

Crowdsourcing for Crisis Mapping in Haiti

It was 7 p.m. on January 12, 2010, when Ushahidi's Patrick Meier saw the news on CNN that a devastating earthquake had struck Haiti. He immediately called David Kobia, Ushahidi's tech lead, to set up an Ushahidi platform for Haiti.¹ Patrick then emailed the International Network of Crisis Mappers to launch the group's response.² Several partners replied and provided immediate support to Ushahidi's deployment. By 10 p.m. that evening, Ushahidi's crisis map was being customized for Haiti and reports from Twitter and Facebook were being mapped on the platform. By January 14th, however, Ushahidi and its partners could no longer keep up with mapping the massive amount of information coming out of both mainstream and social media. Patrick, who is a PhD candidate at Tuft University's Fletcher School of Law and Diplomacy, emailed the Fletcher student body to ask for help. An informal network of student volunteers from the Fletcher School mobilized to take the lead on what quickly became the most comprehensive and up-to-date map of humanitarian needs in Haiti.

Ushahidi is a free and open-source platform that allows interested individuals and groups to create live, interactive maps. The platform can be used to combine citizen reporting with mapping and visualization tools to create a crisis map—a real-time, dynamic, multifaceted snapshot of how a crisis is evolving. Maps created using the Ushahidi platform need not relate to crises or particular events—

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MapKibera's use of Ushahidi, for example, includes information on housing, education, and water facilities.³ In Haiti, however, the Ushahidi platform was employed to address a crisis—and one of a daunting scale. A distributed global network of around 1,000 volunteer translators and 300 students used the platform to launch an effort that connected Haitian citizens in need of aid with the humanitarian responders providing that aid. The tool quickly became the go-to place for up-to-date crisis information, with a range of military, UN, and NGO actors using the map as part of their needs assessment process. Preliminary feedback from these responders suggests that the project saved hundreds of lives.

USHAHIDI'S KENYAN ROOTS

Ushahidi means “testimony” or “witness” in Swahili, and the organization was originally set up in Kenya in January 2008 to monitor post-election outbreaks of violence and unrest. The project was initiated by the Harvard-educated Kenyan lawyer Ory Okolloh, who used her blog to document reports of escalating violence received through her information network. She was very concerned about the amount of violence that was going undocumented, and when she opened up the site so people could submit comments about what they were observing and where, she was quickly inundated with information. Seeing the need for a website where people could report directly and where their reports could be located on a map, Okolloh introduced the idea of a so-called mash-up with Google Maps on her blog. Erik Hersman read the blog post, contacted another Kenyan friend of his, David Kobia, and they developed what became the early Ushahidi platform and an important innovation in the evolving field of crisis mapping.

Using the Ushahidi platform, individuals could go online to report what they had seen and pinpoint the incident on a map. This early version of Ushahidi also tied SMS to the map, so that Kenyans could text a short code, a four-digit phone number, with their report. The project relied on both traditional and social media to spread information about Ushahidi to Kenyans. In addition to Okolloh's blog, which had about 70,000 daily hits, the message was distributed through press contacts, particularly local radio stations. A short-code collaboration with Kenyan telephone company Safaricom also helped publicize the Ushahidi platform.

OPEN SOURCE AND CROWDSOURCING

Behind the Ushahidi concept are important philosophical ideas from the world of software development, including open source and crowdsourcing. In an open-source production process, volunteers create the product and can distribute it free to anyone; users can then modify or change the product to meet their specific needs, and a community emerges to develop and support the product. Openness, transparency, collaboration, sharing, and a dynamic decision-making structure are seen as crucial elements to a successful innovation process. This self-organization of large and diverse communities of innovators contrasts with the traditional closed approach, which considers innovation most efficient and successful when it

is protected and tightly managed by a team of experts. Open-source ideas have been gaining increasing momentum and credibility well beyond the world of software development, leading many to concur with Eric Raymond's assertion that "the closed-source world cannot win an evolutionary arms race with open-source communities that can put orders of magnitude and more skilled time into a problem."

Linked to these advantages of scale, skills, and time is "crowdsourcing," a term coined by Jeff Howe of *Wired* magazine in 2006, which illustrates a distributed problem-solving model where the task of solving a challenge or developing an idea

gets "outsourced" to a crowd. (It is important to note that Ushahidi does not necessarily imply crowdsourcing methodology—one could use the tool for more traditional research methods as well, yet the emphasis thus far has been on this particular approach to data gathering.) The crowdsourcing approach focuses on the time and cost-related efficiencies of tapping into a larger and more diverse pool of talent in a way that alters the role of passive audiences, recipients, or beneficiaries, and turns them into active participants with greater ownership of the process. For the humanitarian and development sector, Ushahidi is in many ways a technology-led way of scaling-up existing community-based research methods. As Internet and mobile access increase, this will have significant implications for how needs assessments might be conducted in the future. It also indicates an important shift from scarcity of information toward abundance. Thus, "crowdfiltering" of data, through verification, finding trusted sources, and weighing the importance of different information, becomes as important as crowdsourcing.

