Can we use a crisis mapping platform for community development?

Ana Brandusescu[1], Renée E. Sieber[2], and Sylvie Jochems[3]

1 Geography, McGill University, ana.brandusescu@mail.mcgill.ca
2 Geography and School of Environment, McGill University, renee.sieber@mcgill.ca
3 School of Social Work, Université du Québec à Montréal, jochems.sylvie@uqam.ca

Abstract

Crisis mapping has carved a niche in the information and communications technology for development (ICT4D) movement as a method of connecting and empowering marginalized citizens during emergency events. Those impacted by natural and human disasters can share and provide information. Crisis mapping information can further be used by agencies to improve service delivery. We investigate the repurposing of crisis mapping to more long-term or 'chronic' community development practices. We apply the crisis mapping platform, Crowdmap (a platform developed by Ushahidi), for three cases in Montreal (1 case) and Vancouver (2 cases), Canada. Creative methods like storyboarding were employed for communicating with both non-technical and multilingual audiences. Our case studies show mixed results about the adoption and use of these applications for community development. In particular, temporality plays out in unexpected ways in acute and chronic events in communities.

crisis mapping, community development, ICTs, Web 2.0

Background and Relevance

Crisis mapping is promoted as a medium by which impacted individuals can easily contribute and share information related to natural and human disasters; agencies can use crisis mapping to improve service delivery; these benefits extend to potentially countering the power dynamics of the state (Meier, 2011). Crisis mapping has garnered considerable media attention, volunteer support and funding from numerous agencies (Forrest, 2010; Zook et al., 2010; Gao et al., 2011; Greengard, 2011; Morrow et al., 2011; Roche et al., 2013). Despite challenges (e.g., access to technology, developer / administrator training, information accuracy), it demonstrates connectivity between linking open source software, humanitarian crises, crowdsourcing and adaptable tools (Okolloh, 2009).

Crisis mapping builds on a long history of digital mapping for community empowerment. For example, Participatory GIS processes have emerged to assist in

community development, to preserve urban parks and identify bad landlords (Elwood & Ghose, 2004; Sieber, 2006). There are challenges and opportunities of local knowledge production and support for marginalized communities. Community residents are seen to have the best knowledge of their community (Burns et al., 2004). As part of these digital participatory or contributory practices, citizens have reframed public policy debates and, in certain instances, gained control over planning processes, providing more sophisticated analyses and visualizations than experts and officials (Sieber, 2006; Haklay, 2010; Goodchild & Li, 2012).

The platform Ushahidi was originally created to allow for easy and fast reporting of post-election violence in Kenya (http://legacy.ushahidi.com/) and the Haiti Earthquake. It later extended its use for non-crisis scenarios and non-expert by creating the Crowdmap application. How do citizens contribute this content? Applications based on platforms like Ushahidi and Crowdmap explicitly link mapping and texting, which differentiate them from the rest of online platforms that solely rely on the Internet for user contribution (Zook et al., 2010). Using mobile technology for community development has been linked to progressive outcomes, for example, in banking, epidemiology, agriculture, and fishing (Abraham, 2007; Wong, 2008; Patnaik et al., 2009; Aker & Mbiti, 2010). A significant part of what drives this usage is the potential for increasing community integration. Authors argue mobile technologies facilitate communication, promote networking, and build social structures for communities (Horst & Miller, 2006; Hardey, 2007; Donner, 2008; Yzer & Southwell, 2008; Katz, 2011). However, researchers must be wary of any tendency toward technological evangelism and promotion of initial positive results and then neglect the ways that mobile phone usage can express or even exacerbate gender, income and other digital divides (Albert et al., 2008). Therefore, the mere presence of Information and Communications Technologies (ICTs) in a project does not guarantee support from existing community development initiatives because ICTs are not always viewed as broadening participation (Girard & O Siochru, 2006). Ultimately an application is only as good as the audience it can gain and the relevant content it can present.

