation which outweighs the perceived cost of the action taken. It is argued that the balance of risk-reward calculations made by an individual explains their motivation to help others during emergencies (Wu 2009).

Therefore, based on the motivational theories as well as risk-reward model, we examine the impact of *perceived risk* and *perceived reward expectations* as well as *perceived trust in information accuracy* on SNS use at campus emergencies. We also examine how *perceived usefulness*, which is a motivation towards technology acceptance, and which is based on TAM model, influences social networking site use during emergencies.

Perceived Risk and Reward Expectations

Risks are potential losses that are viewed as the consequences of decisions, while risk perceptions are individuals' expectations about both the probability and severity of disaster impacts (Tierney et al. 2001). It is argued that, as a cognitive motivational factor for emergency response, risk perception is one of the key factors which determine a person's behavior in responding emergencies (Dovidio et al. 1991; ORC Macro 2006; Wu 2009). In line with this, we would expect that students will be motivated from the fact that their and friends' health and well-being will be at risk during emergency situations, which will enable them to share and gather information using online SNSs. Therefore, we propose that perceived risk of students will determine their behavioral intentions towards using online social networking sites.

Rewards of risk taking in routine environments can be in the forms of monetary as well as social (e.g., gratitude and reciprocity) (Dovidio et al. 2006). In an emergency context, people are likely to analyze the situation by considering the risks and costs associated with their possible actions, and then make decisions and take actions which will lead to the best possible outcome (Penner et al. 2005; Piliavin et al. 1981; Wu 2009). The reward expectation in such situations will be the safety and well-being of themselves or their friends. For safety and well-being, it is of vital importance for students to gather accurate and timely information regarding the emergency situation. As literature shows, people are greatly likely to obtain such information from their friends by using online SNSs (Palen and Liu 2007; Vieweg et al. 2008). Such websites as well as other social media tools are able to provide up-to-date and high-quality information at emergencies (Brunner and Giroux 2009). In parallel with this, we would expect that perceived reward expectations of students will lead to their behavioral intention to use SNSs during campus emergencies. Therefore, based on the risk-reward model, we propose the following hypotheses;

> **Hypothesis 1:** *Perceived risk has a positive effect on behavioral intention to use social networking sites at campus emergencies.*

> **Hypothesis 2:** *Perceived reward expectations have a positive effect on behavioral intention to use social networking sites at campus emergencies.*

Perceived Trust in Information Accuracy

Another factor we consider is the perceived trust in information accuracy. Trust is defined as "the subjective assessment of one party that another party will perform a particular transaction according to his or her confident expectations, in an environment characterized by uncertainty" (Ba and Pavlou 2002). Research shows that trust plays a critical role in promoting information and knowledge sharing among the community members (Ridings et al. 2002; Chiu et al. 2006; Hsu et al. 2007). On the other hand, information accuracy is of critical importance in emergency situations. The reason is that people who have concerns about themselves and their friends and families are seeking accurate information to take actions, such as help in response efforts. According to recent research, it was possible to gather accurate information about victims, their families, and the university community during and immediate aftermath of the Virginia Tech incident. This is achieved through social convergence which is created through online SNSs (Palen et al. 2009; Vieweg et al. 2008). Furthermore, there is an issue called normalcy bias,

which leads the community to not to take emergency warnings seriously. It is argued that this is a serious problem for school administrations, as the receivers of the information or warnings may not trust in the information sent even if the alert is issued (Gow et al. 2008). That is why SNSs are suggested as an alternative communication channel to disseminate critical information, as the users are able to gather and share information which they trust, and they exchange the information with the friends in their list on such websites. Thus, we propose the following hypothesis;

> **Hypothesis 3:** *Perceived trust in information accuracy has a positive effect on behavioral intention to use social networking sites at campus emergencies.*

Perceived Usefulness

Perceived usefulness is one of the factors related to cognitive motivation for technology acceptance (Wu 2009). In TAM model, perceived usefulness is considered in organizational context and defined as the "prospective user's subjective probability that using a specific application system will increase his or her job performance" (Davis 1989; Davis et al. 1989). As a motivational determinant of behavioral intention, perceived usefulness is one of the key research construct in our research model. However, we adapt this construct to fit in the emergency context as different informational requirements (e.g., accessibility, relevancy, etc.) exist in such contexts. In the context of this study, perceived usefulness is defined as prospective user's subjective probability that using a SNS will increase his/her safety and well-being in emergency situations. As mentioned earlier, it is of great importance for students to have accurate and relevant information which is accessible, when the university campus is exposed to an emergency situation. Students are likely to gather and share this information through online SNSs and will likely to increase their perceptions towards the usefulness of these websites. Therefore, we propose the following hypothesis;

> **Hypothesis 4:** *Perceived usefulness has a positive effect on behavioral intention to use social networking sites at campus emergencies.*

Research Plan and Methodology

The constructs proposed in the previous section will be measured by a survey instrument. The items will be adapted and modified from the previously developed measures from the relevant literature. An online survey will be created using SurveyMonkey to a sample of students enrolled at a major Northeastern university. Several reminders will be sent to students in order to increase the response rate (Dilman 2007). Before administering the main survey, a pilot survey will be delivered to a sample of students in order to ensure the effectiveness of the methodology and measurement. Students will be asked to give their opinions and feedback about the survey. Furthermore, the survey questionnaire will be discussed with senior academicians as well as the university personnel involved in emergency response in order to establish the face validity. After the pilot survey and face validity process, survey items will be modified, dropped, and/or added if necessary.

The measurement and structural model will be tested using SmartPLS 2.0 software (Ringle et al. 2005). To measure the reliability of testing the measurement model, two methods will be used (i.e., internal consistency reliability and indicator reliability). If the composite reliability values of the constructs are greater than the recommended threshold value of 0.70, we will conclude that measures have internal consistency reliability (Nunnally 1978). Squared item loadings that are greater than the threshold level of 0.50 will indicate that indicator reliability is acceptable. To measure the factorial validity of the constructs, two methods will be used (i.e., convergent and discriminant validity). If each measurement item significantly loads on its respective latent construct with a threshold level greater than 0.70, and loads more highly on their respective construct than on any other, convergent validity will be confirmed. To test discriminant validity, the diagonal elements of the cross-correlation matrix (i.e., 1.00) will be replaced with the square root of each latent construct's AVE value (Fornell and Larcker 1981). If these values are greater in all cases than the off-diagonal elements in their corresponding row and column, discriminant validity of the scales will be supported.

Conclusion

This research-in-progress attempts to contribute to our understanding of the students' behavioral intentions to use social networking websites, particularly in the course of emergency situations. The study specifically examines the impact of perceived risk, perceived reward expectations, perceived trust in information accuracy, and perceived

usefulness on intention to use SNS. To our knowledge, there is no study developing theoretical model to explain this phenomenon in the context of campus emergencies.

There are some implications to this study from the perspective of the university administrations and emergency departments. After the Virginia Tech incident, many colleges deployed SMS or E-mail based notification systems. However, as mentioned earlier in this paper, these systems have various limitations. In order to disseminate the critical information to a greater number of students in the shortest time possibility during emergencies, university administrations should deploy additional communication technologies. Findings of this study will shed light on this issue and provide guidelines on the use of SNSs for this purpose. By identifying and validating the factors determining the SNS use at campus emergencies, emergency authorities and university administrations will have a better sense regarding the perceptions of the students. By considering our research model, policy makers involved in the emergency notification and response will be better able to shape their strategies regarding campus emergencies and be better equipped on how to create awareness at university campuses.

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