

FUNCTIONS OF AND COMMUNICATION BEHAVIOR ON TWITTER AFTER THE 2015 NEPAL EARTHQUAKE

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Abstract

This paper looked into how Twitter was used by users three days after the 2015 Nepal earthquake and which communication behavior were reflected in the microblogs. Grounded on the Uses and Gratifications Theory (U>) and the Situational Theory of Publics (STP), this risk and crisis communication study proceeded with a content analysis of 300 tweets per day mined from April 26 to 28, 2015. After data mining, inter-rating schemes which involved four trained raters sat down to analyze the data based on the research problems. Results showed that the top function of Twitter was the helping function followed by information, communication, and political functions, respectively. Although the predominance of these functions were uniquely different compared with findings in previous studies, results revealed that certain functions of Twitter persisted across various crises. In addition, most users exhibited problem-facing behavior while only a number of users showed constrained behavior. This implied that those who took to Twitter possessed high problem recognition of the crisis and point to how Twitter was used to spread information, making it a very useful social media tool during a crisis. Moreover, results supported Grunig (2013) who argued that, in times of crisis, people become active users of social media tools. Implications for risk and crisis communication plans based on the findings of the study are discussed.

Keywords: 2015 Nepal earthquake, risk and crisis communication, Twitter, Uses and Gratifications Theory, Situational Theory of Publics

TABIAT FUNGSI DAN KOMUNIKASI TWITTER SELEPAS GEMPA BUMI NEPAL 2015

Abstrak

Kertaskerja ini meneliti bagaimana *Twitter* digunakan tiga hari selepas berlaku gempa bumi di Nepal pada atahun 2015 dimana tabiat komunikasi di paparkan dalam blog mikro. Dengan menggunakan Teori Kegunaan dan Kepuasan dan Teori Situasi Publik (STP), kajian risiko dan krisis komunikasi ini dijalankan dengan menganalisis 300 *tweets* setiap hari dari 26 hingga 28 April 2015. Selepas mengumpul data dan menjalankan skema penilaian yang melibatkan empat orang penilai untuk menganalisis data hasil dari permasalahan kajian, dapatan kajian menunjukkan fungsi tertinggi *Twitter* ialah fungsi bantuan diikuti dengan maklumat, komunikasi dan politik. Walaupun kehebatan fungsi-fungsi ini adalah unik dan berbeza berbanding dengan kajian-kajian lepas, kajian ini membuktikan ada beberapa fungsi *Twitter* yang wujud dalam beberapa krisis. Ramai pengguna menampilkan *problem-facing behavior* sementara hanya segelintir yang menampilkan *constrained behavior*. Ini menunjukkan mereka yang guna *Twitter* mempunyai pandangan yang serius terhadap krisis ini dan ini memberi indikasi bagaimana

Twitter digunakan dan menjadikannya alat yang amat bermanfaat dalam waktu krisis. Kajian berkaitan banyak menyokong Grunig (2013) yang membahaskan bahawa dalam waktu krisis, khalayak menjadi pengguna alat sosial media yang aktif. Implikasi untuk perancangan risiko dan krisis hasil dari dapatan kajian juga dibincangkan.

Kata kunci: *Gempa bumi Nepal 2015, komunikasi krisis dan risiko, Twitter, Teori Kegunaan, dan Kepuasan, Teori Situasi Publik (STP)*

Introduction

The world has been a witness to the rampant growth and development of technology, from radio to television, to the invention of cellular phones, and to the continuous development of the internet. With these technological advancements, a lot of processes have been made easier and more accessible; this includes the communication process, which also develops and creates new media.

It cannot be denied that more and more people patronize the use of new media such as the different social networking sites. This maybe because these new media, aside from the uses it can offer as stated above, provide a very visual and interactive experience to the users which makes the process of communication more dynamic. In addition, the presence of the internet and social media enables people to update or get updates instantly regarding important events. The scope and power of social media have increased drastically over the past few years. Today, it is estimated that there are over 1.39 billion people worldwide who are using social media, and the numbers are expected to increase as the years pass by.

Twitter is a widely used social media platform. It is both a microblogging and a social networking website that enables the users to post and read short messages (containing only 140 characters) called "tweets." In addition, Twitter users can follow one another for them to get updates from each other's posts. Twitter also has a retweet button which allows users to repost a certain tweet which is similar to the share button on Facebook, and a favorite button which is similar to the like button on Facebook. Moreover, a user can also create and use hashtags (ie. #TyphoonYolanda #ReliefPH) in order to categorize or organize their posts. When there are a lot of people using a specific hashtag in their tweets, there is a possibility that this hashtag will trend locally or worldwide (to be included in the trending list). In addition to this, a user can search a specific hashtag and see all the posts which contain this hashtag. As part of the security features of Twitter, users can choose to make their profiles available to the public or they can keep their profiles private, meaning only those who are following them will be able to see their tweets.

