

**FROM SENSORS TO CITIZENS: EXPLORING THE TENSIONS OF USING WEB 2.0
TECHNOLOGIES TO SUPPORT ONLINE VOLUNTEERISM**

by

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Abstract

This thesis explores the collaborative and social elements of Web 2.0 and its application to online volunteering by Canadian geographers for African non-governmental organizations. Specifically, it looks beyond the binary issues of access and motivation to tensions that exist when connecting individuals in geographically disparate locations. Using principles from action research, this study is carried out in partnership with the Mapping Across Borders Society, a non-profit group operating in British Columbia, Canada. This study uses semi-structured interviews and thematic coding of emergent themes from interviews with students and professors of Canadian post-secondary institutions and with staff members from African non-governmental organizations. Our findings indicate that there are a wide range of tensions that occur when combining Web 2.0 technologies and online volunteering, that need to be understood to ensure effective online partnerships.

Preface

This research was conducted in collaboration with the Mapping Across Borders Society, a non-profit group incorporated in British Columbia. In conducting this research with Mapping Across Borders, I was able to use their online services as an entry point to my research interviews, inform their website design and use the organization in my case study chapter. Funding for this research has been generously provided by the Comart Foundation, a Canadian Charity.

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List of Abbreviations

AJAX – Asynchronous Java and XML

GIS – Geographic Information System

GPS – Global Positioning System

ICT – Information and Communication Technology

IP – Internet Protocol

MAB – Mapping Across Borders

NGO – Non-Governmental Organization

PAR – Participatory Action Research

PGIS – Participatory Geographic Information Systems

PRA – Participatory Rural Appraisal

RRA – Rapid Rural Appraisal

SDI – Spatial Data Infrastructure

VGI – Volunteered Geographic Information

XML – Extensible Mark-up Language

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Chapter 1. Introduction and Research Question

The focus of this research is to develop an understanding of the social and pragmatic issues that surround a new non-profit organization, Mapping Across Borders, which focuses on connecting Canadian geographers with African NGOs using Web 2.0 and social media for volunteering projects.

1.1. Mapping Across Borders

In East Africa, use of Geographic Information Systems (GIS) is in its infancy. While international non-governmental organizations (NGOs) with large budgets can afford to hire dedicated (and skilled) staff and pay high software license fees, local NGOs remain left behind (Mutula and Kalaote 2010). Ironically it is these local NGOs working on the ground and implementing development activities that most need to be using GIS in the long-term planning, monitoring and evaluation of their projects. This need has led to the implementation of a project called Mapping Across Borders. Mapping Across Borders seeks to address these two interrelated barriers of implementing GIS programs and training end users in African NGOs. It will achieve this through marrying the staff of local African NGOs with the largely untapped capacity of Canadian student geographers from locations where GIS use and training is well established. Using the Internet's social networking technologies, Mapping Across Borders offers the framework to develop an international network of instructors and practitioners that will deliver GIS training, engage in real world projects that benefit from GIS application, and provide long-term skills backstopping through the creation of an international community of GIS practice.

1.2. Mapping Across Borders Purposes

Students graduating with GIS degrees often lack the practical experience to get jobs in their field at meaningful levels. The mission of Mapping Across Borders is twofold:

- to support NGOs in the establishment and use of GIS
- to provide Canadian geographers real world experience.

Mapping Across Borders accomplishes both of these goals by creating an online space where geographers in Canada can collaborate on a GIS project with overseas NGOs, as well as providing online training and mentorship.

While other NGOs exist that provide expert GIS volunteers¹, these NGOs accomplish their goals by sending professionals overseas to provide one-time services. This model requires a substantial time investment, consumes large amounts of money and does not guarantee the sustainable transfer of GIS capacity. Mapping Across Borders takes an integrative approach that builds and supports capable GIS talent through long-term networking and thoughtful knowledge transfer. Many Canadian geographers can contribute their expertise without having to leave their home as Mapping Across Borders would provide the framework for networking, as well as all of the required training materials in digital formats for NGOs.

