

ICT SUPPORT TO THE RECONSTRUCTION OF SOCIAL MEANINGS AFTER A DISASTER

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ABSTRACT

In this paper we briefly discuss how ICT and its applications may impact on the process of social reconstruction of meanings developed by communities affected by a disaster. In particular we refer to the L'Aquila case (hit by a major moment magnitude 6.3 earthquake on April 6, 2009), an extra-ordinary situation in which the sudden loss of the private sphere of people homes as well as of the ordinary work and public environments makes the availability of virtual spaces crucial for social interaction and for the re-definition of the lost identity (both at individual and at community level). The paper presents the main characteristics of the EagleVox platform, to show how the combination of mobile ICT technology, social web, and semantic technology is suitable for supporting the social recovery process.

KEYWORDS

Identity, citizen's participation, crisis management, mobile computing, social web, semantic technologies

1. INTRODUCTION

When discussing about how and to which extent the use of ICT impacts on people identity, one usually implicitly refers to an "ordinary" world where identity is defined, among others, through the participation to social spaces (family, professional environments, public life). There are however "extra-ordinary" extreme situations in which people lose their systems of personal and social meaning in the "real world", as in the case of large-scale disasters (e.g., earthquakes, flooding, etc).

The subject of social and psychological impact of disasters is widely debated in the literature (e.g., Barton 1969, Drabek and Key 1976, Fenoglio 2006, Lanzara 1983, Perry and Pugh 1978, Solé 2000, Weick 1993), and it is generally agreed that one of the most relevant effect of a disaster is the relaxation or, in the worst case, the disruptions of the social linkages upon which a community is based. These immaterial damages are less evident than material ones, are subtle, and may remain unnoticed for a long period of time. The disaster causes a sort of "cultural mourning" in the community, i.e., the loss of the world of meanings and social places that constituted the customs, the rituals, and the geography of such a community (Fenoglio 2006). Material damages, although extremely heavy, are often not as relevant as immaterial ones.

It has also to be noticed that, in the immediate aftermath of the disaster, the attention of rescuers is usually captured by the material needs of the victims, leaving sociological and psychological needs usually not addressed or addressed by means of standard protocols unable to reach the entire population (especially in case of large disasters, when support would be even more necessary).

In the cyberspace era, however, when the environment arising from computer technology is not merely a *means through which* people communicate but a *space in which* communication occurs, it is legitimate to investigate (1) on the role of such a space (immaterial, to some extent) as the "locus" in which destroyed social linkages can be partially re-built, and (2) on the kind of interaction that may support the social recovery. We may refer to Levy's view of the cyberspace as a manifestation of the *knowledge space*, the most recent anthropological space, after the *earth*, the *territory*, and the *commodity space* (an anthropological

space, as defined by Lévy, is “a system of proximity (space) unique to the world of humanity (anthropological), and thus dependent on human technologies, significations, language, culture, representations, and emotions” (Lévy 2002 [1994]:27)). Actually, following Lévy’s vision on the development of humanity in terms of these anthropological spaces, we may observe that while the disaster impacts on earth, territory and commodity spaces (consequently injuring identity facets relying on affiliation, address and professional role), it spares the “knowledge space” that, never structured “a priori”, has the potential of promoting “the construction of intelligent communities in which our social and cognitive potential can be mutually developed and enhanced” (Lévy 2002 [1994]: 31). This space can hence be exploited for the social process finalized to the re-definition of individual and social identities, provided that “institutional, technical and conceptual tools that make information navigable” are made available (Lévy 2002 [1994]: 30).

In this paper we report on our experience in a real case, the major earthquake that hit L’Aquila on the 6th of April, 2009 (some of the authors have witnessed the disaster), after which the University of L’Aquila, in collaboration with CNR (National Research Council) and the LUISS-Guido Carli University, started a project aimed at designing and implementing the EagleVox system (Banzato et al, 2009). EagleVox is an ICT platform for providing on-line services and a multimodal forum to support the social interaction of people during chaotic post-emergency situations, thus allowing them to act as active agents in the redefinition of their social connections, and eventually re-gaining personal and collective identity.

The rest of the paper is organized as follows: after discussing, in Section 2, the case study and the theoretical framework, in Section 3 we present the main characteristics of the EagleVox system, in terms of functionality and architectural aspects. Finally, in Section 4, conclusions are drawn.

2. FACING THE AFTERMATH OF A DISASTER

On April 6, 2009, at 3.32 am, a major moment magnitude 6.3 earthquake hit L’Aquila and its neighboring territories. Overall, the quake caused 308 deaths and more than 1,500 injured persons. L’Aquila was devastated, both in its residential areas and in the historical center. The earthquake caused massive damages to cultural heritage (churches, monuments, museums, etc.) and to fundamental public services (such as the City Government building and even the main hospital). The whole city of L’Aquila was immediately evacuated and the historical center (now the so called “red area”) has been isolated.

