

Volunteered Geographic Information and the Future of Geospatial Data

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Chapter 1

Engaging With the Participatory Geoweb: Experiential Learning From Practice

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ABSTRACT

Maps were historically used as tools of the elite to maintain and expand power and control. The development of participatory mapmaking and the geoweb have opened new avenues for broader citizen engagement and therefore challenge traditional power dynamics. This chapter analyzes three examples and presents experiential learning around participatory processes and VGI contributions. Specifically we explore who is contributing their information, what are their motivations and incentives, in what ways do users interact with available technologies, and how is this contributing to change? We conclude by discussing the roles of motivations, the type of contribution, organizational capacity and leadership, and objectives. In comparing and contrasting these case studies we examine the individual and organizational dynamics of engagement, and how this can better inform the discourse about VGI.

INTRODUCTION

Over time, maps have been used by society's powerful as tools of control, as means for securing land and resources, and as mechanisms to establish and assert control. In recent decades, participatory mapmaking, and more recently the emergence of the participatory geospatial web (geoweb), has swept "like a pandemic" and acted to purposefully challenge these power dynamics (Chambers, 2006, p. 1). It has been claimed that participatory processes, wherein information is contributed by the 'crowd', can be empowering for those often excluded from the agency of mapmaking (Cochrane, Corbett & Keller, 2014). In the contemporary context of the geoweb, this citizen contribution of spatial information is frequently framed as volunteered geographic information (VGI) (Goodchild, 2007b). As new web-based mapping

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technologies and mapmaking platforms emerge, there is a need to better understand VGI contributions: who is contributing their information using the participatory geoweb, what are their motivations and incentives, in what ways do users interact with available technologies, and how is this contributing to change? In this chapter we draw upon applied research to approach answering these questions. We analyze the complex, contested and diverse nature of VGI, drawing upon three examples that use the participatory geoweb tool Geolive. In comparing and contrasting these examples we examine the individual and organizational dynamics of engagement, and how this can better inform the discourse about VGI.

BACKGROUND: CONTEXTUALIZING VGI

The contributions made by individuals in participatory mapping projects occur within a broader trend wherein citizens around the world want to voice their opinions and have their concerns acted upon (e.g. McGee, Edwards, Minkley, Pegus & Brock, 2015; World Bank, 2014; 2016). In some instances, these are activities undertaken alongside government initiatives, such as community members informing development planning and natural resource management (Brown, 2006; Brown & Reed, 2009; 2012; Brown & Weber, 2013a; 2013b). However, the needs and priorities of community members who provide VGI and government officials receiving this input may not align (Brandeis & Nyerges, 2015), resulting in a lack of interest and limited impact (Brown, 2012). At the other end of the spectrum, VGI can be a part of the process that challenges and contests government, including re-mapping resources to challenge ownership (Peluso, 1995) and territorial control (Quiquívix, 2014). The choices embedded within maps have multiple impacts creating layers of complexity and dilemmas related to whose worldviews and priorities are conveyed in the process (Hodgson & Schroeder, 2002; Wainwright & Bryan, 2009). It is within this challenging change space that VGI is best engaged with. Participatory mapping and VGI offer opportunities for enhanced citizen engagement as well as a means to influence (or compel) transparency and accountability of decisions that affect the public. At the same time, the limitations and the potential for using these tools to co-opt public opinion or be mechanisms of exclusion must also be considered.

In the context of participatory mapping, VGI is closely associated with crowdsourcing whereby individuals contribute geo-located information as a means to share and engage with geographic issues, processes and problem solving (Brabham, 2008; Estelles-Arolas & Gonzalen-Ladron-de-Guevara, 2012; Howe, 2006). Generally, the act of contributing is voluntary and the viewing of data is open, however in certain instances it is restricted. For many, the ‘crowd’ is imagined as being representative of citizens for whom the issue at hand is relevant; broad, diverse and “radically distributed beyond the boundaries of professionalism” (Brabham, 2008, p. 75). Platforms, such as Geolive, provide an online space for collective place-based knowledge, experience and wisdom to be captured, shared, exchanged, contested and negotiated. As a group, it is argued, the collective wisdom is greater than the sum of its individual members (Surowiecki, 2004). Yet, the data points and products of participatory mapping projects are not a reflection of all members of society; barriers of accessibility, identity, language, status, skill, political affiliation, location, age and user priorities may alter the composition of the ‘crowd’ and thus the processes as well as the products (Beischer, Cochrane, Corbett, Evans, Gill & Millard, 2015). While crowdsourcing offers unique opportunities for enhanced citizen engagement, it can also reflect existing inequalities and be a means through which prevailing conflicts may be re-created. It is not possible to make broad generalizations about when crowdsourcing is representative and when it is not; rather, stud-

ies of its use can provide insight into the diverse manifestations of the ‘crowd’ and how analyses of the (lack of) representativeness can enable critical reflections on processes and results.