Mapping Across Borders is new², and it is currently building its organization. To do this, it relies on the support of a number of crucial partners in both the Global North and South. Some of these resources include; mentorship from University of British Columbia staff and faculty, funding and guidance from the Comart Foundation³, partnership and promotion from the Coady International Institute⁴, and on the ground support from a number of development organizations including Oxfam Canada, the World Agro Forestry Center, Agri Service Ethiopia, and others.

1.2.1. Mapping Across Borders Programs and Website

At the same time as building itself as an organization by developing partners and recruiting knowledgeable advisors, Mapping Across Borders is also engaged in developing its programs and electronic resources.

The programs that Mapping Across Borders operates are dedicated to the development of GIS skills in development organizations. As a result, Mapping Across Borders conducts

¹Examples include: MapAction, iMap and GISCorps

² Mapping Across Borders was incorporated by the BC Provincial registrar of companies as a non-profit corporation in 2010

³ The Comart Foundation is a Canadian Charity dedicated to supporting poverty relief in the Global South

⁴ The Coady international Institute is a Canadian education and training centre based out of St. Francis Xavier University

training programs every year in East Africa, teaching short courses on GIS software, and follow-up activities with organizations in the field.

Mapping Across Borders is also building a set of electronic resources for NGOs that will be hosted on its website⁵. This website is intended to be a hub for international collaboration between Canadian geographers and African NGOs to learn, teach and implement GIS skills. The website does this through two major components, a learning space and a project space. The learning space hosts lessons, tutorials, assignments and a glossary of GIS terms, in multimedia formats. The learning space is an open platform for collaboration, utilizing many of the lessons and technologies developed by the Wiki-Media foundation which produces Wikipedia⁶. The project space⁷ that Mapping Across Borders operates is where African NGOs and Canadian Geographers are able to come together and work on projects as partners, sharing their expertise with one another to inject spatial decision making into development initiatives. The project space is able to accommodate different project types whether they are large or small, individual or crowd participation based.

Through these two spaces, the Mapping Across Borders website will provide the resources necessary to accomplish its goals of increasing the use of GIS in NGOs and provide opportunities for Canadian Geographers to practice their craft.

1.3. Research Question

In academic research literature there is a claim that new Internet technologies such as Web 2.0 will provided a never-before-seen opportunity to engage ordinary citizens in civically minded activities (Rheingold 2007; Rheingold 2008; Shirky 2010). This claim has been supported by the online volunteering movement and is particularly relevant to geographers who have contributed to Web 2.0 based volunteerism (Amichai-Hamburger 2008; Elwood 2008).

⁵www.mappingacrossborders.org

⁶www.wikipedia.org

⁷ See chapter 5 for an in depth discussion of the Mapping Across Borders Project Space

This research explores the intersection of online volunteerism and Canadian geographers using Web 2.0 technologies. Mapping Across Borders provides an ideal research case study. Specifically, this thesis will investigate the following question; how can Web 2.0 collaborative technologies support Canadian geographers and African NGOs in sharing applied geospatial skills and knowledge?

1.4. Thesis Structure

In this thesis Mapping Across Borders has been explored as a community of likeminded individuals and as a website which serves these communities to learn and practice GIS for development projects. The order of the chapters in this thesis follow the progress of an action research methodology, starting with introductions to relevant research related to this study and its methodology during chapters one to three and progressing through the stages of the action research cycle. Chapter one has introduced Mapping Across Borders as an organization and website. Chapter two evaluates relevant literature in which this research is placed. Chapter three introduces the action research methodology and techniques used in this study to investigate the specific research question. Chapter four introduces the persons who interact with Mapping Across Borders website and discusses the importance of community in online environments. Chapter five builds upon the lessons learned in chapter four and presents the structure and nature of the Mapping Across Borders website that serves the community's needs. Chapter six presents quantitative and qualitative research results from the 88 semi-structured interviews used in this study to understand issues which surround the application of Web 2.0 tools for the Mapping Across Borders project. Chapter seven discusses these results and looks at the tensions that emerge from using Web 2.0 technologies in online volunteerism with Canadian geographers and African NGOs. Chapter eight draws conclusions from the study discussion and reiterates key findings. In this order, this thesis follows the cyclical nature of action research, from learning about community (chapter four), to putting lessons into action (chapter five), and then learning from those actions again (chapter six and seven).