Data and Methods

We worked with three communities in Canada and built four applications. The first two, *Espaces Lachine* (Lachine Spaces) and *Saine Alimentation* (Healthy Eating) were created for Lachine, Quebec. Lachine is a disadvantaged neighbourhood in Montreal, consisting of 7,340 low-income residents (18% of the population in Lachine) (Statistics Canada, 2006); these residents are also physically separated from other areas by heavy industry (Centraide, 2012). We worked with the *Table de concertation jeunesse de Lachine* (Table for Youth Dialogue in Lachine) from *Concert'action Lachine*. The Table is an umbrella non-profit organization of numerous community based organizations

that coordinate/organize activities and events for Lachine youth, professionals, and adults. The third application, Acadia Park Spaces was created for Acadia Park, a neighbourhood of Vancouver, British Columbia consisting of young, middle class families living in subsidized student housing, with a total population of 1,700 (Mahal, 2013), with more than half (58%) reporting an annual income of less than $30,000 (Bigam, 2013). We worked with the collective Acadia Families for Sustainable Communities, formed of current and former student families that are concerned about the risk of the community's land-use changes. A fourth application, Let The People Speak, was created but never launched for the Grandview-Woodland neighbourhood of Vancouver. The neighbourhood comprised of a mixed low and middle income population with multiple ethnicities that are largely renters (66%) (City of Vancouver, 2012).

Through on-the-ground networking and emails, we contacted the community organizers and activists. We prepared for the meetings with community organization members by creating storyboards (presented as a comic book) to explain the process of mapping and contributing content to be mapped. We met and presented the project and, to give them insight into the potential, showed previous applications. We attended community meetings and developed each application after consultations with the communities. There were numerous iterations of application development, following discussions with community members. The applications were launched once we came to a consensus. Multi-lingual flyers were designed by community based representatives. Manuals were written so that the organization could navigate the applications. Guidelines were created for what constituted an appropriate message (e.g., no foul language).