The contribution of an individual’s VGI are intentional and voluntary. Goodchild argues that VGI is “one part of a fundamental transition as society redefines its vision of the role of public information” (2008, p. 239). Emerging from the new forms of participatory, crowdsourced mapping are examples of its power, such as its deployment in response to emergencies, and in improving existing and imperfect field data (Componovo & Freundsuh, 2014; Harvey, 2012; Shekhar, Yang, Gunturi, Manikonda, Olive, Zhou & Lu, 2012). Yet, there are challenges of credibility, accuracy, representativeness, motivations and biases (Flanagin & Metzger, 2008; Goodchild, 2007b; Goodchild & Li, 2012). VGI is not neutral or apolitical (Elwood, 2008; Quiquívix, 2014). Further complicating analyses of these process is that much of the available literature insufficiently outlines the methodologies employed (Sui & DeLyser, 2012) and the impacts that result (Corbett, Cochrane & Gill, 2016). Much more research is needed to bridge the theoretical analyses and critiques with practice-based experiences.

METHODS

An analysis of participatory mapping projects enables the theoretical questions and literature trends to be assessed in specific and concrete ways. In order to systematize the analysis, we have purposefully selected three Geolive projects for comparing and contrasting the manifestations and impacts of VGI in different scenarios. Since Geolive began in 2008 it has been used in approximately forty unique projects. The examples chosen for this chapter represent diverse forms of VGI, requiring different levels of approval and/or user ownership of data and its entry, as well as varying degrees of participant engagement. Since each of the projects started at different times, we analyzed the first year after the project launch, which includes a range of user, visitor and input data. The examples are contextualized in terms of the motivation behind the desire to contribute, the types of contributions, the capacity and leadership offered by the delivering organization, and how these factors align with the overall project objectives. We use these factors to compare and contrast the organizational elements that influence VGI contribution, use and impact.

We recognize that these three examples are not sufficiently broad to represent the entire nature of VGI, furthermore they draw from examples that use the Geolive platform, which uses an invitation-only mechanism to solicit and manage user activity and contributions. In a number of large spatial crowdsourcing projects (such as OpenStreetMap) the contributing volunteers are imagined as broadly as possible. They do not need to be associated with the area being mapped, nor does their involvement in the project require invitation. However, these larger projects are harder to define as examples of participatory mapping, while the uses of Geolive explored in this chapter do serve to provide some experiential insight into the relationship between participatory mapping and VGI.

In each of the three projects outlined below, collaborators have utilized Geolive, a web-based participatory mapping platform. Similar to other web-based spatial crowdsourcing tools such as Maptionnaire¹ and ArcGIS online², Geolive allows registered users to create and share their own spatially located information and experiences using a dynamic internet-based map interface. Using Javascript and PHP programming languages, the application is built on top of the Google Maps API and linked to a MySQL database. Information is tied to a specific point and can include embedded text, time, image, tags and video data. Geolive was created in the Spatial Information for Community Engagement (SpICE) lab

at the University of British Columbia Okanagan. The platform was initially designed and developed to support the active participation of users in the contribution of location-based content. It has been programmed to be user-friendly to non-technical users (for example data is added to the map using a very structured set of form fillable steps), visually engaging and robust to use. It therefore closely aligns with the intent of participatory mapping practice described in the introduction section. Geolive supports user contributed markers; spatial discussions; interactive layers; variable access control (varying levels for different users); search functions; tags and data filtering; a timeline function to understand how the spread and location of markers change over time; and social media integration.

We have selected three project examples for comparative analyses, these include: (1) British Columbia Marine Trails Network Association, a closed system where elite members crowdsource data about camping and kayaking opportunities, and make that information available to other network members; (2) Inclusive Employment Mapping Tool, an open system about experiences of positive and comprehensive employment for those with intellectual disabilities; and (3) Okanagan Refugee Community Resources, a restricted system connecting community members in the Okanagan with the skills and material possessions needed by newly arriving refugee families. All participants were directly involved with the development and deployment of their specific projects. These examples do not represent the full scope of the Geolive application, but they do provide a means through which some of the complexities of VGI can begin to be analyzed and understood. In addition, they cover a range of types of mapping and VGI experiences, having open, closed and restricted systems.

The examples articulated below draw on: (1) a descriptive narrative based on the experiences of the authors; (2) interview results; and (3) quantitative data analysis. The authors have been intrinsically involved with the design, development, deployment and ongoing maintenance of all three projects and are therefore well positioned to comment on the intent and outcomes of each of the projects. Interviews were conducted with at least two participants from the partnering organizations, further material was derived from email correspondence and material shared through the map. The quantitative data was drawn from database SQL queries. Screenshots of the three examples are presented below, along with descriptive data on usage. We had intended to graph data usage overtime for comparative purposes, however inconsistent data availability did not allow for a representative presentation in a graphed format.

PROJECT EXAMPLES

British Columbia Marine Trails: A Closed System Where Executive Members Contribute Data

The British Columbia Marine Trails Network Association (BCMTNA) is a British Columbia (BC), Canada, based registered non-profit society. The principal aim of the network is to create, in collaboration with governmental and other stakeholders, a marine network of campsites and access points along the coastline of British Columbia. The network is comprised of 10 paddling clubs from Vancouver Island, Salt Spring Island and the mainland of British Columbia. Each club assigns designated representatives to liaise and volunteer with the BCMTNA. Since 2007, when the network was officially established, volunteers have performed site assessments, inventories, cleanups and upgrades along the expanding network of trails (BC Marine Trails Network Association, 2016). The network acts as a focal point for

tourists and tourism-related activities and seeks to connect coastal communities and their economies while promoting an ethic of stewardship.