Because of the following characteristics Twitter has, the medium has been used on many events, whether crisis or non-crisis. In 2009, Twitter played an important role during Typhoon Ondoy where people made use of Twitter to ask for help or rescue. Because of this, the officials were able to respond quickly to the victims' calls, and in turn were able to rescue many people from possible harm, as suggested by the recorded data during the typhoon.

On the 25th of April 2015, a magnitude of 7.8 earthquake struck central Nepal, and like most earthquakes, it was not foreseen prior to its impact. According to an article posted in *Earthquake-report.com* last May 26, 2015, the death toll from the first earthquake has totaled to 8510, and the second earthquake totaled to 163 in Nepal. In addition to this, the number of people missing were around 199, and of these, around 170 were in the affected earthquake regions. Also, there were 80 foreigners who were reported missing. As of the date indicated above, there were still no data available on the extent of damages the earthquake had caused, however; early witness reports suggested that many buildings sustained damage in some of the areas affected. This shows how devastating an earthquake can be especially to areas unprepared for these types of crisis.

The researchers looked into the functions of Twitter and the communication behavior of users who tweeted after the 2015 Nepal Earthquake for several reasons. First, the event was relatively recent, which means that, in terms of research, there would be little or no studies and thus presents a fertile ground for a risk and crisis communication investigation. Second, the researchers focused on this crisis it does bear several implications for risk and crisis communication in the Philippines, as the country also experiences several earthquakes periodically. Lastly, Twitter was chosen as the social media in question as it does present the potential for it to be integrated into different crisis communication or crisis preparedness plans.

This paper zeroed in on the following questions:

1. What functions did the microblogging site Twitter serve after the 2015 Nepal Earthquake?
2. What communication behaviors of Twitter users were evident immediately after the 2015 Nepal Earthquake?

This paper argues that risk and crisis events shape microblogging sites like Twitter into a platform serving altered functions and which results in altered behavior of communicators in using the social media.

Information shared through social media is very important among risk and crisis communication experts. These information aid in updating situational awareness (knowledge of what is currently happening on areas affected by a crisis) and improving crisis response. Hence, by analyzing the tweets and knowing the different functions of Twitter, as well as the user's communication behavior on the face of a crisis, the researchers would be able to see what can be done to improve crisis communication in the country.

Review of Related Literature

Mayfield (2006, as cited in Buenher et al., 2011) believes that social media are at the core of human communication because they possess certain characteristics such as participation, openness, conversation, community, and connectedness. This has become more and more observable nowadays as almost everyone, if not all, are using social media for different purposes such as communication, entertainment, gathering information, etc.

Consumers of information are at the same time becoming contributors of information; this means that social media provide the basis for user-generated media (Buenher et al., 2011).

Because of the new media, people can update or get updates instantly through the use of an internet-enabled device. Even news may spread through social media in just a click of a button, even without the presence of journalists.

Buenher et al. (2011) explains that new media such as social networking sites have a lot of potential for encouraging preparedness, knowledge, and involvement in a crisis response because it makes the topic visual and interactive. For example, Akmal and Ahmad (2011) report that Facebook assists Malaysian environmental non-government organizations in disseminating environmental messages to the public due to its accessibility and high users interface. Meanwhile, Bidin and Mustaffa (2012) claim that blogs also appeal to the youth as they offer an outlet for personal expressions and reflection, as well as way to communicate and connect with others.

Indeed, social media help encourage people to be prepared, knowledgeable, and involved in times of crisis. Combine this with the broad scope of social media, there is indeed a possibility for these new media to play an important role during a risk and crisis events. Hence, there is a need to study social media in relation to risk and crisis communication.

Conventionally, risk and crisis events were studied from the lens of traditional media. For example, Dafrizal, Ibrahim, Kee and Ahmad (2013) investigated reporting trends on violence issues in Malaysian and Indonesian mainstream media. However, with the continuous and rampant development of technology, the manner by which people interact with each other and how people communicate when there is a crisis have evolved. Through the new media, news about a crisis can now be shared to millions of people in an instant even without the presence of journalists (Buehner et al., 2011).

Today, crises attract the attention of several social media users which is why the dissemination of information regarding a certain crisis becomes faster. With just a click of a button, a user will be able to share news which may come from official or unofficial sources. This has become a very common phenomenon especially in social networking websites.