The earthquake made L’Aquila (in particular its city center) a ghost town: all the social areas, the main squares, the churches, the shopping areas were heavily damaged and were made inaccessible to the citizens (and so are now). The municipal offices were moved to different locations. Factories, commercial areas, public utilities, infrastructures were (and partly are still) unusable. In a handful of seconds more than 70,000 persons (counting just L’Aquila, but the situation in the surrounding villages is not better) lost not only the private sphere of their homes but also all ordinary work and public environments.

Official figures on the evacuated population of L’Aquila states that in January 2011, while waiting for the reconstruction of their home, about 15,000 persons are living in transitory houses, about 5,000 persons are still housed in temporary shelters (like barracks and hotels, some of them on the Abruzzo coast) and about 20,000 persons are housed in more than 20 small new villages built after the quake under the coordination of the Civil Defense and located all around the city territory, approximatively along a 100 km closed path.

As suggested by Weick, what makes a disaster so shattering is that “both the sense of what is occurring and the means to rebuild the sense collapse together” (Weick 1993: 633). People need to trigger a new process of sense making to redefine the two worlds of “what is possible” and “what is impossible” normally used to represent the reality (Solé 2000) but destroyed by an event that, on the one hand, made possible something that was considered impossible and, on the other hand, made things and actions previously possible become impossible (e.g., getting home, interacting with neighbors, going to work). When a disaster destroys these two worlds, a reconstruction of meanings is necessary. This has to be considered a social process that takes advantage of rich and extensive interactions among the actors that co-create a shared new universe of legitimate meanings.

Alas, in the L’Aquila case, both the extent of the catastrophe and the strategies adopted in the aftermath of the quake heavily impacted on social interactions because of the dislocation of the population over a large

territory. This is hampering the process of sense making, increasing the cosmic scope of the event: “the lack of communication [...] should heighten the group’s vulnerability to disruption” (Weick 1993: 644).

The adoption of strategies, techniques and tool to foster interaction between individuals is hence to be considered an effective strategy for enabling an efficient process of sense making. Over the years, many ICT-enhanced support tools, categorized as Disaster Management Systems, have been developed to this end (Turoff 2004). Some of them are focused on the management and the coordination of resources for the rescuers (Wallace and De Balogh, 1985) (Van de Walle et al, 2009) (White et al, 2010), while others try to offer citizens the possibility to participate in a reconstruction phase by sharing information (Okolloh 2009). Two of the most relevant examples of the second type are Sahana (www.sahana.lk, (Careem et al, 2006)) and Ushahidi (www.ushahidi.com, (Okolloh 2009)). Sahana, used e.g., for the Asian tsunami, has the goal of coordinating rescuers activities and improving their efficiency. Ushahidi, born as a website during the 2008 Kenya electoral crisis, enables citizens and organizations to collect and visualize real-time geo-referenced information. Although these systems aim at managing crisis and disasters, they do not allow citizens to interact and exchange personal feelings to support the reconstruction of a social community.

3. MAIN CHARACTERISTICS OF THE EAGLEVOX PLATFORM

The EagleVox project aims at providing on-line services and a multimodal forum able to support the social interaction of people during chaotic post-emergency situations, thus allowing them to act as active agents in the redefinition of their social connections.

To achieve these objectives, EagleVox offers citizens two kinds of access modes: by mobile phones (with a communication based on unstructured SMSs in natural language) and by web terminals (via the system web portal interface). It has to be observed that the choice of a simple everyday consumer item as the cellular phone on the one hand, and of a simple communication channel as SMSs on the other hand, are crucial for guaranteeing that communication is potentially offered to the entire population affected by the tragic event, regardless of users’ technical skill and/or temporary unavailability of more sophisticated devices like PCs or smart phones (as we experienced in L’Aquila, communication via SMSs remained available during and immediately after the disaster). However, since the system is conceived as a support also in the medium term, communication through a web portal is helpful both for rescuers/institutions and for citizens.

In this way EagleVox gives voice to citizens by collecting their real needs, expectations or fears during the reconstruction phases in a unique listening point. By means of EagleVox, people can first of all establish a virtual social network and then develop a social sense making process based on semantic analysis of exchanged information. It is worth highlighting that this process is driven by people, in a peer-to-peer approach (citizen-to-citizen). Furthermore the system, by semantic analysis, can periodically forward received information to the appropriate institutions, hence supporting also top-down and bottom-up communication (citizen-to-institution, institution-to-citizen, institution-to-institution), along with the customary push and pull communication typical of SMS-based services. In this way it is possible to monitor main community events that support the reconstruction of the social connective tissue.