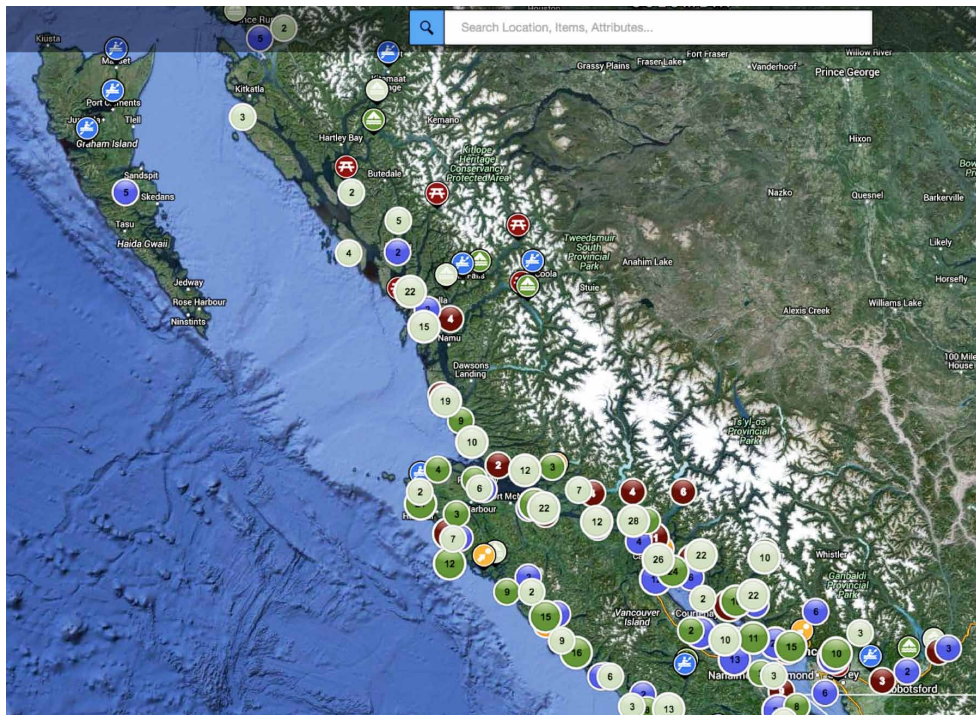
In order to strengthen the objectives of the network, reach out to new members, communicate the extent of the campsites and access points, as well as provide services to the membership base, BCMTNA collaborated with the SpICE Lab to create a crowdsourced and interactive web map. The map was launched in 2010. It originally presented the location of campsites, access points and network sponsors. BCMTNA already had a partial database of this information in a spreadsheet format, however, the data was not consistently geocoded and the dataset contained a large number of incomplete items and fields.

The site was built around a web based interactive map, which was designed to allow users to directly contribute point-based information to the database through a Google Maps interface. The map included: layers that correspond to the data classifications identified above (notably campsites, access points and network sponsors), user registration processes, login data contribution and management tools, as well as search abilities. As the project progressed, BCMTNA requested additional functionality for the map. This included developing an interactive paddling areas function, data export and download tools, as well as the ability for users to create a route and measure the distance and direction from location to location on the map. As the project matured, BCMTNA staff de-emphasized the ability for its broad membership to contribute data to the map and began to limit the ability of anyone but select members (most of them in the network's executive board) to add information to the map, or manipulate existing data through the map's interface. This was partially because of the risks associated with paddling and the need to ensure that the data contributed to the map was accurate.

The de-emphasis on open contributions was also linked to the considerable (and initially unanticipated) effort required by the executive members to clean and reformat the original database. There was a fear that if the ability to add and edit the data was open to the public there was no guarantee that the contributions would be complete and/or accurate, thus diminishing the overall value of the dataset. In this example, VGI was limited by the objectives of the map and therefore may be best understood as a closed input system, having only seven marker creators. However, information is accessed by a large number of members who are part of a pre-existing network. In the initial year there were 263 users, 2,958 markers and 40,619 map displays. Map usage was highly seasonal, as the activities mapped are largely used on a seasonal basis.

The objective of the organization was to create a resource, connect communities and educate users of the coastal areas. In order to do this, a broad network was created of organizations and clubs with similar objectives, in collaboration with government and First Nations communities. The change space for the first objective, or the immediate sphere of influence, was creating useful tools for users, which has been demonstrated as highly effective based on the number of markers and visitors. Due to a lack of baseline information and limitations of on-going monitoring data, we are less able to speak to the impact of the network and map on the second and third objectives: to better connect coastal communities and their economies, and to promote an ethic and practice of stewardship while interacting with the coastal environmental areas. With regard to VGI type, this map demonstrates how different approaches were taken in order to meet the objectives, as well as navigating concerns about safety and risk. The result was a shift away from open, voluntary contributions to a managed and limited entry process, with open access to the data. The success of the map was supported by a pre-existing organization, for which a map was determined to be a key resource that would further its organizational objectives and membership needs, as well as working toward their broader objectives of connecting communities and promoting stewardship beyond the membership.