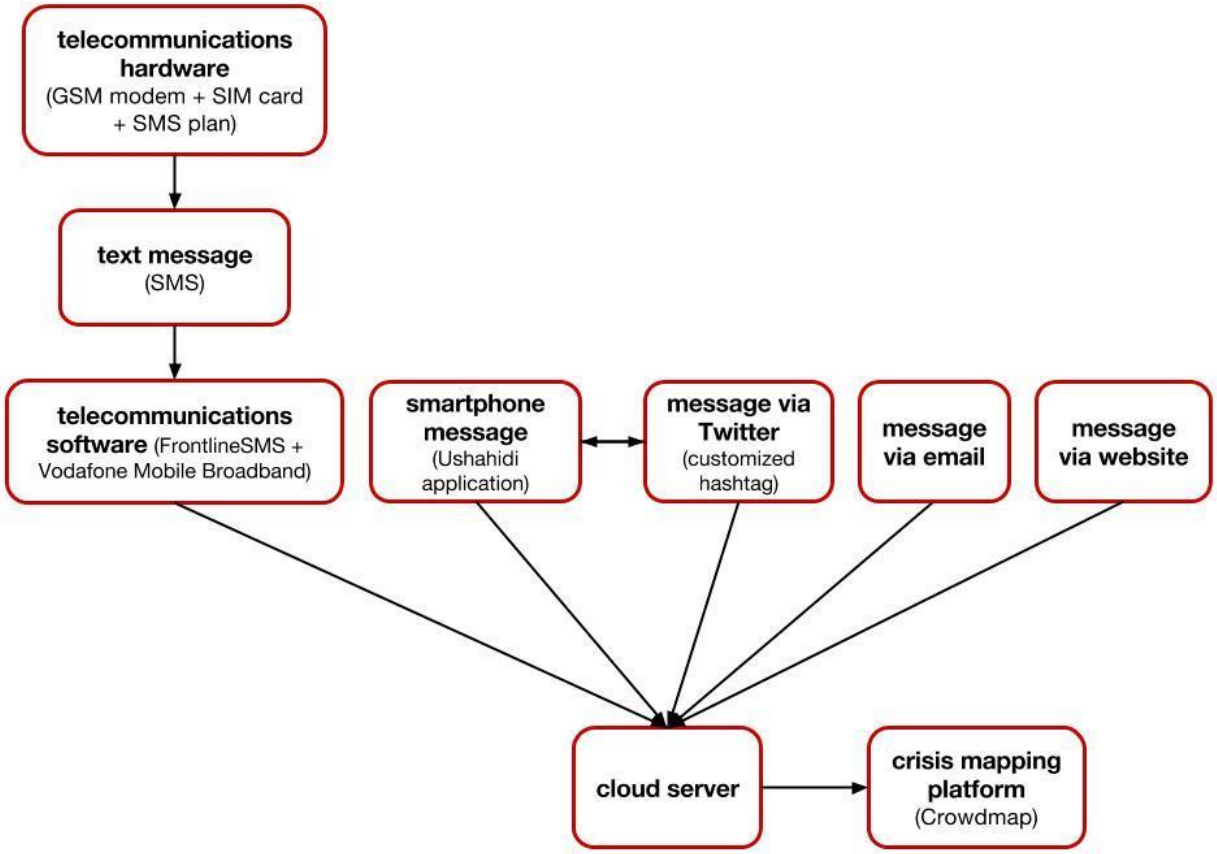

Figure 1. Crowdmap architecture of message submission for developers/administrators. (Source: Authors)

Each application we launched consisted of three parts: a mapping software platform, telecommunications hardware, and a telecommunications software platform (see Figure 2). We used Crowdmap, a free and open source cloud-based mapping platform to develop our applications. Building the application required telecommunications hardware and software, which, unlike the vision of universality of the cloud, is highly dependent on country infrastructure and regulations. Ultimately, telecommunications issues dominated the development time. Mobile network provider inconsistencies were prevalent with hardware and software. We used FrontlineSMS, which integrates with Ushahidi, as our telecommunications software. The hardware and software required by FrontlineSMS is under the Global System for Mobile Communications (GSM) network, not the Code Division Multiple Access (CDMA), which is prevalent in Canada. Our provider options thus were narrowed as we entered a contract with a GSM network provider so our subscriber identity module (SIM) card would match the GSM modem standard.

Our case study approaches varied based on community management and motivations for the adoption of the platform. For instance Vancouver cases were activist-driven; whereas the Montreal case was managed by community organizers. The Vancouver cases had motives resembling crises (e.g., immediate rezoning, anti-densification, loss of social housing). The Lachine organization had longer term goals (e.g., community asset development). Lachine relied primarily on texts; Acadia Park relied on contributions via the website. Commonalities included flyer distribution, poster creation, attending community events, and meetings. Despite the similarities, the differences determined many of the results.

Results

Specific contributions were categorized into map legends, which appear as 'Categories' in Figure 2, based on community assets and concerns. Figures 2 and 3 display the websites of two of the four applications created. In Figure 2, the homepage of the Acadia Park Spaces application is illustrated. It shows an interactive map that aggregates messages represented as blue circles. The map allows for users to zoom to different scales and explore messages. In the categories section, 'Places I love' and 'Places I want changed' are tabs that can expand to reveal specific categories (e.g., play spaces, green spaces, housing, hazards). The 'How to Report' box displays the available ways to submit messages (phone number is not included because the number is no longer in service) to the website.