In late October 2007, Twitter was used to inform citizens of time critical information about road closures, community evacuations, shifts in fire lines, and shelter information in relation to the Southern California US wildfires (Sutton, Palen and Shklovski, 2008, in Hughes & Palen, 2009). More recently, Twitter was used by those in the area affected to report on the events that took place in the Mumbai, India terrorist attacks on November 26, 2008 (Stelter & Cohen, 2008, as cited in Hughes & Palen, 2009).

In the Philippines, a study conducted by Salazar and Yambao (2012) looked at the applications of Twitter in the disaster risk reduction management, where they found that Twitter is a viable tool in communicating information. The research found that Twitter can be used by different agencies such as Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), National Disaster Risk Reduction & Management Council (NDRRMC), Metro Manila Development Authority (MMDA), the Philippines National Red Cross local government units, and various media outlets.

After the Great East Japan Earthquake in Japan 2011, Miyabe, Miura, and Aramaki (2011) investigated the numerous tweets which were exchanged on Twitter. The researchers have noted that there have been several studies which pointed out that microblogging systems have shown potential advantages during emergency situations; however, it remains unclear how people use them. The results revealed two things: (1) people in the disaster area tend to directly communicate with each other (reply-based tweet), and (2) people in the other areas prefer to spread the information from the disaster area by using retweets.

Another study conducted by Cho et al. (2013) explored the social media use during Japan's 2011 earthquake. In order to explain how social media use transforms the locus of crisis communication, the authors collected sufficient data on tweets in Japan from the Twitter public timeline during the earthquake. The researchers have also taken a look at the Japanese government's Twitter account and websites. The results indicated that crisis communication on Twitter was led by peer-to-peer communication and relied on peer-generated information. In addition, the government's traditional leadership role in exercising control over crises and facilitation crisis communication were not apparent on Twitter. By examining the shift in the locus of crisis communication through social media, the researchers were able to provide insights into the dynamics of social media use during risk and crisis events.

There had been several studies which analyzed the relationship of a crisis, more specifically earthquakes, and Twitter; this present study aims to contribute to the literature of risk and crisis communication particularly the use of the microblogging site, Twitter, in investigating the social media functions and communication behaviors of users during an earthquake. In order to proceed in a theoretically sound approach, the authors made use of two relevant theoretical underpinnings.

Theoretical Framework

Situational Theory of Publics

The theory was first developed in 1968 by James E. Grunig. According to Aldoorj et al. (2010), the situational theory of publics (henceforth STP) is a theory that can help explain how publics form in the face of risk and crisis. It states that certain factors such as problem recognition, level of involvement, and constraint recognition influence whether people will merely process the information about a problem or whether these individuals will actively seek out for more information. The theory may be one of the most useful theories for understanding why publics communicate and when they are most likely to do so (Grunig et al., 2007).

According to the theory, people will automatically form their own groups in the digital world depending on their perception of a crisis and how this crisis can affect them, thus by using this theory, it will be easy to identify the groups which have formed after the crisis and how these groups behave. The theory advances two dependent variables (information seeking and information processing), and three independent variables (problem recognition, constraint recognition, and level of involvement) (Grunig, 1982, 1983, 1992, 1997; Grunig & Hunt, 1984, as cited in Grunig et al., 2007).

Grunig (1997, in Grunig et al., 2007) looked into the relationship among the different variables and claimed that “active publics” have low constraint recognition and high problem recognition and involvement; these publics are actively seeking information about a problem and are potentially sharing information becoming activists about it. Meanwhile, “aware publics” have high problem recognition and involvement, but due to higher level of constraint recognition, do not move to action. Once aware publics perceive constraints to be removed, they are more likely to become active. “Latent publics” have low problem recognition, but their level of involvement is still moderate to high.

Grunig et al. (2007) argue that, in times of a crisis, people will become active information seekers and processors. STP further argues that people will become active publics and seek information from organizations when they recognize a problem, are highly involved in the issue, and believe that they can actually do something about it. For the purpose of this study, the researchers examined two variables (problem recognition and constraint recognition) to identify which communication behavior was reflected through the tweets of people three days after the earthquake made an impact.

Uses and Gratifications Theory

The Uses and Gratifications Theory (henceforth U>) was coined by Katz, Blumler, and Gurevitch in 1974. According to the uses and gratification perspective, media use is determined by several variables including “people’s needs and motives to communicate, the psychological and social environment, the mass media, functional alternatives to media use, communication behavior, and the consequences of such behavior” (Rubin, 1994, p. 419, as cited in Merkin, 2009).

Uses and gratifications research has typically focused on how media are used to satisfy cognitive and affective needs involving personal needs and entertainment needs (Rubin, 2002, in Merkin, 2009). Stafford and Gonier (2004, as cited in Merkin, 2009) have identified several gratifications from internet use that motivate users’ behaviors. These include web searching, the acquisition of information, the ability to engage in interpersonal communication, and socialization.

