

Web-Based Participatory Mapping for Parole Boundary Deliberation

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Abstract

This paper describes a Correctional Service Canada (CSC) project conducted in the summer of 2010, using web-based participatory mapping to compile, analyse, and deliberate jurisdictional boundaries for Canada's 84 federal parole offices, utilising input from CSC officials across the country. The Google Maps API was selected for its ease-of-use, extensibility, and large developer community. Participants were able to toggle regional boundaries, create markers, and submit comments spatially referenced to the markers' coordinate pairs, which were then uploaded into a GIS for analysis and adjustment. Participation rates were assessed, finding that 75% of participants used the web-based tool, while the remaining 25% preferred to submit comments via email or telephone (n=64), and regional variations in participation rates were noted. Lessons learned are reflected upon and a pilot framework for assessing such web-based participatory tools is presented.

Background and Relevance

Correctional Service Canada (CSC) operates 84 parole offices nationwide (as of August, 2010), each of which handles parolees within its respective catchment area. These catchment areas cover the entire country, ranging in size from under 10 km² in some urban areas over 2 000 000 km² in the North. In order to more efficiently service these spaces, regional parole offices have independently designed and implemented boundaries without the knowledge of the central administrative body, National Headquarters (NHQ), posing significant concerns for incident response planning. In order to more efficiently coordinate inter- and intra-departmental actions, the development of a comprehensive nationwide spatial database of parole office locations and catchment areas became a priority.

Utilisation of Web 2.0 technologies for participatory data collection and mitigation is an increasingly prominent topic in the literature, facilitated by the growing community of amateur developers who are continually discovering novel applications for web mapping (O'Reilly 2005; Lévy 1997). Leveraging web technologies can both empower and restrict user groups in participatory processes, yet this particular case study is unique in that its 'public' is within an hierarchical organisation, thus the motivating factors for volunteering geographic information come from within that structure (Bussi 2001; Goodchild 2007).

Methods and Data

A three-phase plan of action was developed and implemented to address the problem. The first phase began with the consolidation of spatial information about parole office jurisdictional boundaries; a request was made to the regional offices to submit written descriptions of their parole offices' jurisdictional boundaries. These descriptions were received, interpreted, and digitised in a GIS to produce polygons corresponding to the catchment areas. A GIS was

selected for its ability to quickly identify gaps, overlaps, and underserved areas, which were subsequently identified, necessitating deliberation and mitigation. A bilingual participatory web-based mapping tool was developed to allow users to submit spatially-referenced comments regarding the boundaries. Utilising the Google Maps API, this tool allows users to overlay boundaries and submit comments spatially referenced to points (appearing as markers on the map) in a familiar and easy-to-use Graphical User Interface (GUI), although functionality was limited by the inability for users to create polygons. Comments were received as text strings with metadata and a coordinate pair corresponding to the user-created marker, arranged into a tabular format, and geocoded in MapInfo.

The second phase involved the dissemination of access to this tool and collection of submitted comments addressing boundary gaps, overlaps, conflicts, and other relevant qualitative spatial information from the regions and parole offices. Once user-generated comments were submitted, NHQ received and uploaded these comments into a GIS and used them to evaluate the original boundaries, as collected in the first phase. Changes to the catchment area polygons were made according to the user submissions, group evaluations of an area's spatial characteristics, and consultation with regional parole administrators. The second phase results were then disseminated back to the regions and parole offices, inviting users to make another round of comments before the jurisdictional boundaries were finalised.

The third phase comprised a more detailed GIS-assisted gap/overlap analysis of the boundary dataset, followed by the production of a parole atlas, which was disseminated to CSC offices and partner police organisations across Canada. The participation results were also analysed to determine ways in which the tool could be improved for future use.

Results

Of the 64 comments received, exactly 75 per cent were submitted using the tool; the remaining 16 comments were made via email or telephone, suggesting room for improvement in the tool design and accompanying instructions. All of the submissions from Ontario were made using the tool, while the Atlantic Region did not submit a single comment using it. The greatest proportion of submissions (33%) came from the Prairies Region, many of which referenced remote areas. Interpretation of the results was difficult in many cases, as users could only submit written descriptions referenced to a point. Discussions with users identified that the addition of line and polygon feature creation would significantly improve usability and encourage more participation through the tool, rather than the alternative methods (email and telephone).

Conclusions

While effective in consolidating parole office boundaries across six regions, this Google-based tool lacked some of the features that would facilitate more participation. These findings highlight the importance of user-centred design in participatory tool development (Abrams, et al. 2004). Google Maps API provides an easy-to-use toolset with which many users are already familiar, and a growing 'crowdsourcing' community for ideas and support.

While such tools are useful for gathering input, much of the onus in their effective implementation lies in the ways in which information gathered is implemented in the decision-making process. In this instance, the GIS operator had control over how comments were interpreted and changes to boundaries made. A novel '3E' framework (engagement, empowerment, and enactment) is proposed for structured evaluation of participatory web-based tools, designed to analyse how a project engages its target users, empowers them with the tools and information required to participate, and enacts the data collected in a spatial decision-making process.

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