Towards Emergency 2.0: Social media and Civil Engagement in Emergency Management

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ABSTRACT

Emergency management is a critical activity in which the participation of citizens is becoming more and more decisive. Citizens are moving from a reactive behavior, guided and oriented by official agencies and services, to a proactive outlook characterized by free involvement and self-responsibility. Nevertheless, this engagement has so far been focused on fostering communication with and among citizens, leaving aside activities such as hazard identification, risk assessment, or even emergency coordination and planning where they can also play an important role. In this paper we present a study showing the main barriers that official agencies see in the integration of social media in crisis and emergency management and we use the findings of this study to identify a number of research challenges that need to be addressed to make the Citizen 2.0 real in the context of emergency management.

Categories and Subject Descriptors

H.5.3 [**Information Interfaces and Presentation**]: Group and Organization Interfaces – *collaborative-computing*

General Terms

Design, Human Factors

Keywords

Emergency management, citizens involvement, social and collaborative computing, socio-technological systems

1. INTRODUCTION

The passive role played by citizens, acting as mere observers of the public sphere, has been recently countered by the so-called active citizenship [2]. An active citizen participates contributing his/her knowledge or ability to collaborate with other citizens and help them achieve their goals [7]. This participation can result in voluntary work, in the donation of resources or in performing useful work for the community. Citizens are gradually recovering the character of "active members of the community" as advocated in ancient Greece. One of the events that has contributed most effectively to this change is the emergence of the Internet and, more specifically, the rise of Web 2.0 whose underlying principles include fostering collective intelligence, trusting users as co-designers, facilitate access to different platforms or support the long-tail model. Mechanisms such as social networks, blogs, or micro-blogging, make available to the public, are forms of social communication with a capacity of almost immediate viral spreading. This new reality has led to the emergence of the so-called Citizen 2.0 [6] and has facilitated the deployment of many technological tools -such as SeeClickFix, Ushahidi or GovLoop, among others [1]- that support different types of citizen participation trough social media.

In the context of emergency management, citizens could help to improve the performance of the entire community in an emergency or crisis situation through Web 2.0 tools. Nevertheless, this engagement has so far been focused on fostering communication with and among citizens, leaving aside activities such as hazard identification, risk assessment, or even emergency coordination and planning, which could also play an important role. All these activities are based on generating and evaluating ideas, selecting alternatives, and producing new knowledge about the way of managing emergencies, crisis, and disasters. Despite the potential of web 2.0 tools for supporting these processes, official agencies are still reluctant to fully integrate them. In this paper, the results of a study done with 36 practitioners from the areas of British Columbia (Canada) and Washington (USA) about their perception on social networks are used as the basis to explore the research challenges that remain open to make the Citizen 2.0 real in the context of emergency management. It will be postulated that further research in this multidisciplinary area should be oriented to the development of socio-technological platforms that allow citizens, experts, and practitioners to deliberate together about emergency management.

2. SOCIAL NETWORKS AND EMERGENCY MANAGEMENT

The use of various applications of Web 2.0 in emergency situations is an increasingly trend [4,8]. In the fires that occurred in October 2007 in southern California people needed information from unofficial sources (usually called informal channels or back-channels) to find out what was really happening in small towns and neighborhoods, to understand the damages and how the fire progressed [5]. Non-governmental websites, forums and Web 2.0 Technology such as Google Maps were used for this purpose since traditional media like the TV, radio or newspapers focused on the big picture. For instance, KPBS created a map to show information about burned areas, evacuation zones and other useful information and received more than 1.7 million hits during this crisis [3]. This was one of the first examples studied in depth, but since then it has been constantly reported how citizens are using social networking and other web-based tools to communicate and self-organize in emergency situations.

On the other side, governmental organizations are viewing in this kind of participatory government a way to improve their response capacity and to facilitate accountability to society. But despite all the potential utility the Web 2.0 could have, governmental agencies do not fully integrate this type of platforms in their operation protocols. In order to explore the main challenges they face to adopt Web 2.0 technologies, a workshop was run in Vancouver on August 23rd with the participation of 36 practitioners from British Columbia and Washington State. The workshop was intended to explore the perception of a number of practitioners from 18 different agencies and with different expertise about the use and integration of social media. After a short introduction to social media and its use in EM, participants filled a questionnaire that gathered questions to explore the utility and potential problems of using social networks. In particular the goal was to go deeper into the reasons that deter agencies from using social media to support stronger citizen participation. In terms of the Communication Matrix for a Social Software Infrastructure proposed in [9], the questionnaire was divided in two sets of questions focusing on the two quadrants highlighted in figure 1. Each of the sets included three questions about the perceived utility, benefits and problems that were answered using five-value-likert scale. For the benefits and problems they had a list of potential answers gathered from the literature and a text field to add whatever they considered necessary.

