

Use of Social Media in Natural Disaster Management

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Abstract. The possibilities for the use of social media in the management of natural disasters are discussed in the paper. A brief overview of natural disasters is given. The term social media is defined and their basic functions and components are described. Communication types and the means for their implementation between participants in natural disaster events are analyzed. Basic guidelines for organizing information exchange by social media are proposed.

Keywords: Web 2.0, social networking site, social media, natural disaster

1. Introduction

In recent years, the world has been hit with a series of big natural disasters, from Hurricane Katrina in USA, earthquakes in Haiti and Asia, the tsunami in Indonesia, the earthquake and tsunami in Japan, extremely cold winter in Europe. With the increase of natural disasters that have occurred in the past years it is expected their frequency will continue to increase in the coming years.

A natural disaster is the effect of a natural hazard (e.g., flood, tornado, hurricane, volcanic eruption, earthquake, heatwave or landslide) [1]. It leads to financial, environmental or human losses. Natural disasters come without warning and they take lives of tens, hundreds and thousands of people. The resulting loss depends on the vulnerability of the affected population to resist the hazard, also called their resilience. If these disasters continue it would be a great danger for the earth. This understanding is concentrated in the formulation that disasters occur when hazards meet vulnerability. Thus a natural hazard will not result in a natural disaster in areas without vulnerability, e.g. strong earthquakes in uninhabited areas. The term natural has consequently been disputed because the events simply are not hazards or disasters without human involvement.

Due to natural disasters there is an increased communication since people seek to contact family and friends in the disasters zone, and seek information regarding food, shelter and transportation. Social media has played a significant role in disseminating information about these disasters by allowing people to share information and ask for help. Social media are also becoming vital to recovery efforts after crises, when infrastructure must be rebuilt and stress management is critical.

The extensive reach of social networks allows people who are recovering from disasters to rapidly connect with needed resources. There are a lot of groups in the most popular social networking sites, allowing individuals involved in various aspects of emergency awareness and preparedness to connect, discuss, and share knowledge in specific fields.

The aim of the paper is to analyze the possibilities for the use of social media in the management of natural disasters and to propose basic guidelines for organizing communications and data exchange between the participants in such events.

2. Social Media Essentials

Social media includes web-based and mobile technologies used to turn communication into interactive dialogue. Social media is defined as a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content [2]. In Web 2.0 terms this would be a website that does not just give information, but interacts with users while

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giving them information. Social media is media for social interaction as a super-set beyond social communication. Enabled by ubiquitously accessible and scalable communication techniques, social media has substantially changed the way organizations, communities, and individuals communicate.

Social Media are the platforms that enable the interactive web by engaging users to participate in, comment on and create content as means of communicating with other users and the public. Social media has the following characteristics [3]:

- Encompasses wide variety of content formats including text, video, photographs, audio, PDF and PowerPoint. Many social media make use of these options by allowing more than one content alternative.
- Allows interactions to cross one or more platforms through social sharing, email and feeds.
- Involves different levels of engagement by participants who can create or comment on social media networks.
- Facilitates enhanced speed and breadth of information dissemination.
- Provides for one-to-one, one-to-many and many-to-many communications.
- Enables communication to take place in real time or asynchronously over time.
- Is device indifferent? It can take place via a computer, tablets and smartphones.
- Extends engagement by creating real-time online events, extending online interactions offline, or augmenting live events online.

Social media operates through social media websites implementing functions such as [4]:

- Social Bookmarking (Del.icio.us, Blinklist, Simpy) - Interact by tagging websites and searching through websites bookmarked by other people.
- Social News (Digg, Propeller, Reddit) - Interact by voting for articles and commenting on them.
- Social Networking (Facebook, Hi5) - Interact by adding friends, commenting on profiles, joining groups and having discussions.
- Social Photo and Video Sharing (YouTube, Flickr) - Interact by sharing photos or videos and commenting on user submissions.
- Wikis (Wikipedia) - Interact by adding articles and editing existing articles.

Such websites are not the only social media websites. Any website that invites users to interact with the site and with other visitors falls into the definition of social media.

3. Social Media in Natural Disasters

Online social networking services and social media like Facebook, Twitter, Google+, Etc. can act and try to solve many problems during natural disasters [5]. During disasters all the conventional communications generally stop functioning at this time interval while social media or networking services stay active. Online social networks allow the establishment of global relationships that are domain related or can be based on some need shared by the participants. They have investigated whether or not the social network paradigm can be used to enable individuals and organizations to collaborate in mutually beneficial ways, in all stages of emergency management: mitigation, preparedness, response and recovery.

Conducted research has found that though the use of mobile phones and email did predictably increase in the immediate aftermath of the earthquake the use of social networking sites also increased and even surpassed the use of more conventional methods of communication such as fixed phones [6]. Apart from the use of major public social networking services, many companies actively used their own secured corporate social networking services after disasters to confirm the safety of employees

As with any new technology, there remain many hurdles between current use and optimal exploitation of social media [7]. Although these media are used by people of both sexes and an expanding range of ages, it is important to recognize and explore the technology's limitations in reaching at-risk, vulnerable populations. It is not always possible to know whether social media users are who they claim to be or whether the information they share is accurate. Although false messages that are broadcast widely are often rapidly corrected by other users, it is often difficult to separate real signals of a health crisis or a material need from

background noise and opportunistic scams. Careful consideration must also be given to issues of privacy and the question of who should monitor data from social media [8].