From a technical point of view, EagleVox can be considered a web 3.0 platform that combines mobile ICT technologies (mobile computing), social web (Web 2.0) and semantic technologies (ontology, semantic annotation, natural language computing). People can send requests and communication to a single contact number to reach the platform that gathers, extracts, analyzes, categorizes and consequently stores received messages, according to the architecture depicted in Figure 1.

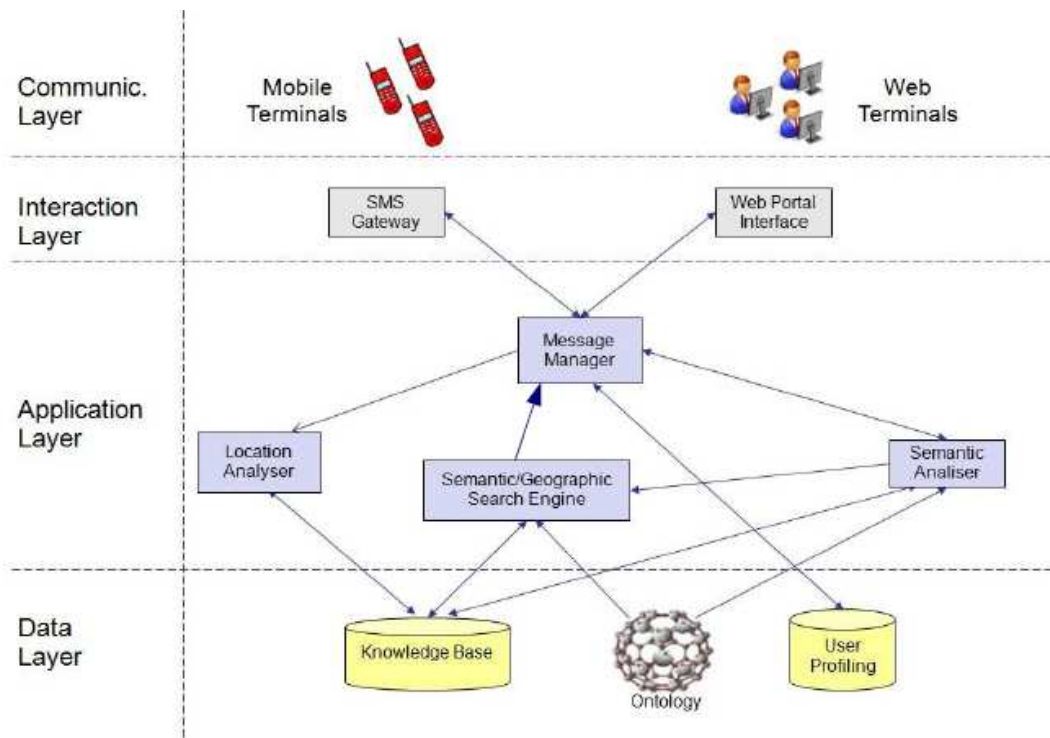


Figure 1. The architecture of the EagleVox platform

SMSs handled by the *SMS gateway* and messages sent by the *web portal* are analyzed by the *Message Manager* to extract significant terms by means of natural language processing techniques. The extracted terms are then categorized by the *Semantic Analyser* by means of semantic annotation techniques based on domain *ontologies* to populate a number of *knowledge bases organized in a federation*: for each sector involved in the reconstruction process (e.g., health care, transportation, mobility, schools) a domain ontology is to be created, and the correspondent knowledge base is used to gather and categorize people needs and proposed solutions. More precisely, the *Location Analyser* processes the portion of the message containing geo-referenced information to further enrich the *knowledge base*; whenever the *Semantic analyser* reveals a request in the message, the *Geographic/Semantic search engine* handles it by retrieving information from the *knowledge base* and sending the result to the user through the *Message Manager*, according to his/her profile stored in the *User profiling* module.

4. CONCLUSION

In this paper we briefly discussed the role that ICT technology may have in the aftermath of a large-scale disaster as to the social interaction necessary to a recovery process that allows people to co-create a new universe of shared meanings. In particular, we focused on the L'Aquila earthquake as a real-world case, directly involving us, which stimulated the EagleVox project.

From a social point of view, the main objectives of EagleVox are twofold: (i) to allow citizens to actively participate in the monitoring of the territory and to contribute in all the phases of the disastrous event, from the prevention to the immediate intervention, to the reconstruction; (ii) to act at a social level to help the population recovering the shock caused by the loss of public and private infrastructure, and to re-tie the broken social and business links. From a technical point of views, these objectives are met by an architecture that combines mobile computing, social web and semantic technologies.

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