310 Case 3
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The Earthquake

Brian Coleman surveyed damage from the major earthquake that had just shaken Torabia.[1] People were trapped under rubble. Still-standing buildings were unstable. Thousands of people no longer had homes. A tremendous amount of work had to be done in a very short time. This was Coleman's first field experience. He was a team leader for volunteers from Help International, a global crisis response organization. He had no experience in Torabia. He wanted to work with other aid organizations to avoid duplicating efforts. He did not want to complicate an already complicated situation.

"*What do people need to know right now?*" he wondered. "*Everything*," he realized. "*They need to know what's going on. They need information.*" He figured that cell phones were on his side. Penetration was fairly high in Torabia. The earthquake might make it hard for people to make voice calls, but text messages and posts to social media might get through.[2] He remembered a case study from school about disaster response during the 2010 Haiti earthquake. A web-based platform called Ushahidi had been used to create crowdsourced maps indicating trapped people or those who needed food, water, shelter, etc. Coleman decided to gather and share information using Ushahidi. (See Figure 1 in the appendix for a screenshot of a crowdmap from the 2010 Haiti earthquake.)

Ushahidi

Ushahidi was developed to track violence that erupted after the 2007 Kenyan elections. The Kenyan government had restricted live broadcasting, and the

[1] Torabia and the characters presented in this case are fictional. The case is based on events that occurred during a deployment of Ushahidi after a severe earthquake struck Haiti in 2010.

[2] Kang, C. & Mui, Y. (2011). Cellphone Service Falls Short After Earthquake. *Washington Post*. Retrieved from http://articles.washingtonpost.com/2011-08-23/business/35269816_1_verizon-wireless-landlines-amy-storey.

mainstream media could not provide much useful information. Ushahidi collected and displayed information that citizens posted online. According to co-founder Ory Okolloh,

> "The Ushahidi website was not intended to be wholly accurate and certainly there was no intention to achieve the standards *e.g.* of a main-stream newspaper or a human rights reporting organisation – the main focus was the immediate need to get information out."[3]

Volunteers who built and launched the site manually confirmed reports with senders or with media accounts or assigned an "unverified" label.[4] Ushahidi had 300 reports in its first month.[5] The founders envisioned a life-cycle tool, useful "from early conflict warning to tracking a crisis situation as it evolves and facilitating response."[6] There were no funds from the Kenyan government, but grant funding from other sources was used to create a nonprofit organization that redeveloped the tool as an open-source platform.[7] Ushahidi grew into a system that people could use to analyze large amounts of real-time data for mapping and analysis. It contained the following:

- Ushahidi Platform: Downloadable software used to collect information from text messages, emails, social media, and web platforms and display it on web- and mobile-accessible interactive maps.
- Crowdmap: A web-based version of the tool deployed through Ushahidi servers to facilitate crowd-based creation of maps.
- SwiftRiver:[8] A tool to gather insights from streaming, real-time information; extract meaning from text using natural language processing, connect location data to information, eliminate duplicate information, measure popularity of information, and identify the most valuable sources of information.[9]

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[3] Okolloh, O. (2009). Ushahidi, or 'Testimony': Web 2.0 Tools for Crowdsourcing Crisis Information. Ashley, H., Kenton, N., & Milligan, A. (Eds.), Participatory Learning and Action. *Change at hand: Web 2.0 for development* (65-70). Hertfordshire, UK: International Institute for Environment and Development. p. 65.

[4] Ibid. p. 66.

[5] Arabic Knowledge@Wharton (2013). Ushahidi: The African Software Platform Helping Victims in Global Emergencies. *Managing Technology*. Retrieved from http://knowledge.wharton.upenn.edu/arabic/article.cfm?articleid=2913.

[6] Okolloh, O. (2009). Ushahidi, or 'Testimony': Web 2.0 Tools for Crowdsourcing Crisis Information. Ashley, H., Kenton, N., & Milligan, A. (Eds.), Participatory Learning and Action. *Change at hand: Web 2.0 for development* (65-70). Hertfordshire, UK: International Institute for Environment and Development. p. 67.

