Crowd-sourcing – crisis response in the digital age

by Christian Dietrich and Patryk Pawlak

In recent weeks Typhoon Haiyan in the Philippines, the tornadoes in the United States and cyclone Cleopatra in Sardinia have served as a stark reminder that natural disasters can strike anywhere, at any time. In addition to the loss of life they cause, they generate heavy economic tolls, such as damage to infrastructure, crops, private property and disruption of business continuity. They inflict further harm on societies through hunger, unemployment, crime, disease, social unrest and environmental damage. According to the UN Office for Disaster Risk Reduction, the costs of natural disasters amounted to over $100 billion per year between 2010 and 2012.

Making use of all available resources in crisis and disaster situations is of paramount importance to mitigate humanitarian, social and economic fallout. In this context, information and communication technologies, coupled with crowd-sourcing, are increasingly proving to be valuable tools in tackling some of the key challenges.

Far from a madding crowd ...

Crowd-sourcing – the practice of obtaining information, ideas and services from large (often online) groups of people – has two main dimensions. Digitally connected communities can be used to either generate – whether actively or passively – or analyse data. The process fundamentally relies on mobile phones, internet-capable devices, online networks, and internet-based applications. Where volunteerism and

access to such technologies coexist, 'netizens' become substantial sources of information.

Crowds as knowledge generators. Often, such 'crowds' are tasked with compiling information about specific events. Many of the better-known examples of crowd-sourcing produce so-called 'crowd-maps' which foster situational awareness by visualising individual data submissions.

For instance, the crisis mapping platform *Ushahidi* was born out of a volunteer project in the wake of the violence that ensued from the 2007 Kenyan presidential elections. As a reaction to biased news coverage, *Ushahidi* built and grew at the intersection of social activism and citizen journalism. The platform enabled people to report incidents of violence via text messages, emails, a dedicated Twitter hash tag, and an online form. Where possible, these reports were subsequently verified by the *Ushahidi* team on the basis of information available through aid agencies and non-governmental organisations on the ground.

Ushahidi rapidly developed into an open-source tool that has since been used in a plethora of locations and contexts. A Japanese version, called *Sinsai.info*, was launched only four hours after the earthquake that struck in March 2011, allowing the population to geo-tag, map reports from Twitter and categorise them by types of available resources: evacuation shelters, operating food stores, gas stations, and locations for charging mobile phones.

Crowds as sources. Openly available exchanges between users of social media like Twitter and Facebook are often valuable sources of information. While engaging in such forms of communication, individuals are not necessarily aware that their tweets or posts contribute to a broader knowledge generation effort.

In the wake of the earthquake that levelled much of Haiti's most populous areas in early 2010, mobile phone networks were restored within days after the tremor damaged or destroyed a substantial number of phone towers. This allowed for crowd-sourcing to be deployed as an information-gathering tool at an early stage. An expanding network of international volunteers initially captured, organised and shared the knowledge that was accessible through news media, social networks and blogs. The intelligence gathered proved to be crucial for response teams on the ground in grasping the scope of the crisis.

Later on, the whole spectrum of crowd-sourcing was deployed to support disaster response and reconstruction. The effort became more substantial and structured once people contributed consciously by supplying, sorting and locating the information. The resulting geospatial data on, for instance, trapped persons and medical emergencies was openly accessible and used especially by the UN Office for the Coordination of Humanitarian Affairs (OCHA) and the US Coast Guard.

Crowds as analysts. Haiti was undoubtedly a catalyst as it illustrated that the knowledge held by disaster-affected communities is key to effective response operations. Ever since, however, satellite images have increasingly attracted the attention of crowd-sourcing platforms. Digital volunteers map areas by tagging remotely sensed imagery, representing a type of crowd-sourcing that breaks up a large task into smaller pieces. The sheer quantity of participants makes the difference in solving these micro-tasks.

Between 2010 and 2012, a famine in southern Somalia left over a quarter of a million people dead and saw hundreds of thousands abandon their homes to flock to urban areas. A partnership initiated by the Office of the UN High Commissioner for Refugees (UNHCR) managed and fed an online platform that let users tag different types of housing structures. Based on this data, UNHCR obtained a better population estimate of the Afgooye corridor, outside of Mogadishu, which is home to the largest concentration of internally displaced persons on earth.

Crowds as communities. The proliferation of *ad hoc* crowd-sourcing initiatives has resulted in their gradual institutionalisation. Created in 2010, the Standby Task Force (SBTF) currently comprises some 1,000 'crisis mappers' from over 70 countries. The SBTF provides dedicated crowd-sourcing, mapping, and data analysis – which has made it a valuable resource for a wide array of organisations.

Additional expertise is created through consortia of volunteer and technical communities like the Digital Humanitarian Network. DHNetwork provides an interface between humanitarian organisations and informal volunteer networks. It was most recently activated by OCHA to perform a rapid damage and needs assessment in the aftermath of Typhoon Haiyan.

There is, of course, an inherent risk that leaving citizen investigators to their own devices becomes a double-edged sword. During the search for images of the bombers at the Boston marathon in April 2013, users of social news website *reddit* and imageboard website *4chan* wrongly accused several bystanders, in an incident that displayed blatant racial profiling. To avoid similar malfunctioning, crowd-sourcing processes are usually monitored, and organisations tend to adopt codes of conduct or guidelines for collaboration.

Mobilising the netizens

These examples provide just a snapshot of the existing plethora of volunteer, start-up and experimental projects. As a practice still in the making, means and ends of investing in crowd-sourcing will eventually have to be addressed by policymakers in a more coherent framework in order to maximise its use and utility while mitigating its shortcomings.

Harnessing the cumulative knowledge amassed by a crowd and translating its findings into practice is still a learning process. In return for more trust in the accuracy and reliability of crowd-sourced data, verification methods must be reviewed. In the end, traditional state actors need to learn to work with the broader community of netizens. This may imply partially shifting from (actively) gathering information – which, in a crisis, is often overwhelming – to facilitating such a process and (reactively) verifying the output.

It is evident, however, that the knowledge generated by large networked online communities can be used to inform policy choices in emergencies. Using crowd-sourcing proactively can therefore help unlock vast potential resources and, most importantly, help save lives and meet basic humanitarian needs.

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