Fig. 1: Focus of the study using Reuter et al, matrix in [9]

The first group of 3 questions was about the use of social networks to communicate with citizens. Participants considered that EM agencies should use social networks with this purpose though with a high variance (μ=4,28; σ=1,76). The main benefits they found were that official information can be spread very quickly (μ=4,50; σ=0,6), they can reach more people (μ=4,44;

σ=0.45) and they can establish a closer relationship with citizens that can result on a better understanding of the crisis (μ=4.38; σ=0.6). However they didn't considered other two options that were more oriented towards promoting a more active role of citizens in the EM process: their utility to promote the creation of self help communities of interest (μ=3,94; σ=0.9) or crowd intelligence processes (μ=3,56; σ=1). It seems that participants considered the utility of social media as a one-way communication channel to get the passive citizens informed but not necessarily to involve citizens in the EM process. The downplaying of the creation of self-help communities of interest is especially striking since this survey was conducted just a couple of months after one of the biggest demonstrations of the impact of self organizing communities in the phase of crisis recovery: the post-riot clean-up organized by Facebook users in Vancouver[10], BC. This seems to indicate a potential bias in the way that emergency practitioners perceive citizen's role by downplaying the active responses that citizens can have in emergency management. Concerning the main problems detected there was a high level of variation in the perception which might depend on the size of the organization as well as the approach they all assumed that social networks are a complementary channel to communicate with users.

Table 1. Answers to the question "Rate from 0 to 5 the importance (0 is not important and 5 is very important) of the causes that might deter official agencies from using social media to send information to citizens"

	μ	σ
You might be not reaching all the people you think	2,91	2,86
Messages can be manipulated	3,41	2,6
You need to be constantly active in the social media	4,19	0,8
Messages have to be specially designed to be effective (short informative texts, use of multimedia…)	3,31	1,58
You need to build a reputation in the social network before using it as a communication channel	3,16	2,5
There is a duplication of effort in information dissemination that might be difficult to manage at the organizational level	3,09	1,6

The second group of 3 questions was aimed at understanding their perception of themselves as receivers of information from social networks. In this case there was a more homogeneous answer about the need to integrate social networks as a source of information (μ=4,16; σ=0.6) whose main benefits are to get a better idea of how people is perceiving the situation (μ=4,34; σ=0.5), to understand the evolution of the situation (μ=4,00; σ=0.8) and a bit less valued was the possibility of involving users in the response phase (μ=3,94; σ=0,7). Concerning the reasons to not integrate social media information in their processes (see Table 2) they identified the lack of trust and the quantity of information to be analyzed as the main problems.

Table 2. Answers to the question "Rate from 0 to 5 the importance (0 is not important and 5 is very important) of the causes that might deter official agencies from using social media to receive information from citizens"

	μ	σ
You cannot guarantee the source of the information is reliable	4,41	0,8

There is too much information to be processed efficiently	4,19	0,7
There are many different social media applications to be checked	3,84	1,1
Other media (tv, radio, public screens, messages to community leaders…) are more effective	2,53	1,9

These results confirm the negative trend that can be observed in most official agencies about moving to a Citizen 2.0 participatory model. Next section proposes a research agenda aimed at guiding the design of such socio-technological systems that support large-scale and participatory emergency management.

3. A RESEARCH PATH TOWARDS EMERGENCY 2.0

As stated above, further emergency management efforts entail a greater citizen involvement in order to integrate citizens into the processes of identifying hazards, assessing risks, proposing or carrying out coordinated actions, and in general actively working to mitigate the impact of crisis situations. The Web 2.0 provides a technological basis on which this civic engagement can be encouraged. With the purpose of achieving this civic engagement, it is necessary to design socio-technological platforms that promote and support large-scale ideation and deliberation among different kinds of actors. These socio-technological platforms should be beneficial to all the involved entities –citizens, practitioners, official agencies, professional services, etc.-, allowing them to build trust and reliability. To this end, it is mandatory to answer to a series of research questions that help to understand in depth the problem. Subsequently, it could be possible to raise appropriate theoretical models and socio-technological solutions. Such issues include the following:

- What factors influence citizen participation in emergency and crisis situations? What barriers, both administrative and technological hinder such participation? What social structures promote the participation of citizens? What social groups are more likely to participate?