Figure 1. Screenshot of BC marine trails map



Inclusive Employment Mapping Tool: An Open System Documenting the Experiences of Those With Intellectual Disabilities

The Canadian National Participation and Activity Limitation Survey (Statistics Canada, 2006) identified that 43.7% of people with disabilities were employed compared to 78.4% of persons who do not have disabilities. Despite efforts to develop labor market strategies for persons with disabilities at both the federal and provincial/territorial levels, employment for individuals with disabilities has remained consistently low over the past decade, and the employment situation for people with intellectual disabilities (ID) is even bleaker (CACL, 2006). Because of the disturbingly low employment rates evident in British Columbia, stakeholders throughout the province are calling for action. There has been substantial activity in this area; for example, in 2013 Inclusion BC launched its “Ready, Willing & Able” campaign targeting increased employment for individuals with ID in BC.

To reach these goals, members of the public and employers need to understand the breadth of stakeholder experiences related to the issue. Using the principles of community-based participatory research (CBPR) (Cornwall & Jewekes, 1995) members of the Centre for Inclusive Citizenship, the BC Centre for Employment Excellence and the SpICE lab undertook a collaborative project aimed at helping to transform employment practices for individuals with ID in BC through the design and implementation of a web-based and interactive BC Employment Mapping Tool (EMT).

The BC EMT was co-designed with self-advocates³ to support individuals with ID to document and share their experiences in the employment sector. Holding true to the principles of CBPR, authentic collaboration between all project partners has been integral throughout each step of the project. We have drawn on an established network of stakeholders (including self-advocates, service providers and

government) who collaborate throughout the province to address employment practices for people with ID. Researchers built on existing synergies and relationships to inform and design the implementation of a collaboration strategy in the development of the mapping tool. This directly involved working with individuals and groups of self-advocates. The EMT was foreseen to be a resource for government, service providers, employers, individuals with ID, and family members to learn and to share examples of innovation in the area of employment. In addition, a core objective of this project was to explore the potential of scaling-up this project for applicability with other populations (e.g. youth, immigrants, and Aboriginal populations). As such, the participatory development of the EMT represents an innovative approach to research, knowledge exchange and knowledge translation in the area of employment practices in BC.

For members of the public, the EMT is a web-based application that functions as an accessible and searchable database that documents best practices and positive experiences related to employment for people with ID and embeds the data within map markers that are displayed on an interactive map. As such, the tool is designed to be of value to numerous stakeholders having different needs and interests. Users can search the database for examples of best practices classified by theme. These themes include 'My first job', 'Getting a job', 'Keeping a job', 'Training and supports', 'Transitions/changes in work', 'Benefits of work' and 'Getting to work'. The map markers also contain links to other information, which at the time of finalizing this chapter are primarily video recordings of self-advocates sharing their employment-related experiences. In turn, these materials act as authentic examples, provide clear strategies of how to best support other individuals with ID across the province in preparing for employment, and provide real-life examples of how employers can address barriers to support for individuals with ID. Specifically, the mapping functionality allows stakeholders to search geographic areas for information or other resources of relevance to employment for individuals with ID in their regions.

We encountered a number of challenges related to the design and initial implementation of the EMT. These challenges required us to rethink the development of the Geolive mapping system, and in particular VGI contribution processes, to make it both usable and robust for individuals with ID, as well as other stakeholders. Because of the range of uses and stakeholders, we were required to recognize the diverse familiarity with using online interactive tools and especially social media, and the varying access to the computing tools required to contribute to the map.

In order to address the challenges related to the range of familiarity with using online interactive tools, we focused on creating an accessible and 'friendly' user graphical interface. The development of the interface involved working with focus groups comprised of self-advocates in participatory settings to design icons and workflows for adding information to the map. It became apparent that assumptions around how we facilitated community users involved in past Geolive projects to add VGI needed to be rethought. Adding information to the EMT became a primary bottleneck to the success of the project. Complex, text focused input from self-advocates could not be expected, but nor could it be precluded. Yet, at the same time we had to ensure that other user groups had the ability to add text intensive information. As a result we had to design a data input wizard to share information on the map in as straightforward a way as possible, but one where different users would add different types of information in different ways. Specifically, for self-advocates, we developed a four-step wizard with icon driven input from the user. At no point was a user required to add text using their keyboard. This interface also lent itself well to developing a mobile-friendly version of the tool.

Another important point to note with regard to familiarity with online tools relates to the existing use of social media applications (Facebook and Twitter in particular). A number of the self-advocate partners were active users of social media. We therefore had to develop a system that was not 'oppositional' to

existing social media practice. Thus we created the ability for users to login using existing social media credentials and then to share, or repurpose, the information that they add to the EMT through the networks that they already use (Facebook, Twitter and Google+). Not only does this encourage users to share their information through the map (because they do not have to duplicate their efforts), but also it serves to direct more user traffic back to the EMT site.