[7] "Company Profile: Ushahidi." (2011). *MIT Technology Review*. Retrieved from http://www2.technologyreview.com/tr50/ushahidi/.

[8] SwiftRiver was discontinued in 2015.

[9] "Ushahidi" (2013). [Web site] Retrieved from http://ushahidi.com/

Ushahidi was a hit, used to monitor elections in Afghanistan, India, Lebanon, and Mexico.[10] The news network al Jazeera used it to monitor the 2009 Gaza War.[11] Ushahidi was used to cover labor strikes in China,[12] crimes in Syria, and harassment in Egypt.[13]

Deployment of the Crowdsourced Ushahidi Map

Coleman talked about his idea with his supervisor Kiki Meneja, director of Help International's crisis response in Torabia. Social media could create a feedback loop between volunteers and victims during disasters. Combining tidbits of information from those affected by the quake with a map to display the information could be powerful if Meneja could get that information to people who could use it. She discussed this idea with colleagues who were also launching relief efforts in Torabia. They decided to create a map.

Within minutes of logging in to Ushahidi, Coleman had created a live map on the web. He created categories to classify messages as they came in: emergency, supplies needed, medical or health services needed, danger or security threats, damage reports, additional natural disasters, service outage reports, and other.[14] He posted announcements about the map on Help International's website and its social media outlets.

Nevertheless, language posed a problem. Coleman did not speak Torabian, and could not decipher reports that came in. The number of Torabian citizens who followed Help International on Facebook or Twitter was small to nonexistent, so he could not tell citizens about this resource. If people began using the tool, he would get a lot of information he could not read. He sought the help of other humanitarian aid organizations, figuring their greater presence in Torabia might get people using it.

At the Red Cross, he ran into Paula Browner, with whom he had worked as an intern. He described the crowdsourced mapping idea. "That sounds great," Paula said. "We need to know where the health clinics are and whether they're accessible. Do you have that information?" Brian would request that people submit it, and asked Paula to spread word at the Red Cross and post the information on their website. She said she would try.

Coleman walked from tent to tent, talking with people from aid organizations, learning what they were doing and what they needed. He told them about the crowdsourced map. When he returned to Help International he found that

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[10] "Ushahidi" (n.d.). [Web document] Retrieved from http://www.ushahidi.com/uploads/docs/Ushahidi_1-Pager.pdf

[11] "War on Gaza," (2009). Al-Jazeera. [Web site]. Retrieved from http://labs.aljazeera.net/warongaza/.

[12] "Elfstrom, M. (2012). China Strikes: Mapping Labor Unrest Across China [Web site]. Retrieved from https://chinastrikes.crowdmap.com.

[13] Arabic Knowledge@Wharton (2013). Ushahidi: The African Software Platform Helping Victims in Global Emergencies. *Managing Technology*. Retrieved from http://knowledge.wharton.upenn.edu/arabic/article.cfm?articleid=2913.

[14] Development Information Systems International. (2011). *Independent Evaluation of the Ushahidi Haiti Project*. Somerville, MA: Morrow, Mock, Pappendieck, & Kocmich. p. 21

organizations had posted links and news websites had linked to the map. He was determined to vet the reports and take action based on them. Expatriate Torabians used Help International's Facebook page to offer help translating reports. Coleman began sending copies of reports to expatriates and cataloguing responses into the map.

Aid workers soon found themselves buried in an avalanche of information, some of it inaccurate. New volunteers arrived in droves without training to handle the information. Incoming reports were contradicted by other reports. Email came in around the clock to team information managers. The problems were small, but with big implications. A volunteer returning from another aid station said the map's report that the other station was on fire was not true. A makeshift hospital was listed as located on 13th St. instead of 13th Ave. Arriving refugees shared information on the location or state of events, structures, resources, neighbors, and dangers, but little of it was verifiable.