However, for the purpose of this study, the researchers did not measure the antecedents in the U> to identify the functions of Twitter after the 2015 Nepal Earthquake, instead, the researchers adapted categories from a previous study which made use of U> typologies to content analyze blogs posted after Hurricane Katrina. In addition, the paper looked whether the results from the previous study remained consistent through the passing of time and when a different medium and crisis is given focus.

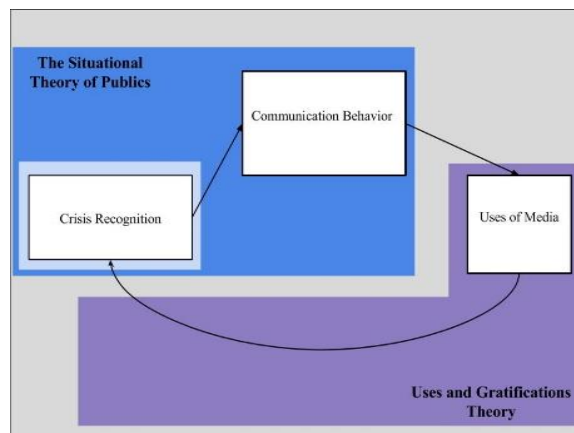


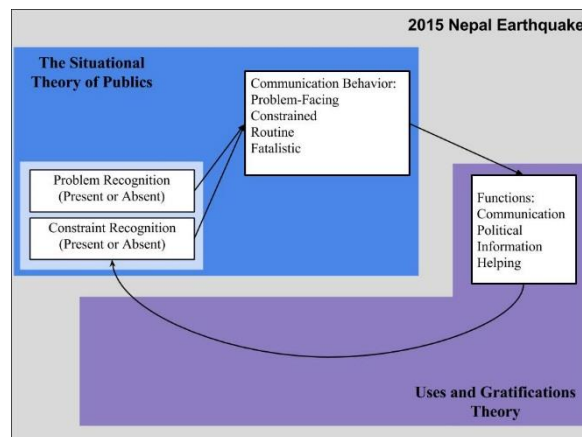
Figure 1. Integration of the Theories

The Uses and Gratifications Theory by Katz, Blumler, and Gurevitch (1974) and Situational Theory of Publics by Grunig (1968) argue that there are factors which may affect people’s communication behavior and how they use a certain medium. Specifically, U> suggests that users have different needs which they want to be gratified, these gratifications will in turn affect how they perceive a certain medium and their attitude toward that medium, the more needs the medium can gratify, the more it will be used by the users. However, as stated in the discussion of the U>, the researchers did not take a look at these variables.

On the other hand, STP proposes that there are variables such as problem recognition, constraint recognition, and level of involvement which affect how a person behaves and communicates. However, as previously mentioned, this study only examine STP’s propositions of problem recognition and constraint recognition.

Figure 1 shows the integration of the two theories used in this study. According to the STP, there are variables which when combined yield different communication behavior. These variables are represented by crisis recognition. In theory, a person will not act on something

he/she does not know about (i.e. If a person is not aware that there is an earthquake in Nepal, he/she will not tweet about the matter). Crisis recognition then paves the way for the communication behavior (i.e. If a person knows that there is an earthquake but he/she is not



aware of the damages it has caused, he/she will most likely not participate, however, if a person knows how grave the situation his, he/she will be involved more). In the STP, the proponent identified four communication behaviors The researchers looked whether each communication behavior yielded different functions. These functions were adapted from a previous study which identified four major uses of blogs after a crisis by content analyzing blogs poster after Hurricane Katrina using U> typologies. Moreover, in theory, if a user finds out that a certain medium is able to gratify his/her needs, he/she will continue to use that medium in future events. This is why the framework for this study is represented as a cycle.

Figure 2. Concepts adapted from studies and the Situational Theory of Publics

In his theory, Grunig (2007) measured problem recognition and constraint recognition in a low to high matrix; however, the researchers thought that it will be hard to identify which tweets reflect low or high problem recognition and constraint recognition. Because of this, the researchers decided to use present (instead of high) and absent (instead of low) as the measures for the two variables.

On one hand, Grunig (2007) defines problem recognition as the extent to which individuals recognize a problem facing them. Grunig and Hunt (1984, in Grunig et al., 2007) explained that people do not stop to think about situations unless they perceive that something needs to be done to improve the situation. On the other hand, constraint recognition is the extent to which individuals perceive factors that inhibit their ability to move to action or change behavior. Perceived high constraints tend to reduce communication.