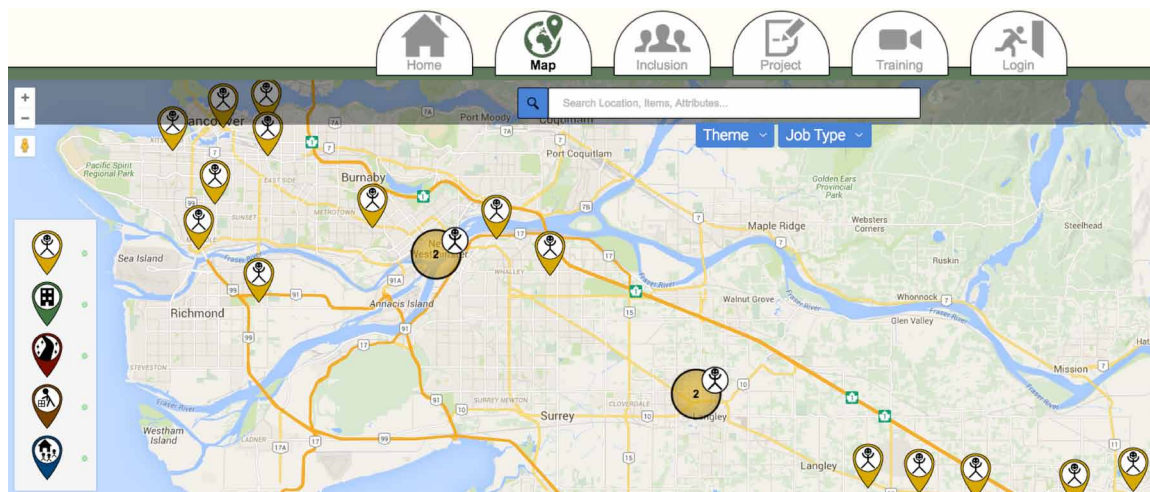
During focus group meetings it became apparent that almost all self-advocate web activity was conducted using Android-based smart phones and (usually small sized) tablets. We recognized that if we did not purposefully design the EMT to have a mobile-friendly interface we would greatly limit its uptake and use by self-advocates. As a result, we developed the tool to work seamlessly across varying screen sizes (from a 4.5-inch smart phone screen to a full sized desktop computer monitor). As the site recognizes the hardware screen size it automatically adjusts icons, links, fonts and legends to match.

During the first year after launching publicly, there were 42,911 map views, 241 users and 129 markers. The content was added by 14 marker creators. The process of enabling VGI contribution for this map demonstrates how typical mapmaking can exclude voices and decrease participation. The multiple phases of redesign of the map in order to be applicable to diverse needs and audiences highlights how objectives and feedback mechanisms can purposefully support adaptive management of systems to ensure the objectives are being met. This mapmaking experience shows how marginalization and exclusion can be replicated in ‘participatory’ tools, and how crowdsourcing may not, in fact, represent the entirety of a population due to the design, and therefore limitations, of who is able to contribute.

Okanagan Refugee Community Resources Map: A Restricted System Providing Resources for Recently Arriving Refugees Into the Okanagan Region

A range of VGI-driven crowdsourcing activities have emerged in response to humanitarian emergencies (e.g. Componovo & Freundschuh, 2014; Harvey, 2012; Shekhar et al., 2012). In relation to the ‘refugee crisis’ a range of mapping related activities have taken place internationally, although not all are reflected in the academic literature (Baranoff & Gonzales, 2015; Xu, Maitland & Tomaszewski, 2015). One of

Figure 2. Screenshot of inclusive employment map



the spaces within which participatory mapping activities has been able to engage is through mobilizing resources and services to support refugees when they have arrived in new host communities. In order to address this need, a resource map was created through a partnership between Kelowna Community Resources (KCR), the University of British Columbia Okanagan's Institute of Community Engaged Research and the SpICE lab. The map is a restricted system that connects community members with the needs of service providers and newly arriving refugees. The content is moderated and access to some information is limited to the public.

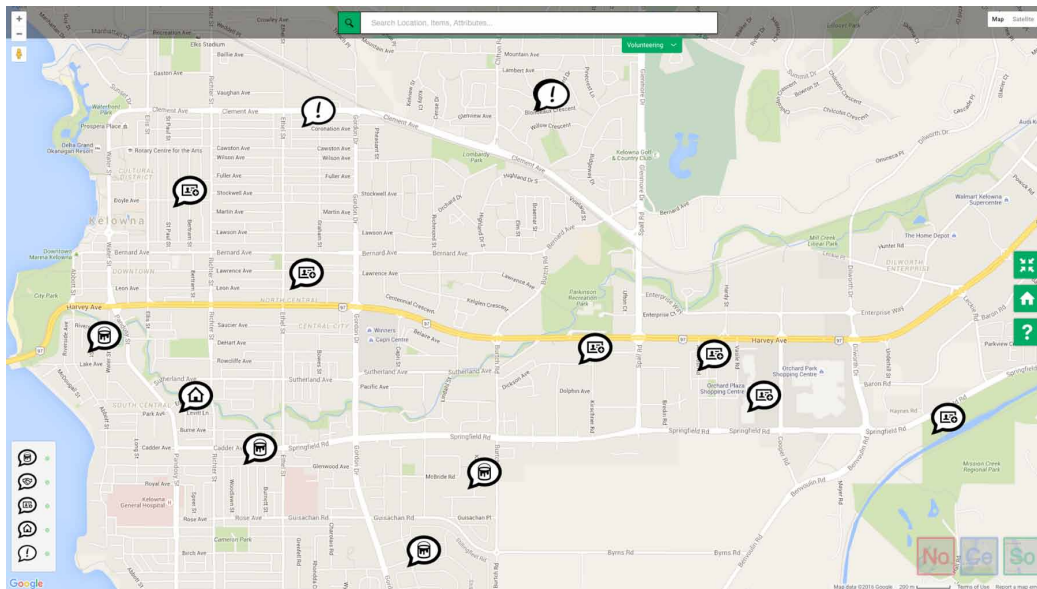
Since civil war began in Syria in 2011, over 4 million people have fled the violence. As the war has progressed the actors involved in the conflict have increased in number and the network of relationships between these actors are at best opaque. The civil unrest and division amongst opposition groups has made it unlikely that the hostilities will cease anytime soon. The situation in Syria is a humanitarian crisis with millions of displaced refugees, demanding action from world leaders and states (Cartier, 2016). The Government of Canada, working with Canadians, including private sponsors, non-governmental organizations, and provincial, territorial, and municipal governments, committed to resettle 25,000 Syrian refugees to Canada by the end of February 2016 (Government of Canada, 2016b). Of the 26,166 Syrian refugees that arrived in Canada by that date, 8,950 were privately sponsored (Government of Canada, 2016c). The Private Sponsorship of Refugees Program allows individuals, or a group, to sponsor refugees from abroad who qualify to come to Canada. Sponsors provide financial and emotional support for the refugees for the duration of the sponsorship. This includes help for housing, clothing and food. Most sponsorships last for one year, but some refugees may be eligible for assistance from their sponsors for up to three years (Government of Canada, 2016a).