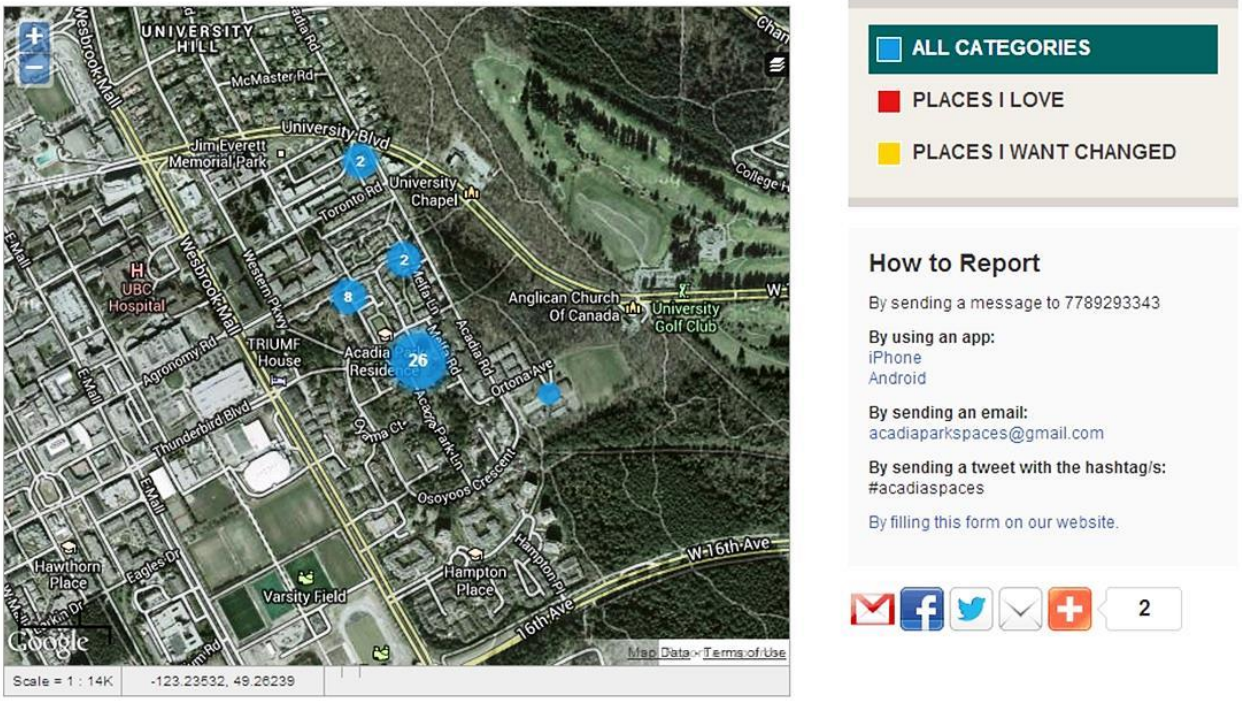

Figure 2. Acadia Park Spaces includes an interactive map that aggregates messages (blue circles), where users can zoom to different scales and explore messages. The 'How to Report' box displays ways to submit messages. Specific contributions were categorized into map legends based on community assets and concerns. The 'Categories' section includes tabs that can expand to reveal subcategories. The categories and subcategories are defined by community organizers and activists.

Figure 3. A message submitted (red placemark on map) to *Espaces Lachine*, sectioned in the categories, 'Rivers and green spaces'. The yellow placemarks represent other submitted messages.

We interpreted our title, *Can we use a crisis mapping platform for community development?*, as an issue of time. That is, is there an embedded temporality to a technology developed for crises that can or cannot be translated to more long-term, non-event-driven, conditions? We found four key points in relation to acute and chronic issues in communities, which are (1) the sheer acuteness of the event, (2) the singularity of purpose (3) the motivations of contributing to non-acute events, and (4) the connection of contribution to action. The term 'acute' is defined as a non-chronic single instance issue.

First, an acute issue may be too acute for crisis platforms used in community development. For example, Grandview-Woodland is a passionate community with imminent concerns; yet the application never launched because community leaders (the

gatekeepers) were unwilling to adopt it. Reliable methods of community practices (see Figure 2), like online and offline petitions, community meetings, emails and rallies, were already being used for voicing opinion and taking action against a recent community draft plan proposed by city officials. Community leaders may have anticipated dilution of their efforts or message fatigue among participants, regardless of the time frame. Indeed, we were drawn to this case both because of its use of ICTs and the crisis-nature of its activities. Ushahidi and Crowdmap are proposed for urgent situations. Their platforms are developed to be rapidly configured, installed and launched; their user interfaces are designed to easily enable urgent communications. However, we sometimes undervalue the role of the organized crisis mapping community. A community can marshall an army of technical assistance; volunteers (physical and virtual), on-the-ground organizations, international development teams and academics, indirect involvement and promotion (face-to-face and online/social media use). This ecosystem of crisis mapping makes crisis platforms functional, which is missing in community development. Lacking that support, a community development organization may ill-afford the distraction of a new application, despite any other proven value in that application.