In addition, the researchers also looked at the communication behavior of Twitter users after the earthquake by measuring two independent variables stated above. As suggested by the Situational Theory of Publics, people may possess the following communication behavior during a crisis: (1) problem-facing behavior, (2) constrained behavior, (3) routine behavior, and; (4) fatalistic behavior.

Grunig (2013) provided the definitions of the different communication behavior in his theory. First, Grunig (2013) defined the fatalistic behavior as individuals who do not recognize a problem nor see themselves connected to the consequences of an organization's behavior. In addition to this, these individuals do not feel that there is anything they could do about the situation. As explained in the theory, the public processes and seeks little information about the focal issue and is highly unlikely to act. These people have low problem recognition and high constraint recognition.

Second, Grunig (2013) defined constrained behavior as that of individuals who recognize a problem and feel personally connected to it. However, they feel that they cannot make a difference in how the issue is handled. They are more likely to process and seek information about the issue as compared to the fatalistic public. Despite constraint recognition, these individuals are over three times more likely to have acted than fatalistic public. These people have high problem recognition and high constraint recognition.

Third, Grunig (2013) defined routine behavior as that of the public that recognizes the problem and feels personally connected to it. In addition, these individuals feel that their efforts can make a difference. These individuals process information at about the same level as the constrained public but they will actively seek information about the issue much more frequently. These individuals are nearly twice as likely to have acted toward the issue as the aforementioned constrained public. These people have high problem recognition and low constraint recognition.

Finally, Grunig (2013) identifies a fourth communication behavior called routine behavior. The researchers operationally define routine behavior as that of people who have low problem recognition and low constraint recognition.

As explained in the theoretical framework, this study did not take into account the variables presented in the U> instead, the paper adapted concepts from a previous study which also made use of the same theory. Losa (2010) looked into the motivations, evaluation, and usage of Twitter, the researchers found that users use Twitter for the following reasons: (1) personal, (2) posting regarding daily activities, (3) small talk, (4) information, and; (5) expressing one's feelings,

The researchers argue that these uses are altered when Twitter is subjected into a risk and crisis context, more specifically the 2015 Nepal Earthquake. The altered functions of Twitter were derived from the study of Macias et al. (2009). In their study, they propose a taxonomy of functions of blogging during Hurricane Katrina as follows: (1) communication, (2) political, (3) information, and (4) helping.

Because this study utilized a retrospective design, the researchers investigated whether the results of Macias et al. (2009) in relation to the function of blogs during Hurricane Katrina in the United States could be consistent when examined in a different context. This paper also aims to determine whether new functions, which were not identified in previous studies, might emerge from the data.

Methodology

This study aims to investigate the functions and communication behavior of people on Twitter after the 2015 Nepal Earthquake. To this end, the paper used a mixed method design combining quantitative descriptive statistics, and qualitative content analysis. The combination of quantitative and qualitative method in this paper aimed to unearth salient topics related to this present study's objectives.

In order to mine the data, the researchers made use of an online software, Twitter Advanced Search (henceforth TAS), to build the corpus of tweets which served as data of the study. The unit of analysis used in this study were individual tweets sent by people from all over the world.

Using TAS, the researchers collected tweets posted immediately after the earthquake in a span of three days immediately after the event. To systematize the mining of data, the researchers, using the program, included only those tweets with the hashtag #NepalEarthquake. The mined tweets were further filtered by removing retweets to ensure that all data included for analysis were unique. In addition, the tweets analyzed did not come from a specific or targeted location; instead, the researchers mined tweets worldwide so that the researchers would be able to examine Twitter use on a macro scale, including use inside and outside the area affected by the crisis.

The researchers mined 300 tweets each day for a total of 900 tweets. The tweets were selected through simple random sampling, through a random number generator. They created two separate code sheets, one for the functions and the other for the communication behavior of Twitter users. The categories and subcategories included in the code sheet for the functions were adapted from the categories presented in Macias et al. (2009). Four BS Technical

Communication students from the same institution where the study was conducted were purposefully selected and trained in order to serve as the inter-raters in the data coding. The code sheet had examples for each of the sub-category to help the inter-raters in properly coding data. On the other hand, the code sheet for measuring the communication behavior only had two variables, problem recognition and constraint recognition. The researchers instructed the inter-raters to rate both variables either present or absent. The researchers practiced both the stability and reproducibility designs for reliability test in content analysis.