This important shift explains why Ushahidi is developing the Swift River platform, which is designed to validate information in real time. Swift River allows users to follow different sources of information, such as Twitter, online news, SMS, Flickr, etc., to triangulate events being reported and create veracity scores. In other words, Swift River goes beyond the notion that information is either true or false and creates probability scores that rate the likelihood that an event being described in the mainstream and social media has actually taken place.

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Technical though these concepts may sound, their potential to shift power is ultimately both human and direct. Capturing good ideas from the people whose lives and livelihoods may depend on the merit of those ideas obviously makes sense—the speed and scale at which it can happen now is a game-changer, and this provides the backdrop for our discussion of the innovation process behind Ushahidi in general, and the Ushahidi deployment in Haiti in particular.

THE INNOVATION PROCESS

The Ushahidi platform is an important product innovation that responded to a clear demand for better citizen reporting outlets during crisis and non-crisis situations, as well as reliable and visualized information about how crises evolve, what the most urgent needs are, and how humanitarian agencies and others can best respond.

Individuals and groups that deploy Ushahidi platforms often use crowdsourcing to collect crisis information in a manner that amplifies the voices of local citizens in crisis analysis and humanitarian needs assessments. Using both traditional media, such as TV, radio, and regular phones, and social media tools, such as Facebook, Twitter, blogs, and mobile phones, citizens become informants, and the aggregation of all the data submitted can provide a powerful analysis of what their needs and concerns are. Its mobile-based functionality is especially powerful: with the proliferation of mobile phone usage internationally—more than 50 percent of the world's citizens now own or use a mobile phone, and developing countries are driving that growth—as well as significant increases in access to the Internet, the barriers to reporting are diminishing in inverse relation to the potential power of the tool. Since its inception in Kenya, where it had 45,000 users, the Ushahidi platform has been used in over 300 instances all over the globe—by human rights groups in Democratic Republic of the Congo; election monitors in India, Afghanistan, Sudan, and Mexico; aid professionals in the Philippines and Colombia; Al Jazeera in Gaza and many more.

USHAHIDI HAITI

The first major use of Ushahidi as a humanitarian needs assessment tool in the immediate aftermath of a sudden emergency came after the 2010 earthquake in Haiti. Using the product and process innovations built into the Ushahidi platform, a group of student volunteers based at the Fletcher School near Boston set up haiti.ushahidi.com, a crisis-mapping tool specifically for post-earthquake response. Initially a contained volunteer effort based in the living room of Patrick Meier, who launched the Haiti platform, the project quickly scaled-up to include around 1,000 Haitian American translators based all over the U.S. and 300 volunteers, including members of the Haitian Diaspora, coordinated out of the Boston situation room, with satellite teams in Washington, D.C., Geneva, London, New York, and Portland. Becoming known for having the most exact GPS coordinates for incident reports, the student-run project became the go-to location for up-to-

date crisis information post-earthquake for several of the humanitarian responders in Haiti.

While initially focused on monitoring traditional and social media outlets for reports, the initiative gained significant momentum upon the creation of a short code, 4636, which Ushahidi set up in conjunction with the U.S. State Department, the Emergency Information Service, FrontlineSMS, inSTEDD, Energy for Opportunity, and the Thomson Reuters Foundation, and distributed through partnerships with Haitian telephone companies, Digicel and Comcel. This SMS initiative, called Mission 4636, was spearheaded by Robert Munro, a PhD candidate in linguistics at Stanford University.⁴ The short code allowed Haitians to send free text messages specifying their needs and location to help guide the humanitarian response on the ground. Significant process innovations followed, drawing on the principles of crowdsourcing and crowdfiltering, which illustrated the aforementioned shift from a scarcity to an abundance of information: the challenge does not become lack of data, it becomes making sense of a vast amount of data. At the time of writing, over 40,000 SMS have come into the haiti.ushahidi.com system.⁵