This avalanche of information continued after the earthquake. Noise was often mistaken for signal, and the absence of key resources made correction difficult. The local government's offices were destroyed, so up-to-date maps of the rural road network were unavailable. One was generated by trial and error. The destruction of the official registry of citizens hindered accounting for the missing.

Coleman thought the crowdsourced map would help by promoting situational awareness. Some referenced it that way, but others were committing resources as though the information on the map was reliable when it was not. One rescue group drove to ruined structures to help trapped residents identified on the map, but the group also passed structures whose trapped residents were not on the map. A water well near Help International's headquarters was identified by the map as contaminated, but days later tests performed in desperation showed the water was drinkable. Paula Browner was grateful to find another source of drinking water and sent Coleman an email thanking him for the map, not realizing that bad information in the map had created the water problem in the first place.

One of Torabia's major television news networks, Torabia TV, broadcasted the map's contents to the public, but struggled to keep up with corrections. A Torabia TV reporter kept changing the location of emergency food supplies as updated data arrived, confusing viewers. One of Torabia TV's producers stormed into Help International's aid tent and angrily asked a volunteer to stop posting "misinformation." The volunteer not so politely reminded the producer that her team was working hard to verify hundreds of incoming email, SMS, and social media messages. The producer was welcome to join the volunteers and try to sort things out, but the producer left in a huff.

Aid workers using the crowdsourced map did better than those without access, but access was uneven. One aid group could not use the map because they did not have a computer. Other aid workers had a computer, but software problems prevented the map from displaying information on their areas. Most Torabians had cell phones, but the mobile phone network was paralyzed and service was spotty. Workers at Help International and elsewhere could not corroborate reports quickly. They received text messages hours late. A message might contain information that would save a life, so each had to be checked to verify actionable information. This

labor-intensive process took hours and created delays. Few understood how dependent the map was on reliable information infrastructure.

Enter an Opposing Force

The information infrastructure problems were minor compared to what happened next. Despite information infrastructure challenges, Ushahidi made enough information available to enable the Third Army for Revolution in Torabia, known locally as PART-3, to act. Soon after thousands of aid volunteers arrived in Torabia, a statement from PART-3's leader said the group would expel all "invaders" (foreigners) by force and punish those involved in the "attempt to reduce Torabian self-reliance." PART-3 called the crowdsourced map the invaders' "tool of their own demise." They would use the map to hunt foreigners and all they wanted to punish.