In order to examine the functions as identified by (Macias et al., 2009) and which communication behavior was dominant on Twitter after the Nepal Earthquake 2015, the study made use of the descriptive statistics. On the other hand, to strengthen the study’s explanatory power, the study followed Silverman’s (2006) qualitative content analysis, which is a relatively simple process of identifying the connections and patterns across the data set, with the aim of discovering recurring themes related to both the functions of Twitter (communication, political, information, and helping) and the communication behavior of people (problem-facing, constrained, routine, and fatalistic) during the 2015 Nepal Earthquake.

Results and Discussion

Functions of Twitter after the 2015 Nepal Earthquake

Going back to Macias et al. (2009), the researchers presented four categories for the functions of blogs during Hurricane Katrina which were communication, information, helping, and political. The results suggest that the four functions remained consistent even when a different medium and a different crisis were focused. Figures 3 and 4 and Table 1 present the data as to the functions of Twitter after the 2015 Nepal Earthquake.

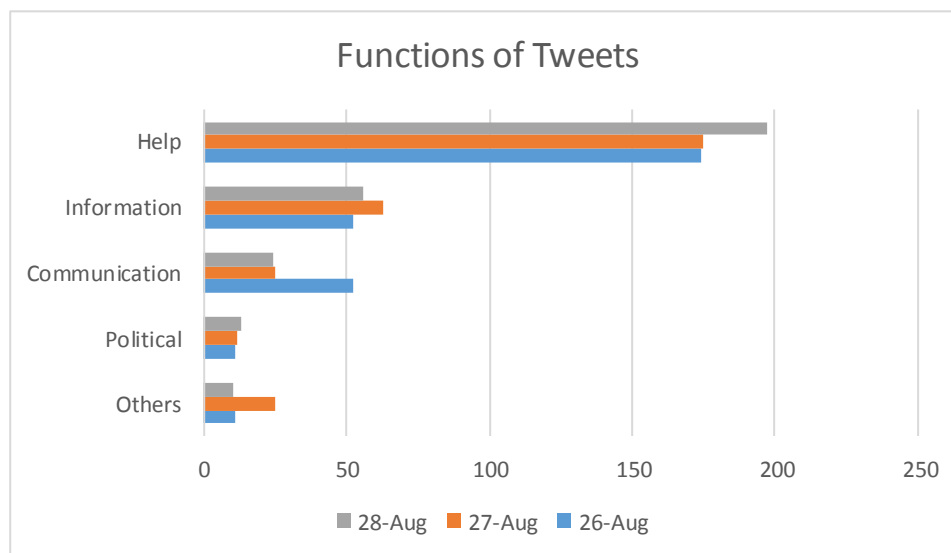


Figure 3. Functions of Twitter over a three-day period after the 2015 Nepal Earthquake

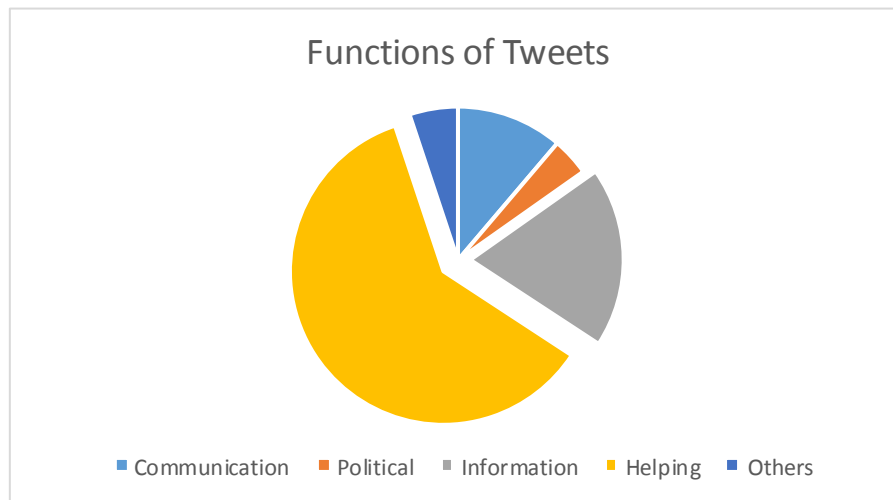


Figure 4. Summary of the Functions of Twitter after the 2015 Nepal Earthquake

Table 1.

Frequency of the functions of Twitter after the 2015 Nepal Earthquake

Functions	August 26	August 27	August 28	Total	Percentage
Helping	174	175	197	546	61%
Information	52	63	56	171	19%
Communication	52	25	24	101	11%
Political	11	12	13	36	4%
Others	11	25	10	46	5%

The top function of Twitter after the 2015 Nepal earthquake was the helping function, which had the most number and consistently increased every day. The information function ranked second; on the first day, the information and communication functions had the same frequencies. However, the information function made its peak during the second day then decreased on the last day. The third function is communication which drastically and consistently decreased from August 26 to August 28. Lastly, the fourth function which is the political function remained almost constant for three days. Although the political function received the least frequency for each day, it constantly increased for the three days. There were also a number of tweets which were not categorized into any function, this will be discussed in the succeeding parts of the paper as a new function may arise from these tweets which were coded as others.