THE CRISIS-MAPPING PROCESS

The crisis-mapping process worked as follows: The SMS reports arrived into the Ushahidi system in Haitian Creole.⁶ The nationwide U.S. network of translators recruited and managed by Samasource—a social enterprise that recruits women, youth, and refugees for IT-oriented jobs—and Crowdfunder—an initiative that connects companies with thousands of workers, 24/7—would translate the messages immediately, with a lead time of five to ten minutes. If the information contained in the message was not sufficient, translators could use the “reply” function to get more specific information. The global network of crisis-mapping volunteers, including members of the Haitian Diaspora, would then use the location information in the report to find the exact GPS coordinates. This was a manual, and often complicated, process, due to the lack of reliable maps of Haiti. In fact, the team relied heavily on Lonely Planet maps for the first few days post-earthquake. However, software programmers working on open-source mapping tools, such as Hypercube and Open Street Maps, quickly enhanced the maps to the point where these tools were literally improving by the hour. Google Earth also released a “KML” with post-earthquake imagery of Haiti, which meant that mappers could zoom down to street level to get a sense of the level of destruction in any given area, and to verify information coming from alleged camps for internally displaced persons (IDP)—the images allowed users to count the number of IDP shelters in the area to get an idea whether the self-reported number of individuals at each location seemed correct.

Once the GPS coordinates had been found, the crisis mappers would create a report on Ushahidi. The report contained a title to alert the humanitarian responders to the incident, specifying factors such as urgency or size of population; the

original text message and its translation; the GPS coordinates and location details; categories such as medical emergency, food, water, collapsed structure, dead bodies management, and so on; approve and verify functionality; and, for accountability purposes, information about the person creating the report, as well as 5-by-5 indicators as an attempt to estimate the trustworthiness of the information and/or the source. Importantly, the report would indicate whether or not the information was actionable, that is, whether a humanitarian responders could act based on the available data in the SMS.

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The reports would then be published on the map at haiti.ushahidi.com, and also submitted to humanitarian agencies via RSS-feed. If the information contained in the SMS was particularly urgent—for example, related to people trapped beneath the rubble or severe medical emergencies—the Boston situation room established direct phone lines to certain responders in Haiti to act on the information as it came in. The agencies using the Haiti Ushahidi crisis map included the U.S. State Department, Red Cross, Federal Emergency Management Agency, U.S.

Agency for International Development, Office for Foreign Disaster Assistance, U.S. Marine Corps, U.S. Coast Guard, SOUTHCOM, UN Development Programme, World Food Programme, International Medical Corps, Appropriate Infrastructure Development Group, and numerous other nongovernmental organizations.

PROCESS INNOVATIONS

In addition to the technology-related innovations and developments, several interesting approaches to “virtual volunteer” management were developed in parallel. The volunteer teams relied heavily on Wikis, Skype group chats, and shared Google documents to give people access to information about the rapidly changing project and its constantly developing technology tools. The Wiki was used as a shared document, which all volunteers would sign into once they started the day to have access to volunteer guides and updates. The Skype chats were used for discussions on process—for instance, in attempting to find particularly difficult locations. Experienced mappers who had become very apt at finding Haitian neighborhoods

and streets would offer advice to newer volunteers on how to use the mapping tools, how to change the spelling of addresses to yield more results, and so on. Shared Google documents were utilized to build open-access databases of important locations, such as IDP camps, schools, churches, orphanages, and other addresses that were coming up regularly, so that volunteers did not duplicate efforts. The shared technologies, in particular Skype, became important ways of connecting volunteers who had never met each other and were not physically in the same place, and facilitated some sense of team-building within the dispersed network of volunteer mappers. Twitter was used actively by the crisis-mapping team, not just for monitoring Haiti-related tweets, but also to ask questions related to locations in Haiti. An example of this was an incident where a person was trapped beneath a shop in Port-au-Prince: people on Twitter helped the team find that the supermarket was close to a hotel, and even shared contact details for a person in Brooklyn who had previously worked at the hotel and could confirm its exact location. This model of distributed, web-based humanitarian action, where most of the voluntary translators, crisis mappers, and open-source developers had never met each other, seems to have worked well in these two instances, and could offer an interesting model for future deployments. Strategic partnerships with humanitarian and development agencies, as well as diaspora organizations, are also being cultivated to ensure the scaleability, replicability, and sustainability of the Ushahidi Haiti model.