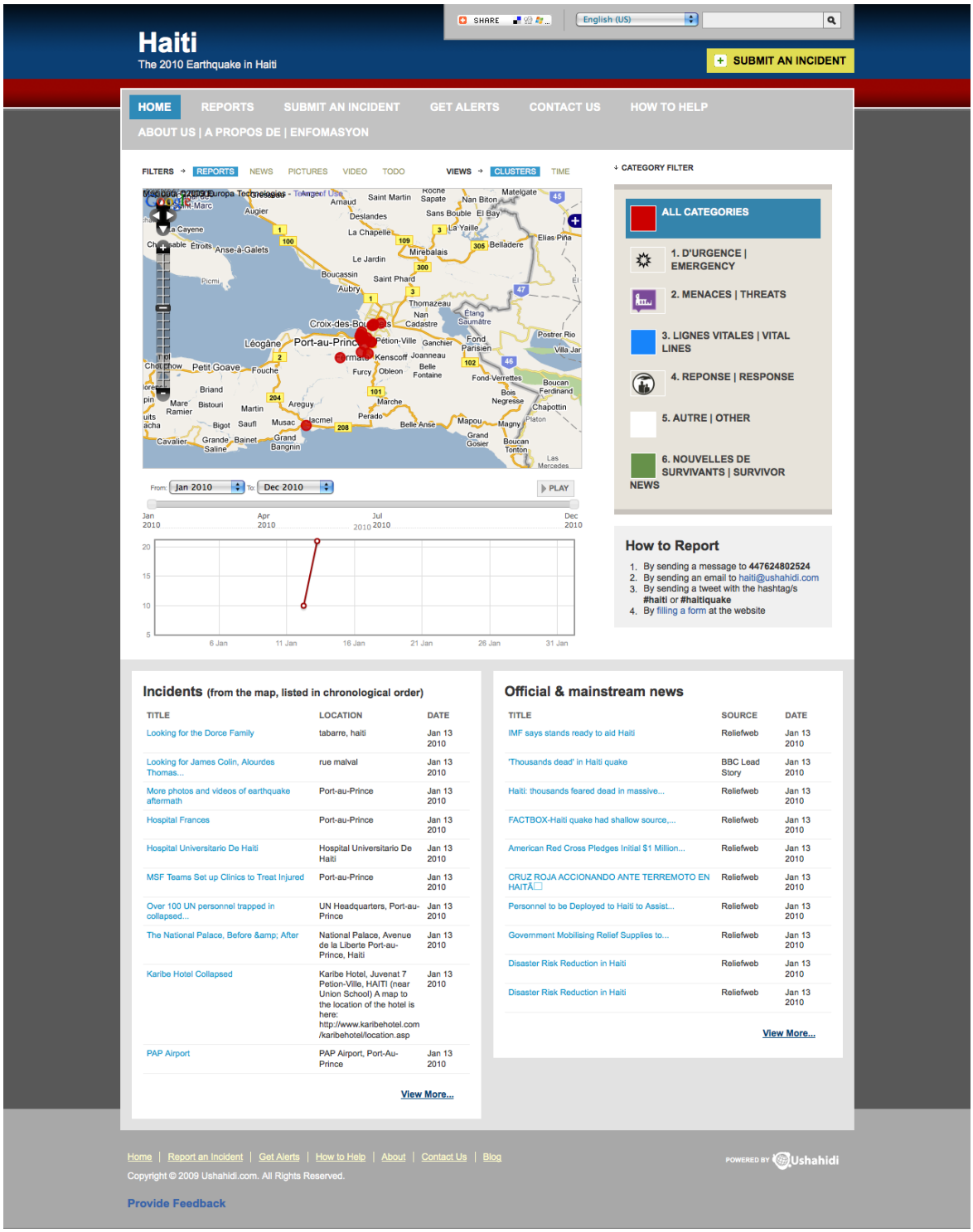
Reports of this threat reached Help International's aid station. Kiki Meneja had volunteered in the aftermath of PART-3's recent attack on neighboring Brobdasia. She knew the danger that PART-3 posed. They had attacked aid workers before. They would track down and retaliate against locals who worked with foreign aid workers. Their threats were real. Meneja knew full evacuation of volunteers was not possible or desirable. However, it was possible that PART-3's efforts would be foiled if the crowdsourced map could be shut down and aid workers in dangerous areas relocated. This would make coordination of relief efforts more difficult, but it could provide some protection for PART-3's targets. Meneja knew the aid agencies did not want to give in to PART-3's demands, but she wondered if the map helped their operations. Was it saving lives? Was it consuming too much volunteer time? What benefits did it offer? If a volunteer was hurt or killed, could they justify their use of the map?

The government of Torabia was little help. Factions sympathized with PART-3. The country needed outside help in the wake of the earthquake's devastation, but the government didn't want to put its citizens at risk. Members of Torabia's parliament used the situation for political gain, denouncing PART-3 while blaming the aid groups for broadcasting information that could harm citizens. They called for the crowdsourced map to be taken down to avoid spreading sensitive information that could worsen the situation.

A Decision To Make

Meneja had to act. Should she continue running the map and encourage residents to send information? Should she shut it down and remove it from Help International's website, even if she could not remove the map from other sites? Should she leave the map active but make it private, no longer accepting crowdsourced data but allowing aid workers to post and share information? What should she do?

Appendix: Figure 1[15]



[15] "Haiti: The 2010 Earthquake in Haiti." (2010). Web picture retrieved form http://community.ushahidi.com/index.php/deployments/deployment/haiti-crisis-map