Chapter 2. Literature Review

This research examines the use social networking and Web 2.0 technologies by Canadian Geographers and African NGO Staff to support volunteerism. The study sits at the intersection of several research fields. In order to reveal the value of this study, it is prudent to touch upon each of these relevant bodies, and in so doing, find where the research presented in this thesis is positioned.

I have chosen to break this literature review into three constituent parts: the study of motivations in volunteerism; the modes of volunteering, from offline to online; and the position of volunteering within the field of geography and GIS.

2.1. Terminology: The Global North and South, GIS, Web 2.0, Social Networking and the Crowd.

Before I discuss the relevant literature, I will first explain four terms that are used throughout this chapter and thesis. The terms are the Global North and South, GIS, Web 2.0, Social Networking and the Crowd:

- The Global North and Global South are terms that mark the socio-economic disparity between nations located in the Northern hemisphere and the South. The Global North refers to countries with relatively high wealth and development, and the opposite for those in the South. For further information and definition on the North-South divide, see Arrighi (2001).
- A Geographic information system refers to computer software and hardware that is used to catalogue, analyze and visualize features on the earth. For a more in depth discussion of the discussion surrounding the definition of GIS see Maguire (1991).
- Web 2.0 is a term that is attributed to Tim O'Reilly (2007) and describes a change in the Internet after the dotcom bust in the late 1990s. After studying companies that survived the dotcom bust, he suggested that these companies saw the Internet as a platform to connect individuals rather than seeing the Internet as a service. Websites that fit his description of Web 2.0 were able to harness the contributions of each user, creating a network effect of knowledge and harnessing collective intelligence from a crowd of Internet users (O'Reilly and Battelle 2009).

- An online social network, also known as a Social Networking Service (SNS), is a web-based application that facilitates relationships between individuals by creating online profiles for users who can then use these profiles to connect to one another. These relationships become a network of users that are able to communicate with one another virtually, whether they are strangers to one another or not. For a full definition and discussion on social networks, see Ellison (2007).
- In this research a number of different situations have been considered that involve crowd-based user communities. Crowd-based user communities are a phenomenon that occur on Web 2.0 websites and allow a large number of Internet users to work together towards a common goal, such as submitting information to a website. For a more in depth discussion of crowd-based user communities, see Brabham (2008).

2.2. Motivations in Volunteerism

Volunteerism can be defined as the helping of others with no expectation of reciprocity (Smith 1981). Within this definition there is room for many different avenues of study, however in this research, I have focused specifically on the motivations for volunteerism.

What drives individuals to dedicate their time for the benefit of others is an often researched phenomenon in studies of volunteerism (Smith 1981; Wymer Jr 1997; Clary and Snyder 1999; Ryan and Deci 2000; Bussell and Forbes 2002; Callow 2004; Finkelstien 2009). Although there are a multitude of motivations, it is possible to divide them into two broad categories: intrinsic and extrinsic (Ryan and Deci 2000; Finkelstien 2009). Intrinsic emotions and motivations are those that come from within the volunteer, such as personal enjoyment or wanting to learn something new. Extrinsic are those that come from the outside, such as peer pressure or learning skills requisite for a job application; these extrinsic motivations are not necessarily related to the goals of the volunteer activity. An example of intrinsic and extrinsic motivations can be understood in reference to editing Wikipedia articles. If a user wrote an article because they thought it may be useful, that would be an intrinsic motivation. However, if a user wrote an article because they were required to for an academic course, that would be extrinsic.