In contrast to Grandview-Woodland, Acadia Park rapidly adopted the platform. We approached the group in the midst of an imminent rezoning of student family housing. This was due to a land-use change plan that had an unsatisfactory consultation process with the community. Fifty percent of the housing needed to be evacuated by August 2013 for future development and land use plans. The application garnered support from the activists and community members because there was demand for a mapping-based method to express community concerns. There was no limitation to the length of message submission (if submitted via web or email) and it provided a safe environment for contributions (e.g., confidentiality and anonymity were assured). The likely reason for uptake here was the acceptance by a tight knit community, which was open to new technology projects and channels of communication. The community was able to quickly deploy and offer feedback on the project and obtain submissions in a short time frame.

Second, a chronic community development issue may not work as well as an acute driven issue on crisis mapping platforms due to development times. This finding was most apparent in Montreal, where a year was spent working with the community (cf., one-three months at the other cases). Participants kept reorienting the goals of the application; there was debate about the proper communication medium (texts versus website reporting) and the venue of contributions (i.e., as a group in a workshop or a fare or individually on-the-ground). Longer development times worked against a singular purpose like an event-driven crisis.

Third, motivations for participating on the application also were impacted by temporality. Motivations to contribute to mapping platforms are driven by personal, social or technological goals and vary amongst users (Budhathoki, 2010, p. 31). People here could contribute because they perceive an outlet for creative and independent self-expression. Contributors may wish to be altruistic and evoke a pride of place (Coleman et al., 2009), which could be interpreted in a disadvantaged place as future aspirations of a community. The motivations literature does not consider the intensity or urgency prompting those contributions as well as the clarity of the goals of the site. The needs were real to the members of all communities but were not viewed with the same urgency. Community development proved too amorphous a goal for Lachine in terms of its applications (hence the two applications) and there were no identifiable easy causal links (i.e., fix this and the problem will be solved). Conversely, Acadia Park had intensity linked to motivations.

Fourth, the connection between contribution and action is unclear. In the Lachine case, a mother concerned about her child's safety--he had broken an arm on the playground before--reported a damaged playground. She asked whether her reporting to the mapping application would induce the city to fix the playground. A sense of immediacy of response is created by the application that does not guarantee an immediacy of action (or any action, no matter the time). The irony is that crisis mapping *presumes* action is tied to reporting because of the urgency of the event.

Our findings represent a limitation to the use of crisis mapping platforms for community development due to temporality issues. Crisis events appear to occur at a singular point or a short duration in time (e.g., earthquakes). Chronic events (e.g., poverty) are long-term, complex and, to some, seemingly intractable. Chronic events receive less attention than crisis based events, where there is "unequal power of spectacular and unspectacular time" (Nixon, 2011, p. 6). Community development research exposes the need to express crises that do not happen instantaneously and involve long term degradation, but warrant our consideration. Yet, the sense of urgency to communicate community crises does not parallel disaster-driven crisis situations. It should be noted that disasters themselves are increasingly considered complex socio-technical events (Frickel, 2008; Fordham, 1999) with long time horizons. We simply place our attention and our energies towards the blip in time. A temporal advantage of community development over crisis mapping is that the developer has the luxury of time to know the community as we did. This is not essential to all community development mapping projects, which occasionally have spawned a number of what essentially are geospatial web "carpetbaggers" who develop mapping applications from afar in the hopes that communities will find them useful (Sieber et al., 2009).

Conclusions

We asked the question: *Can we use a crisis mapping platform for community development*? The results were mixed. Community development events are highly complex issues that do not have clearly identifiable causative events. Moreover, temporality is a key overarching factor in the adoption of our platform by the case study communities found in our four main results. First, the adoption of technology during acute community events was not always successful. One community chose not to adopt the new platform based on effective methods for responding to acute situations that were already in use. However, another community found the platform useful for voicing opinions. Second, a chronic community development issue may not work as well as an acute driven issue on crisis mapping platforms due to development times and goal reorientation. Third, motivations for participating on the application also were impacted by temporality, where the sense of urgency and intensity of issues differed depending on the communities these represented. Fourth, there is a presumption that the application guarantees an immediacy of action, which is often not the case. Our results represent a limitation to the use of crisis mapping platforms for community development due to the issues of temporality.

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