Most of the commentary about social media during natural disasters has centered on its role as a news source. Certainly this is invaluable with instantaneous information available across multiple devices, critical with power outages shutting down TV stations and landlines. People need advice and information, not only in the wake of a disaster but also for ensuring in advance that they are prepared. Disasters bring risk into the mainstream conversation as people have heightened concerns about their loved ones, and not just the ones in the path of a disaster. During these periods, there are sharp increases in the information shared about claims, preparedness tips and how-to insure for the future. Social media is a critical sharing vehicle because it already connects people and it is very easy [9].

Emergency service agencies are utilising the power of social media and SMS to instantly broadcast and amplify emergency warnings to the public [10]. The multi-channel communication approach incorporates mainstream media. They monitor and actively crowdsource localised information from community agencies and the public, which they relay with geospatial information to emergency personnel on the scene. The public are directly receiving and acting on localised, real-time emergency warning information via SMS alerts and messages to their social networks as well as the traditional channels of radio, TV and online. They are directly accessing links to online information via a number of platforms including websites, mobile friendly sites, smartphone apps and video sharing sites as well as social networking sites. They are actively forwarding emergency agency messages to their social networks and amplifying the warnings.

The role of social media in the wake of natural disasters is still unclear, but sites like Facebook, Twitter and YouTube can be of great value when tsunamis, earthquakes, floods and other natural disasters strike. Social media [11]-

- Provides valuable information to those in a disaster area pre and post disaster (via Internet, if available, or SMS updates).
- Drives awareness to those outside the affected areas, generating volunteers and/or donors.
- Connects displaced family & friends.
- Provides information about unclaimed property, and in worst case scenarios, bodies.
- Offers information about aid, centers and other resources available to those affected.

A study by the American Red Cross shows more people are turning to sites like Facebook and Twitter to learn about emergencies, get information and check on friends and family [12]. Facebook, Youtube, MySpace and Twitter were the most popular social network sites when nature strikes.

Research and reviews of different cases has identified the four primary ways that citizens use social media technologies during natural disasters [13]:

- Family and Friends Communication - To connect with family members between affected and unaffected communities/areas (or within affected communities) for situation updates and planning responses. This is the most popular use. Primary tools used are Twitter, Facebook and/or a blog.
- Situation Updates - Neighbours and communities share critical information between each other such as; road closures, power outages, fires, accidents and other related damages.
- Situational/Supplemental Awareness - in a number of cases citizens rely less and less on authority communication, especially through traditional channels (television, radio, phone.)
- Services Access Assistance - Citizens would use social media channels to provide each other with ways and means to contact different services they may need after a crisis.

Before a disaster social media can help people better prepare for a disaster and understand which organizations will help their communities [14]. During the disaster social media helps users communicate directly to their families, reporters, volunteer organizations and other residents and immediately share information. It also controls rumors because it's easier for organizations to validate facts. After the disaster, social media helps bring the community together to discuss the event and share information, coordinate recovery efforts and get information about aid.

The use of social media for disaster preparedness has two components [15]:

- As an effective means for providing updated information about a crisis, proactive steps must be taken prior to disasters in order for effective communications to occur.
- As a part of crisis observation, managers should be monitoring social media platforms and channels that may be relevant to their organization. Observing can be as simple as conducting regular searches and analyses of media platforms for keywords and phrases that may imply an emerging crisis or disaster. Monitoring of social media should extend into the crisis response and post-crisis phases to check how crisis management efforts are being received.

Many researchers propose three ways to use social media during natural disasters [16, 17, 18]:

- Preparing for a natural disaster - though no one can predict an earthquake days in advance, social networks such, email and text messaging could help people prepare for the emergency.
- Responding during and immediately after the natural disaster - this is especially the case for SMS messages and other communications that can be received through cellphones.
- Recovering from the natural - communication is done through social media.

Nevertheless, the tendency to sensationalize news that is inherent in human nature, basic information may get disproportionately misconstrued as a result of which rumors are created, misleading people with regard to ongoing activities. In the process, there is a loss of confidential information and victims may fail to be notified about revised safety measures. Eventually the lack of constant flow of communication can result in chaos and confusion.

Critical tasks that can be implemented by social media [18]:

- Prepare citizens in areas likely to be affected by a disaster;
- Broadcast real-time information both for affected areas and interested people;
- Receive real-time data from affected areas;
- Mobilize and coordinating immediate relief efforts; and
- Optimize recovery activities.

Concerns such as the threat of technology failure, hackers, stalkers, viruses, flaming, and usability issues will have to be addressed in the development of emergency online networks [5]. Current social networks have limitations in terms of the collaborative tools available to users that might be repurposed for emergency use, especially given as they were generally designed with socializing rather than emergency efforts in mind. Nevertheless, within a short time, even the most enhanced system will seem primitive as user requirements mature and develop in all areas. Systems will ultimately emerge that allow true collaboration and have complete user control. When developing the use of online social networks, it is essential to engage emergency management personnel and their organizations in dialog to determine their concerns, needs and how to serve them in the best feasible manner.

4. Conclusions

Social media has re-defined communication in today's modern world. Text messaging, the internet and social networking sites have made it possible to communicate with a large number of people anywhere on earth. It is an efficient and easy way to keep in touch and impart information, particularly in a time of crisis.

The Internet has become an essential communication network during this time. With thousands displaced from their homes and many having fled the disaster zone, people turned to social networking sites to contact friends, post photos and share stories. Social Media has become a valuable means of communication in many places affected by a natural disaster, which allows people to keep in touch with family and friends and access important information. Social media cannot and should not supersede current approaches to disaster-management communication or replace existing infrastructure, but if managed strategically, they can be used to bolster current systems. Now is the time to begin deploying these innovative technologies while developing meaningful metrics of their effectiveness and of the accuracy and usefulness of the information they provide. Social media might well enhance systems of communication, thereby substantially increasing the ability to prepare for, respond to, and recover from events that threaten people and infrastructure.

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