A large number of intrinsic factors have been identified in the literature; commonly listed intrinsic motivators to volunteerism include:

- Personal development—i.e. learning new skills (Clary and Snyder 1999; Marta, Pozzi et al. 2010)
- Family—passed-down generational values learned at home (Marta, Pozzi et al. 2010)
- Identity—to help a person develop an identity as an individual who values volunteering (Clary and Snyder 1999; Marta, Pozzi et al. 2010)
- Status—to elevate one's status within a community or how they see themselves within a community (Peterson 2004)
- Helping others (Bussell and Forbes 2002; Callow 2004)
- Social interaction—to be in the company of others (Wymer Jr 2003)

Extrinsic motivations to volunteerism include:

- Fulfill requirements for high school or college programs (Clary and Snyder 1999; Garver, Divine et al. 2009)
- Pressure from friends—when a friend requests a person to help them (Wymer Jr 1997; Marta, Pozzi et al. 2010)
- Release from social pressure—such as emotions that stem from friends, work environments or relationships (Marta, Pozzi et al. 2010)
- Avoidance of others—to be able to complete a task that does not require working with others, such as sorting items at a donation centre (Callow 2004)

While the above are the motivational factors that explain why certain persons choose to volunteer, this is only one of the areas of volunteerism that researchers have studied. Another active study area is the relative increase or decrease in volunteer activity. In his landmark research, Putnam (2001) looked at a decline in volunteerism and civic engagement in U.S. cities, and sought to understand why the trend was occurring. Along with the factors identified, he stressed that with the increasing use of the television into American homes, the ability to passively entertain oneself had removed the need to go out

and be active, which was traditionally filled by activities such as volunteering. Putnam also expressed concern that in the face of the Internet, civic engagement would again decline. However, other scholars disagree with this statement (Van Benschoten 2000; Rheingold 2008; Shirky 2010) stating that the opposite effect will happen—that the Internet is not only a good medium for civic engagement and volunteerism but also promotes these activities.

2.3. Modalities in Volunteering

Volunteering has changed with the introduction of communication technologies. Civic-minded citizens are now able to contribute to volunteer activities using a wide range of technological resources, allowing for increased accessibility. This type of volunteering is often referred to as virtual volunteering, however it has also been named telementoring, and cyber service (Cravens 2006). This type of technology-aided volunteering has had a history longer than most would assume, as Cravens (2006) notes that it has been used for over thirty years. Cravens (2006) and Murray and Harrison (2002) note however that volunteerism on the Internet really began in the 1990s. Murray and Harrison (2002) go on to indicate the value of internet technology advancements saying, “although Internet-assisted volunteering has existed since the mid-1990s, easily accessible systems to support it have only been widely available since 1999” (p.3).

The ways that we organize and participate in volunteering has changed. While in the past volunteering had been entirely located in a physical space, there has been an increasing trend towards participation in a virtual space. The extent of virtual participation can range from using technologies as a way to organize volunteer activities, through to performing entire efforts online with multiple variants in between.

2.3.1. Volunteerism Planned and Organized Virtually, Participation Offline

Perhaps the simplest method of including virtual participation in volunteering is to organize and coordinate volunteer efforts through the web, as Reynolds (2009) writes about in regards to the guerrilla gardening project. In guerrilla gardening, members sought to improve the public spaces around where they live by planting flowers and vegetables. The

project allowed members to congregate online via the website⁸, pick a location to improve, decide what they want to plant at the location, and finally, a time and place to meet for action. At the same time, the group has a strong focus on acting outside of local bylaws and uses paramilitary language throughout their site. As the site's founder says, "this blog began as a record of my illicit cultivation around London. It is now a growing arsenal for anyone interested in the war against neglect and scarcity of public space as a place to grow things, be they beautiful, tasty (or both!)." Another example of this type of online to offline volunteerism is from Yarn Bombing, which involves the same concepts and is also organized and coordinated through online interactions and carried out in person. In the case of Yarn Bombing, volunteers knit colourful artworks and display them on municipal infrastructure, such as park benches, street lamps or parking meters. Yarn Bombing activities are often coordinated online but can also be carried out in person individually. Often the results of Yarn Bombing events are shared in online communities, such as Ravelry⁹, a site for sharing hand-made knitting creations. What is interesting about these projects is that volunteers do much of the work on their own time rather than as a group activity traditionally associated with volunteering, either gathering seeds or knitting the yarn bomb pieces. This reinforces Callow's (2004) linkage between volunteer motivations and methods for avoidance to social interactions.

A transition to entirely virtual volunteerism has also been investigated, where coordination and acts of volunteerism are completed from start to finish online. There are a number of different ways that this can be accomplished, from donating the resources of your computer and teaching others, to working on and completing digital resources.