In the lead up to the arrival of Syrian refugee families in February and March 2016, a large number of local individuals and groups wanted to sponsor, contribute and volunteer. A number of websites and Facebook pages sprung up in anticipation of the needs required by the incoming refugees. However, there was little coordination and groups remained largely disparate and unconnected with each other.

After extensive discussion between the project collaborators, SpICE lab members created a mapping hub that allows people to share information about household items, employment opportunities, services, housing, and volunteering that might be used by incoming Syrian refugees. Information is contributed through the map and is made directly accessible to sponsors of refugees and others who are working with refugees in their transition to Canada. The information shared on the site is also 'pushed' to the websites and Facebook pages that were developing rapidly and independently by groups throughout the region. When developing the hub, we did not intend to create yet another parallel, and competing system, rather to create a hub that would share important and relevant information to existing groups using their own existing communication channels, thus minimizing redundancy and repetition.

In order to contribute information to the map, users must register and log in to the map, drag and drop the marker identifying the appropriate information to the correct location, and fill in a number of required information fields. Users can choose to make the information available to the public, or only to themselves and coordinators from the various groups sponsoring refugees in the area. The map covers the entire Okanagan region, so if other groups in the Okanagan want to have their own Facebook pages automatically included and updated with information added to the map, they simply subscribe to the map and the associated services. Groups working with facilitating the transition of refugees who want to access the private information on the site, needed to contact site administrators before this information was made available.

Figure 3. Screenshot of Okanagan Refugee community resources map



The map was launched in February of 2016, and at the time of writing only four months of data was available (in comparison to the first year after launch used for the other two examples). During that time, 11,810 map views occurred, with 74 users, 28 marker creators and a total of 113 markers. Due to a range of privacy and safety concerns associated with the types of information being shared (especially the location of housing for vulnerable populations), VGI for this map was regulated and access restricted. Although this poses some limitations, as a public service it is designed to allow individuals to volunteer geographic information (such as an address and contact details), which is shared with service providers. In addition, the public facing site enables the public to view the types of goods and services offered and needed, and therefore allows hosts and organizations to make informed choices regarding the most needed contributions. The creation of the map emerged out of a need, as individuals and groups were communicating, but not connecting. The geoweb map sought to centralize this information, as well as operate as a hub that would connect these diverse groups and initiatives. In this example, access to VGI was restricted due to concerns of privacy, whereas in the first example access was open while contributions were restricted due to associated risk.

DISCUSSION

This chapter focuses on experiential learning with regard to the participatory geoweb and VGI, and what these projects can contribute to the theoretical understanding and framing of participatory mapping, the participatory geoweb and VGI. In this section we outline some of the broad findings of the Geolive examples, and discuss the implications for considering and opening a more critical discourse on the way in which VGI-driven participatory projects are researched. The examples were contextualized in terms of the motivation behind the desire to contribute, the type of contribution, the capacity and leadership offered by the delivering organization, and how these factors align with the overall project objectives. We

will use these factors to compare and contrast the organizational factors that influence VGI contribution, use and impact. These findings demonstrate how the dynamics of VGI cannot be viewed in isolation, but as being influenced by broader organizational and contextual factors. They also contribute to the literature about participation, VGI and crowdsourcing.