More than half of the tweets were coded into the helping function which is the top function, followed by the information, communication, and political functions. Table 1 shows that helping is the top function with 61%, more than half of the data. Information comes in second with 19%. The third is communication with 11%. Lastly, political with 4%. There were also some tweets which did not fall into any category, and the researchers labeled it as “others,” these tweets represent 5% of the data.

The result of this study did not align with the result of the previous study conducted by Macias (et al., 2009), which suggests that information (which had the total frequency of 730) is the top function during a crisis, followed by political (622), communication (584), and helping (511). However, it must be stressed that the previous study looked into blogs which were very different from the medium in focus of this study which is Twitter, a microblog. Also, it must be acknowledged that the crisis in focus on the previous study is not the same as the crisis this paper looked at. Moreover, the study did not look only at tweets sent by the people in Nepal but worldwide, and that most of the tweets which were analyzed were not sent from Nepal, hence, there might be some inconsistencies with the results of this study compared to the results of previous studies. It can be concluded then that users who were outside the area affected by the crisis mostly made use of both the functions of helping and information.

Moreover, it was documented that the destructive earthquake in Nepal, which claimed the lives of at least 4,000 victims and injured many more, took a toll on the country's Internet connectivity, which was already one of the least developed in the region. This can be supported by several articles posted after the earthquake and even some tweets which were posted by those who have experienced the earthquake first hand.

M. @MMerajKKhan Apr 26
Situation in #Kathmandu #Nepal is difficult — Internet is down and parts of
Kathmandu have no electricity. #NepalEarthquake #Kathmanduquake

This might be a contributing factor as to why there were only few people from Nepal who were able to communicate and communicated with in that situation, thus, limiting the Communication Function of Twitter. In addition to this, Nepal has less than 0.6% of total global users, and it is estimated that there are only 100,000 Twitter users in the country (Kshetri, 2012). This may also be a reason why most of the tweets used as the data of this study were sent from outside Nepal. It can be concluded that since there are not much Twitter users in Nepal, as compared to other countries, and that power outage and loss of internet connection were experienced during and after the earthquake, the functions of Twitter might be limited in this situation and might not be observed in the tweets, thus, yielding a different result for the functions of Twitter after the 2015 Nepal Earthquake.

For the Helping Function, the top sub-category is social support which represents 90% of the total tweets under the Helping Function. On the other hand, the top sub-category of the Information Function is posting official news which represents 88% of the data under the Information Function. There were two sub-categories which had the most frequencies of the Communication Function, these were documenting life experience which had 52%, and looking for missing which had 33%. Lastly, the two categories for the Political Function which are information about government response and comment on government response share almost the same percentage with 56% and 44%, respectively.

The previous study conducted by Macias et al.(2009) presented 22 sub-categories for the four functions, however, in this study, there were some sub-categories which were not observed in the tweets of people three days after the 2015 Nepal Earthquake; these are: A. political (1) comment on looting, (2) question about looting, B. information (1) checking on status of loved

ones' area, (2) checking status of one's home, C. helping (1) attempts to foster a community, (2) organization of rescue help, (3) offer rescue help. A total of 7 sub-categories were not observed in the tweets of people posted three days after the 2015 Nepal Earthquake, there were only 15 sub-categories which were coded.

On the other hand, regarding the functions, there has not been any study which looked into the function or sub-category of a medium during a crisis is the most important. Thus, the researchers cannot conclude that Twitter was more useful during the earthquake in Japan as compared to the 2015 Nepal Earthquake because the top function identified in this study is Helping, and the Communication Function only ranked 3rd. Moreover, the Helping Function, which is the top function of this study is not a useless function. According to Macias et al.(2009), the Helping Function or emotive and therapeutic builds a stronger sense of community. In addition, the Helping Function might have also helped increase the donations for the recovery of the people in Nepal who were affected, however, this is just an assumption because this study is limited by its chosen method. It must also be taken into account that the Function of Information ranked second, which means that the medium was used in order to relay messages (whether official news or information), which to the researchers is a very important function of Twitter as it increases situational awareness, thus, resulting in faster relief and rescue efforts. Moreover, there are more tweets which contained information but were not coded into the Information Function because these tweets lacked credible sources.