2.3.2. Virtual Volunteering Through Distributed Computing

Donating the processor in your computer is perhaps the simplest form of virtual volunteering, as it does not require any work on the part of the volunteer, except for downloading and installing software. This activity, commonly known as distributed computing, is often used by researchers who want to tackle complex computational

⁸www.guerillagardening.org

⁹www.ravelry.com

problems and require huge computer processing capability, such as the search for extra-terrestrials (SETI@home) (Anderson, Cobb et al. 2002) and the BOINC project¹⁰ (Anderson 2004). Based at the University of California, Berkley, the BOINC project was created in order to make the use of distributed computing widely available to both researchers of projects that require the resources of a super computer, yet do not have the required funds to purchase one, and to civically-minded individuals who want to volunteer their unused computing resources. In Krebs' (2010) work on the motivations of volunteers in distributed computing projects, she found that the majority of volunteers worked in the computing sector and lived in North America, stating that the activity was a largely Western phenomenon. She also notes that volunteers in these projects were motivated by the simple nature of volunteering, and because they wanted to feel included in technically complex projects. Virtual volunteerism through distributed computing is an easy way for volunteers to be involved in projects, however it is most applicable to clearly defined problems that are articulated by experts and require limited or no interaction with the human volunteer. A more involved type of virtual volunteering is teaching and performing digital services for others online.

2.3.3. Online-Only Volunteering

Online-only volunteering is most relevant for this research and has an accompanied body of literature that has developed since the late 1990s. Online volunteerism has been defined as, “volunteer tasks completed, in whole or in part, via the Internet and a home or work computer” (Ellis and Cravens 2000, p.1). This definition provides room for both of the earlier integrations of the Internet in volunteering, yet as Dhebar and Stokes (2008) note, “the online context presents new opportunities for access to those otherwise limited by schedule, distance or physical ability” (p. 497). Amachai-Hamburger (2008) views online volunteering as a potential avenue to civic service for Internet users and presents his findings in figure 1. The table illustrates the advantages of online volunteering projects in three categories based on the method of interaction from the personal (individual) to the interpersonal (a small number of participants) to the group (a large number of persons). Amachai-Hamburger (2008) further classifies the benefits of online volunteerism into two

¹⁰ <http://boinc.berkeley.edu/index.php>

ways; those that leverage the ability of the Internet to present information to volunteers and as a method for communication between volunteers and outsiders.

Advantages of Internet volunteer projects			
	Personal	Interpersonal	Group
Information	<ol style="list-style-type: none"> 1. Ease of accessing information 2. Freedom to search for information 3. Access to the largest information resources in the world 4. Overcoming disabilities 	<ol style="list-style-type: none"> 1. Ease of information exchange 2. Real learning 	<ol style="list-style-type: none"> 1. Finding a similar interest group 2. Variety of channels for information exchange 3. Collective data bank
Communication	<ol style="list-style-type: none"> 1. Reframing their identity 2. Revealing the 'real me' 	<ol style="list-style-type: none"> 1. High level of self-disclosure 2. Reduction of stereotype use 3. One-on-one supervision 4. Social compensation 	<ol style="list-style-type: none"> 1. Group identity 2. Variety of group decision-making tools 3. Group supervision 4. Group reinforcement 5. E-leadership and group cohesiveness 6. Solving the conflict between relatedness and freedom

Figure 1: Amachai-Hambuger (2008): "Advantages of Internet volunteer projects"

Cravens (2006) has noted that organizations that made use of online volunteering listed free labour, infusion of expertise, global networking, alternative viewpoints, and publicity as additional reasons to involve online volunteering in their operations.

2.3.4. Examples and Statistics of Online Volunteering

It is easy then to see why many organizations have been eager to implement online volunteering. A good example of the potential can be seen by looking at the United Nations Volunteers program website¹¹, which states that in 2010, they had 15,109 volunteer assignments from development organizations around the world (UNV 2012). Volunteer Match¹², another online organization, has reported 70,478 active opportunities and 80,949 participating organizations in the United States (Match 2012). While these two

¹¹ www.onlinevolunteering.org

¹² www.volunteermatch.org

organizations offer volunteering opportunities in any field, other organizations are more tailored to specific types of operations, such as the ThinkCycle project, which is aimed specifically at engineering applications (Sawhney, Prestero et al. 2008), or the Mapping Across Borders Society, which is specific to GIS expertise (Martin 2011).