Motivation

Unlike the characterizations of VGI contributors identified by Coleman, Georgiadou and Labonte (2009), who define a spectrum of expertise in user knowledge, all three examples show how users were invited to volunteer their information because they are already invested in the issue that the geoweb tool is being used to shed light on. For example, members of the BCMTNA are avid and engaged kayakers and they are motivated to increase the resources and services available to pursuing this activity. Contributors to the EMT have a direct association to intellectual disabilities and are motivated to improve access to a positive work environment for themselves and other constituents. People motivated to help Syrian refugees share information and resources that they have available in order to facilitate the arrival of the families into the Okanagan region. In other words, in each of the case studies, contributors are drawn by their pre-existing engagement with the issue, and because they are embedded in the matter, they also have a level of experiential understanding that does not need to be classified as expert or 'neophyte' (Coleman, Georgiadou & Labonte, 2009). At the same time, it becomes clear that these maps are not creations of radically diverse groups of individuals, as some literature may portray them. In particular, the EMT map demonstrates that some individuals are excluded by the design of some mapmaking processes.

The motivations for individuals to volunteer their information through the project geoweb interface vary greatly. There is a need to recognize that in each example, the principal agent in the design and delivery of the tool is an organization (which clearly has its own agenda). Unlike the motivation of individuals to contribute to mainstream social media platforms (such as Facebook, Instagram or Twitter), where users have their own dedicated group of followers, being requested to add this data by an organization might mean that contributors do not clearly understand the purpose for doing so, or else they might feel that the value of their contributions might be only realized by the organization. Or, they may have their own motivations and objectives that do not align with those of the organization. Individuals might also feel that they are being encouraged to share information with others who share the same interest in an issue, but perhaps they do not have a personal connection or relationship, or have different expectations of the outcomes of their contributions.

It is also important to note that the motivation to contribute is not necessarily long lasting. Contributors appear to get involved when they first hear about the initiative, but a sustained and long term commitment to continue to add information to the map is not guaranteed. This is why the BCMTNA is perhaps one of the most lasting and sustainable projects. By delegating the responsibility to add, manage and maintain data the organization assumes a role of custodian and therefore may be more likely to ensure sustained activity. Whereas, topic-specific issues, which may rise and fall with interest over time, such as environmental causes and humanitarian responses, do not, in our experience with Geolive, support sustained involvement, with fewer users continuing to contribute over time.

The Type of Contribution

Each of the case studies requires a very different type of contribution and level of interaction. For example, the BCMTNA took a tiered approach. In addition, different types of users contribute and interact with the database in different ways. Administrators have the ability to add map markers, edit existing markers, export data and determine which data is visible to other users (a large portion of the database points are not publically available). Registered and paying BCMTNA members have the ability to use map-related tools such as route planning, kayaking regions and the ability to identify and save a subset of markers, however, they do not have the ability to add new data or manipulate existing data. Non registered users have the ability to view all visible data, they can also undertake some limited manipulation of the data through turning layers on and off, however, this is the extent of their ability to interact. This approach to working with the data ensures that committed members of the network are taking on the most complex and time consuming tasks required to update and maintain the integrity of the database, while also limiting participation due to concerns about accuracy and responsibility regarding safety.

In the case of the EMT, the volunteered information focused on image and videos, and much less on text. Although this form of multimedia information requires more editing, our focus groups indicated that it is far easier to access and understand for people with ID. It is also important to note that the self-advocates and individuals with ID involved in our consultations were in some cases very confident with the technology, and already intensively engaging on social media platforms such as Twitter and Facebook. That said, we anticipated potential usability challenges with the EMT and learned quickly that these were not unique to self-advocates: generational differences in familiarity with online technologies across participants (e.g., family members and service providers) also served as a challenge to contributing information to the EMT. Reflecting on these broader usability and accessibility constraints suggests that mapmaking is representative of some voices, but certainly not all voices, and on-going research needs to better disaggregate VGI input in order to contextualize the design, processes and results and specify the limitations of usability and accessibility more explicitly.

Furthermore, there remain challenges of spatial literacy⁴ and map reading within the context of successfully sharing information through the EMT project. Undoubtedly, the map is an important component of the ‘friendly’ interface and provides a mechanism to examine the relationship of ‘place’ in relation to access to experiences and services available. Through initial evaluations, a number of users have talked about the importance of the visual aspect of the map. Yet, we are concerned that we have built this on a number of assumptions about the map. These are, firstly that the map is both readable and understandable to users (for self-advocates in particular and members of the public more broadly), and secondly, that the map provides an important framework to structure the volunteered information in a way that makes it more meaningful, or at the very least more accessible. Our user testing has shown that self-advocate users are more drawn to the street view capability built into the EMT and less to the map itself. This remains an ongoing aspect of the research project, and indicates an area for future research in other participatory geoweb initiatives.

The issue of spatial literacy remained important in the Okanagan Refugee Community Resources project. Although the map acted as a means to quickly add and visualize the information, it was not necessarily communicating the information required by the refugee sponsors. A non-spatial database might have been equally useful. The true value of the contributions was the ability for the map to act as a clearing house and mediating tool for the contributed data, as it allowed users to contribute their data using a simple standardized and streamlined interface that was then redirected and pushed to the appropri-

ate non-spatial databases already being used by the relevant organizations. In fact, this became such an issue that we created a completely non-map interface for users to add their information; it still required users to add their physical address, but otherwise the process of adding had no reference to the map.