However, the study having utilized content analysis, cannot determine the end result of the tweets that were analyzed, how these tweets were able to fulfill their functions (i.e. how the tweets which fell under the Helping Category helped improve rescue and relief efforts, or how the tweets which belong to the Political function affected the crisis situation, etc.) According to Macias et al.(2009), the nature of content analysis does not allow for knowledge to be gained beyond the text available.

Communication Behaviors on Twitter after the 2015 Nepal Earthquake

This section presents the results of the study after proceeding with a second content analysis, which were backed up by the key variables or concepts presented in Grunig's Situational Theory of Publics, of tweets posted after the 2015 Nepal Earthquake. Table 2 presents the summary of findings according to the communication behavior of users.

Table 2. Communication behaviors of Twitter users after the 2015 Nepal Earthquake

Communication Behavior	August 26	August 27	August 28	Total
Problem-Facing	93	93	94	280
Constrained	6	7	5	18
Routine	0	0	0	0
Fatalistic	0	0	0	0

Out of the 300 tweets which were analyzed, only 298 were coded; the two tweets did not reflect either of the two variables.

Drawing back from the review of related literature, Palen, Vieweg, Liu, and Hughes (2009, in Aldoory et al., 2010) said that microblogging is emerging as grassroots practice

alongside official emergency response and mainstream media coverage, opening up new opportunities and challenges. Microblogging engages bystanders and volunteers in providing continuous updates about different affected locations and developments of crises at particular points of time. This has also been observed from previous studies which looked into how Twitter was used on different types of crisis (as discussed in 'Twitter and Crisis' see pp. 12-14); these studies concluded that the main function Twitter played was information dissemination. Moreover, according to Buenher et al.(2011), consumers of information are at the same time becoming contributors of information, this means that social media provides the basis for user-generated media. The result of the content analysis supports these information and validates how Twitter can be used to make the dissemination of information faster in times of a crisis, this then supports the main proposition of crisis informatics, that because of the utilization of the new media, together with the traditional media during a crisis, situational awareness increases and would then result in improved relief and rescue efforts. The data shows that 100% of the tweets posted three days after the earthquake reflected problem recognition. This implies that people were able to easily access information through the medium.

Moreover, almost all of the tweets reflected a problem-facing behavior (93% of the total data), and only a number of tweets were coded to the constrained behavior (7% of the total data). The two other communication behaviors presented in Grunig's Theory, routine and fatalistic behaviors, theory were not seen on the tweets analyzed. There is also one tweet which the coders were not able to categorize.

93% of the tweets analyzed in this study reflected problem-facing behavior, which Grunig et al. (2007) describes as publics who recognize the problem and feel personally connected to it. Based on the data, Twitter users had high problem recognition and low constraint recognition. They felt that their efforts can make a difference and process information at about the same level as the constrained public, but will actively seek information about the issue much more frequently. These individuals were nearly twice as likely to have acted toward the issue as the aforementioned constrained public. They are those that risk and crisis communicators consider as active or aware publics, or people who would have acted and who would have sought and processed more information after the event.

This finding support the hypothesis proposed by Grunig in his theory the STP that in times of crisis, people tend to become active publics. Out of the four communication behavior identified in the theory, only individuals who have problem-facing behavior and constrained behavior can be segmented into the active and aware publics.

The researchers hence conclude that the medium in focus, Twitter, can play a very important role especially in spreading news, increasing situational awareness, and possibly making relief and rescue efforts fast for those who have been affected by a crisis.

Conclusion

After having analyzed the tweets sent three days after the 2015 Nepal Earthquake to investigate which functions of Twitter were present in the said event, and which communication behaviors were reflected through the posts of people, this study concluded that Twitter plays an

important role in risk and crisis related events such as earthquakes, typhoons, etc. because of the many uses it can cater to people (communication medium, information dissemination, etc.) This conclusion is not something new, it has been stated by several scholars in previous studies, as Buenher et al. (2011) stated, new media such as social networking sites have a lot of potential for encouraging preparedness, knowledge, and involvement in a crisis response because it makes the topic visual and interactive. However, this study through the use of two theories supports the conclusion and helps strengthen the literature on crisis informatics. The study also validates that in times of crisis, people will tend to become active as proposed by Grunig in his theory. This implies that twitter will be a very useful medium and will be widely used in future crisis. The results of this study show that the functions documented before were consistent even through the passing of time. The same functions identified by Macias et al, (2009) proved to be consistent even when a different medium and crisis were given focus; with that, risk and crisis communicators can hypothesize that in future crisis, the same functions of Twitter will be used by people. Moreover, it can be concluded that people who are outside of the area of crisis will most likely use Twitter's helping and information functions. In addition, the findings did not show any evidence of relatedness between the user's communication behavior and how they use the medium during the crisis.

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