2.3.5. Social Networking and Online Volunteering

Research is beginning to examine the value of online social networking¹³ in volunteerism. For the individual, online social networks can provide a semi-anonymous way to test and form an identity while feeling relatively secure (Amichai-Hamburger 2002; McKenna, Green et al. 2002). The lack of physicality of online spaces means that participants find they are able to participate in dialog without fear that they may be judged by their race, age or gender as information provided to other users can be controlled (Ben-Ze'ev 2005). The lack of pre-judging the commentary or value of submissions is important, as online volunteers often participate with others of different backgrounds (Amichai-Hamburger 2008). Online social networking interactions are also potentially important for capacity building (Bennett and Gibbs 1996). Social networking is particularly important for online capacity building projects that development organizations engage in, as it combats isolation e-learners often feel (Martínez, Miláns del Bosch et al. 2007). Aside from companionship in the learning process, online social networks provide opportunities for guidance and e-leadership (Avolio, Kahai et al. 2000; Oravec 2000).

2.3.6. Challenges and Criticisms of Online Volunteerism

Online volunteering is not without its challenges and criticisms. Face-to-face interactions carry with them visual cues related to body language and inflection that can be lost when communicating online. Without a physical location, efforts spent working towards a goal can be difficult to measure or see. Through new studies and surveys, much of the literature related to the limitations of online volunteerism has been centered on the management of volunteers. As Cravens (2006) says,

¹³For a definition of social networking, please see the glossary

“Many, if not most mission-based organizations, in the North or the South, have little experience or training in the fundamental volunteer management tasks, such as creating volunteering opportunities and effective support for volunteers” (Cravens 2006, p. 17).

However, this argument is not only limited to online activities, but can be applied to offline volunteerism as well, which Murray and Harrison (2002) illustrate in their survey of 494 volunteer managers,

“Some managers of volunteer resources said that they believed virtual volunteers would be less dependable because they had no physical presence in the organization. It appears, however, that virtual volunteers are really no different from their on-site counterparts in terms of their dependability and the quality of the work they produce” (Murray and Harrison 2002, p.8).

Nevertheless, Cravens (2006) does note the following concerns of online volunteerism that organizations have found:

- Volunteers drop out after receiving an assignment
- Considerable time is needed to orient and support online volunteers
- Online volunteers spend less time familiarizing themselves with the organizations or the communities that are being served
- Online volunteers want more communication and tasks than organizations can provide
- Volunteers are only able to work with organizations who speak the same language

2.3.7. Strategies for Success in Online Volunteerism

While many of the concerns listed above point to management issues and the ability to commit to the task of supporting volunteers and organizations, there are a number of best practices that can be followed to ensure the greatest chance of success. Dehbar and Stokes (2008) collated approximately one year of data from their website, the NetAid

Foundation¹⁴, which facilitates online volunteerism and wrote *A Non-Profit Manager's Guide to Online Volunteering* to outline the ways that online volunteering can be managed effectively (Dhebar and Stokes 2008). In this guide they review three lessons they have learned: 1. Plan with clarity; 2. Communicate, communicate, communicate; and 3. Monitor and learn from results. Cravens (2006) offers much of the same advice, adding that mixing volunteers who have specific and non-specific expertise can increase discussion, using an online management system of volunteers increases efficiency, the value of champions in development organizations keep projects moving forward, and most curiously that arbitrary bureaucratic hurdles are appreciated by volunteers. This last point may seem baffling, however when organizations force volunteers to jump through hoops and red tape to gain access to volunteering opportunities, it separates dedicated volunteers from those that may quit when the work becomes more involved.

At the same time, Dhebar and Stokes (2008) note that there are requirements that need to be met by both the development organization and the online volunteer. Both the parties must have excellent conversational literacy, be comfortable using online resources, be comfortable following protocols, and be open to alternate points of view. Additionally, development organizations must have stable staffing in place for project continuity and a staff who can champion an online volunteer project.