RISKS

There are of course a number of risks, as well as wider ethics and accountability questions, related to using SMS or other social media tools to crowdsource humanitarian needs assessments. The most fundamental is the potential risk of raising expectations. Could access to a short code, with an implied or perceived promise of help, do more harm than good? Haitians were being asked to text needs and location into 4636, yet the short code was set up without any formal guarantee of action by any local responder. Closer partnerships with the humanitarian responders on the ground is an obvious way to address this. Best practice guidelines in terms of how NGOs use SMS both to disseminate information and gather data do exist, and they need to be implemented and expanded. Verification of information is another major challenge, although it is important to emphasize that any attempt to improve “ground truth” exists as part of a much larger informational ecosystem from which local populations and responders draw data and make decisions. Still, improving the many manual and technical ways that data verification can be tightened is obviously a major area to focus on going forward. Managing a distributed network of volunteers, who in many cases have never met each other, involved its own sets of risks and challenges, especially in terms of dealing with sensitive SMS reports. Getting such direct access to painful and difficult information requires very good HR guidelines. The medium also potentially leaves significant responsibility for managing valuable and sensitive data in the hands of

volunteers. This of course happens against a larger backdrop of accountability issues related to volunteers who are not physically present in the country and who are not bound by the sector's existing codes of conduct, which certainly requires more attention.

One cannot refer to risks without considering the issue of access to mobile phones, and the risk that a technology-based tool can exclude the most vulnerable populations. In Haiti, we noticed that people were using the same phone to report different incidents—phones were obviously being shared among several people within neighborhoods and camps. In any given context, it is certainly of paramount importance to control for mobile phone usage stats, connectivity issues, and the more basic challenge of battery life during times of crisis in order to ensure that the response does not favor those with access to technology. It is, however, important to acknowledge that this kind of tool complements, rather than replaces, agencies' own needs assessment tools.

IMPLICATIONS FOR THE HUMANITARIAN SECTOR

The 40,000-plus SMS messages received thus far are not merely cries for help—they also contain advice about how to distribute aid more effectively; contact details for local volunteer groups who want help their fellow citizens, such as groups of psychiatrists offering free psychosocial help; and input for the long-term reconstruction effort. As needs assessments indicators offering insights into the local population, the tool can potentially answer some of the pressing questions around how the sector can involve local voices in all phases of the relief and development effort.

Part of the power of Ushahidi is its independence—there is no vested interest in “siloeing” information. The opportunity for coordination and collaboration on a neutral platform that exists to get information that is as accurate as possible, rather than getting sufficient information in order to achieve specific programmatic goals, is significant. On a related note, interesting functionalities for the sector as a whole include an “alert” function, which allows agencies to structure the information feed depending on the kind of data they need, either by topic or by region. Consequently, UNHCR could sign up for alerts pertaining to shelter only, UNICEF could be alerted only in child protection cases, a local NGO operating in one specific region could sign up for regional data, and so on. This degree of customization is one of Ushahidi's most significant innovations, because it allows for a demand-driven situational awareness in near real time. Another important feature is “action taken,” which is intended to prevent overlap of activities by agencies tagging a specific region or incident report they are already handling.

Ultimately, Ushahidi attempts to provide a common language for beneficiary populations and the humanitarian agencies tasked with responding to their needs. By efficiently aggregating qualitative data or stories told by local citizens, Ushahidi can quickly create the quantitative data needed by responders—from stories to spreadsheets—sometimes in a matter of hours. That is not to say that the informa-

tion is necessarily statistically representative, but that Ushahidi can have an important role in empowering local communities and amplifying their voices in the relief and development process. And if agencies want to use the Ushahidi tool for more conventional statistical methods using the web or mobile phones, they can certainly do that as well. As access to mobile phones and Internet technology grows across the developing world, we believe humanitarian work is becoming more of a conversation and that local citizens will expect to be a part of that conversation. We hope Ushahidi, and the Haiti case in particular, can be a game-changer that enables local populations to use everyday technology to take greater control of the reporting and analysis of what affects them. We certainly believe it is an important indicator of the type of open innovation approaches and processes that humanitarian and development agencies will need to embrace in order to solve problems faster, more creatively, and more collaboratively.

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1. See <http://haiti.ushahidi.com>.
 2. See <http://www.CrisisMappers.net>.
 3. See <http://www.VoiceofKibera.org>.
 4. See <http://www.mission4636.org>.
 5. About 5 percent of these text messages were mapped. Fletcher School volunteers triaged incoming text messages and mapped the most urgent life-and-death messages.
 6. Initially, the text messages arrived to 4636.ushahidi.com, a new platform built from scratch by the Ushahidi team to crowdsource the translation of the text messages. Once translated, the original message and translation would appear on the back end of the Ushahidi platform. The translation process was later relocated to Haiti, where a Crowdfunder platform was used by Haitians to translate the text messages and derive a source of income in the process.