Organizational Capacity and Leadership

In our experience, organizational capacity is perhaps one of the most important aspects that influence the success of VGI projects. If there is no long-term commitment to market, maintain, prompt the user base and contribute as an administrator, the project is more likely to fail – especially in the long term. In other words, to simply establish and launch a site to collect VGI is not enough, success requires substantial and ongoing support and commitment. It also requires the delivering organization to be clear about the timelines associated with the project goals.

The BCMTNA initiative is the longest running project that uses Geolive. The project began in 2010 and was still running at the time of writing this chapter (2016). In our experience with Geolive, we believe this is partially due to the ongoing relevance of the information contributed and displayed through the map, and is also a testament to the vision and maintenance of the organization and the manner in which they have delegated agency and responsibility. By ensuring a core of dedicated administrators, motivated by both their commitment to kayaking as well as their interest in the technical side of the site, BCMTNA has created a sustainable and continually contemporary system. However, the pressure is placed on a few individuals and not spread through the broader user base, this in turn has its drawbacks, such as the limitation of the breadth of knowledge to draw on and the precariousness of concentrating the requisite skills and knowledge in just a few individuals.

The EMT project, despite having a large number of project partners, did not have a single collaborator prepared to assume the lead role in marketing, maintaining, and prompting the user base after the initial funding was complete. As a result, after an initial period of high public interest (including interviews on CBC radio, the national broadcasting corporation, and coverage in a number of provincial newspapers), during which the project had a funded position for project outreach, the contributions began to dwindle. Although it can be argued that a core base of information regarding employment strategies for individuals with ID was already included on the map, the volunteering of new information does not add to the ongoing usability and contemporaneity of the site.

However, we do understand that for a range of different reasons organizations do not necessarily want projects to run indefinitely. For example, the Syrian Refugee resource map is only relevant within the immediate context of the humanitarian crisis and the arrival of impacted families in the Okanagan region. Outside of that specific spatial and chronological context, the site and the need for VGI has little value. Clearly there is a paradox that as many of these projects progress we begin to associate value and success with longevity – often times this is neither relevant nor desirable.

Alignment With Objectives

The combination of user motivations and incentives, the types of information contributed and their relevance, as well as the organizational capacity ultimately frame and are framed by the objectives of the project. Any VGI-based project requires a clear set of objectives at the outset. Too often in our experience with implementing Geolive, this was not the case. Objectives that are not clearly articulated can greatly complicate the clarity of the messaging within volunteered information. Furthermore, the objectives can shift

through the lifespan of a project. If organizations do not have experience with developing and deploying VGI projects (or web-based initiatives more broadly), their preliminary understanding of the technology will determine the initial objectives. However, once the project takes shape and an organization has a better understanding of the range and potential application of the technology, it is easy to broaden the scope of the project and conflate the starting objectives with other organizational goals. Inevitably this leads to confusion in marketing the project objectives to the broader user base and potential contributors.

This conflation of objectives can also occur when there are multiple collaborators involved in a VGI project. Geolive was initially developed as a web based participatory mapping tool. The practice of participatory mapping is in its very nature a collaborative practice and undertaking, so requires the input of all project partners. In the SpICE lab, we therefore aspire to include the ideas and intent of every party involved. However, unaligned objectives can lead to confusion and which in turn can complicate project marketing and outreach, user motivation and the clarity of their contribution.

From our experience, successful projects are built around clear objectives. These projects cannot be determined without their alignment within broader organizational goals. Objectives need to be straightforward to communicate and the technical usability of the platform limited. More objectives do not contribute to greater success; in fact, the opposite tends to occur, the broader the range of objectives, the less clear the contribution and thus the more likely the project to falter. In sum, projects that require members of the public to volunteer their geographic information are more likely to succeed in the long term if their overall objectives are kept simple.

CONCLUSION

Drawing upon diverse examples, this chapter has brought experiential learning as a contribution and to complement developments in the theoretical literature regarding participatory mapping and VGI. We found that motivations tend to center around pre-existing interest and association, as opposed to a broad user base. The three case studies demonstrate how different types of VGI contribution, by design, can offer opportunities and limitations, which offer insight for both developing participatory geoweb projects as well as researching their impact. Organizational capacity emerged as a key determining factor of sustained activity, although we also find that more mapping projects need to actively engage in decision making about the life-span of projects, as not all ought to have a goal of becoming permanent entities. Project objectives, although often clear at the outset, may change or may not be communicated clearly with all users, which can negatively affect motivation to contribute as well create confusion, and potentially frustration when diverse expectations are not met. Whereas works based on a single case study may identify case-specific issues that are not applicable to other projects, the use of comparative examples, as analyzed in this chapter, demonstrate the contribution that comparative studies offer and how experience-based contributions can broaden the discourse, and issues raised, regarding the dynamics of VGI.

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ENDNOTES

- ¹ <https://maptionnaire.com/>
- ² <https://www.arcgis.com/home/index.html>
- ³ The self-advocacy movement for individuals with ID seeks to overcome the isolation of people with disabilities and give them the tools and experience to take greater control over their own lives. A self-advocate is an individual with ID who is equipped to speak out for themselves, articulate their rights and capable of making decisions related to matters that affect their lives.
- ⁴ Spatial literacy refers to the ability to both read and use maps. Furthermore it relates to the capacity “to visualize and interpret location, distance, direction, relationships, movement and change through space” (ESRI, 2011).