2.4. The Relationship of Geographers to Online Volunteerism

Geography, as a discipline, is grounded in knowledge which is directly applicable in practical situations. Disciplines of both human and physical geography are applicable in development situations, and volunteerism in these fields is common. Health Geography, Developmental Geography, Critical Geography, Geopolitical Geography, Landscape Ecology—each of these fields is important to the ways that humans interact with and manipulate the earth. In describing the *Four Pillars of Geography*, Pattison (1964) explains

¹⁴ www.netaid.org

four¹⁵ traditions that geography was founded on and concludes that in understanding these traditions, geography could make an effective impact on general welfare.

2.4.1. Volunteerism in Geography Classrooms

Several authors have written specifically about how geographers can be involved in volunteering within their classrooms. As Bednarz, Chalkley et al. (2008) notes, geography is well suited to supporting civic engagement at local, national and trans-national levels, asserting that, “geography lends itself naturally to community engagement for enhanced teaching and learning” (Bednarz, Chalkley et al. 2008, p. 90). Other researchers agree with this statement as volunteerism in geography classrooms embeds students in their craft through practice, enhances learning, and includes students in communities that are not necessarily their own (Buckingham-Hatfield 1995; Yarwood 2005).

This is not to suggest that bringing civic engagement into the classroom is easy—it can be a challenge and a burden when considering that it does not necessarily contribute towards promotion, nor tenure among young faculty in academia (Cantor 2006). But geography professors are still motivated to include civic engagement within classes, because many believe that this social action increases the depth of learning and has its own research potential (Bednarz, Chalkley et al. 2008).

2.5. Maps and Development

The tradition of geography increasing general welfare that Pattison (1964) referred to is still present in modern geography classrooms and the discipline at large. Specifically relevant to this thesis is Pattison’s pillar of spatial tradition, which recognises that the discipline has a strong focus in the ways patterns change over space and is the basis of modern GIS. Although the spatial tradition, and GIS in particular, has evolved greatly over the past 50 years, I make the case in this section that throughout its history it has been relevant to volunteerism and development. From the development of the practice of participatory mapping approaches (Corbett and Keller 2005), to Tomlinson’s (1967) Canadian

¹⁵In *Four Pillars of Geography*, Pattison outlined these pillars as spatial studies, area studies, man-land traditions and earth science traditions

Geographic Information System and the emergence of Participatory GIS (Chambers 2006) through to the modern participatory geoweb (Rouse, Bergeron et al. 2007), spatial science has a history of volunteerism and relevance for development.

2.5.1. GIS and Development

Before participatory GIS (PGIS) methods became popular in mid-1990s GIS was already being used extensively in developing nations (David and David 1991; Taylor 1991; Yapa 1991; Yeh 1991). GIS diffused rapidly because of its popularity as a planning and management tool for many institutions and organizations. However, Chrisman (1987) noted, “As GIS finds its way into practical use, it must be accountable economically, politically, socially, and even ethically” (p.1367). This notion of GIS orienting itself socially and ethically has been central to the debate over using GIS for development from the 1990s onwards (Harris and Weiner 1998; Rambaldi, Chambers et al. 2006). Central to this debate is whether GIS is a technology that empowers communities. GIS has the ability to illustrate social inequalities, but maps are strongly associated with positivist Cartesian reproductions of the earth, choosing to include the information of some while excluding others (Harley 1989; Pickles 1995). Scholars have categorized GIS as an expert oriented tool, which is most commonly applied in a top-down manner where power relationships are most often hidden (Dunn, Atkins et al. 1997; Clark 1998). However, while Dunn (1997) notes that there are many negative issues related to using GIS in the Global South, there are many reasons why it can be useful as well, such as the potential of GIS to help identify local resources and provide needed services¹⁶ (Yapa 1991).