- What forms of participation can be provided to citizens to encourage their involvement in emergency management? What kinds of information technologies are best suited to support the participation of citizens in the field of emergency management?

- What validation mechanisms are needed to ensure the utility, integrity and reliability of the contributions made by citizens?

- In what circumstances or activities cooperation between citizens and governmental agencies may occur? What contribution can produce such collaboration for improving the management of emergencies?

- How the information technology can support the collaboration between citizens and government agencies? How the information technology can support the variety of profiles of participation, which exist in such environments?

- What type of non-critical information may be provided to citizens to exercise their active engagement? What kind of information citizens can provide to official agencies in order to improve the management of emergencies or crisis?

- What types of information representation and visualization are most appropriate to facilitate the processing and analysis of social media data, as well as the communication between the different profiles of participation involved? What types of multi-platform interaction models are most appropriate to facilitate the participation of all the involved entities?

The answer to these questions requires an understanding of the civil engagement in emergency management, finding patterns, making inferences across interactions and describing phenomena. With this purpose, theoretical research frameworks such as Activity Theory [11][12] should be used. This framework provides a method of understanding and analyzing a phenomenon, focusing the analysis around the concept of an activity and helping to identify tensions between the different elements of the phenomenon. Performing an Activity Theory analysis may enable researches and designers to identify the tensions in the collaborative space leading to specific needs for new socio-technological tools. It may also identify leverage points to displace the traditional understanding of some of the processes in emergency management and response from emergency practitioners towards self-help communities and crowd-source some of these processes.

4. REFERENCES

[1] Barkat, H. Jaeggli, L., and Dorsaz, P. 17 examples of social media and government innovation. White paper published at http://citizen20.redcut.ch/

[2] Faure, G. "British Citizenship: Points Off for Protest?". Time Magazine. August, 19, 2009.

[3] Liu, S.B., L. Palen, J. Sutton, A.L. Hughes, S. Vieweg, In search of the bigger picture: the emergent role of on‑line photo sharing in times of disaster. Proceedings of the 5th International ISCRAM Conference - Washington, DC, USA, 2008

[4] Palen, L., Hiltz, S. R. and Liu, S. B., Online forums supporting grassroots participation in emergency preparedness and response. Commun. ACM 50, 3 (March 2007), 54-58, 2007

[5] Sutton, J., Palen, L. and Shklovski, I. Backchannels on the Front Lines: Emergent Uses of Social Media in the 2007 Southern California Wildfires. Proceedings of the 5th International ISCRAM Conference – Washington, DC, USA, 2008

[6] Tate, N.E. and Wilson, M.G. "Citizen 2.0" in: A.H. Fine, M.L. Sifry, A. Rasiej and J. Levy, eds. Rebooting America, New York:Personal Democracy Press, pp. 147-150, 2008

[7] Tich, J. Active Citizenship: A New Approach to Volunteering. Huffington Post. April 27, 2010. http://www.huffingtonpost.com/jonathan‑tisch/active‑citizenship‑a-new_b_553417.html

[8] White, Connie. Social Media, Crisis, Communication and Emergency Management : Leveraging Web 2.0 Technologies. CRC Press. 2012

[9] Reuter, C., Marx, A. and Pipek, V. (2011) Social Software as an Infrastructure for Crisis Management: A case study about current practice and potential usage. Proceedings, 8th International Conference on Information Systems for Crisis Response And Management (ISCRAM), May 2011, Lisbon, Portugal, paper 113.

[10] Dhillon, S. (2011). Vancouver cleanup aided by ordinary people after Facebook callout. The Globe and Mail. June 16, 2011. http://www.theglobeandmail.com/news/national/british-

columbia/vancouver-cleanup-aided-by-ordinary-people-after-facebook-callout/article2063827/

[11] Bannon, L and Bødker, S. Beyond the interface: Encountering artifacts. In Carroll, J, ed. Designing Interaction: Psychology at the Human Computer Interface, pp. 227-253, 1991

[12] Kaptelinin, Victor and Bonnie A. Nardi. 2009. Acting with Technology: Activity Theory and Interaction Design. Cambridge: The MIT Press.