2.5.2. The Rise of Participation in Development and Mapping

The debate concerning the ability of GIS to impact development in the Global South while being a top-down outsider driven technology is linked to broader discussions within development. During critical cartography debates (Harley 1989; Pickles 1995), an approach to development called Participatory Rural Appraisal (PRA) was gaining popularity. PRA has its foundations in another approach called Rapid Rural Appraisal (RRA), which was a

¹⁶ GIS is often used to delineate regions of land cover and natural resources and can also be used as a service to maintain civil infrastructure

collection of methods for gaining a holistic view of a rural setting quickly through the use of survey and questionnaires (Chambers 1994). Like the spread of GIS, RRA gained rapid popularity in the 1980s and began to face criticism in the early 1990s. This criticism was based on an understanding that RRA, like GIS at the time, was an expert-driven outsider activity imposed upon a community. At the same time, Robert Chambers (1994) was writing about the need for development to shift from being exclusively an outsider activity, to one that was also an insider activity (Shah, Bharadwaj et al. 1991; Heaver 1992; Chambers 1994; Mosse 1994) saying,

“The revolutionary breakthrough was the discovery during the evolution of PRA that local people could themselves make their own often brilliant maps... In 1974, I spent two hot days in a southern Indian village trying and failing to make a map to show all the wells. In late 1989, during the second PRA event in India in Kistagiri village in Andhra Pradesh, when Sam Joseph invited farmers to make their own map they plotted all their wells with much animated crosschecking and correction, and then indicated which were in good condition, and which bad or dry. They did the plotting in just 25 minutes! There were other eureka moments” (Chambers 2006,p.3).

Because of these ‘eureka moments’, a fundamental change in the way organizations thought about development began to occur. New methodologies based on community participation and community knowledge emerged, starting with Participatory Rural Appraisal, but also including Participatory Video, Participatory Technology Development, and Participatory GIS (Haverkort, Kamp et al. 1991; Campbell 2002; Kindon 2003).

2.5.3. PGIS

The term Participatory GIS (PGIS) is used to describe a collection of mapping techniques. The methods developed started with drawing on the ground or sketch maps on paper (Mascarenhas and Kumar 1991; Rambaldi, Kyem et al. 2006). As the momentum behind PGIS grew, new modalities such as PGIS Spatial Analysis, Participatory 3-Dimensional Modelling and even the use of mobile electronic devices emerged (Mascarenhas and Kumar

1991). Today, Participatory GIS has been used in many different settings in the Global South including water development (Gloeckner, Mkanga et al. 2004), sanitation (Kar 2003), crime prevention (Liebermann and Coulson 2004), malaria control (Dongus, Mwakalinga et al. 2011), resource conflicts (Cronkleton, Albornoz et al. 2010), and others. In fact, the wide use of PGIS led Chambers (2006) to state, “hundreds of thousands, possibly even over a million, of such maps have been made” (Chambers 2006, p.4).

PGIS has become a popular tool in the participatory development toolbox. However, since its introduction it has been lauded as a tool that can both empower and dis-empower communities (Corbett and Keller 2005). While Chambers (1994, 2006) provides ample reasoning why PGIS can empower communities, he is also quick to note that the ability of the process to empower depends on the facilitator. Improper handling of a PGIS project can result in unreasonably raising participant expectations, taking time away from other activities or increasing vulnerabilities to exploitation. Corbett & Keller (2005) further notes that participatory maps lack an aspect of narrative about the land they represent, and so often need to be supplemented with a written or oral description. Kyem (2001) offers further critical reflections on PGIS, using an example from Ghana to show that concerns over the complexity of software used in GIS, opposition from local politics and the lack of immediate results are serious barriers to PGIS.

At the same time, while reflecting on the process, Rambaldi (2006) has sought to develop a practical guide to the ethics of pursuing a PGIS project. Rambaldi asks facilitators to carefully consider the following questions:

- Who participates, decides who participates, identifies the problems to be solved and who is left out?
- Whose voice counts, controls the process, decides what is important, controls the information and who is marginalized?
- Who owns the output, maps, data and organizes updates to the data?

From these questions, Rambaldi outlines 33 issues to be considered while conducting PGIS activities. These issues range from recognising exposure to danger for participants to

adequately planning the required time to ensure thoughtful contributions. He concludes the guide by suggesting that with enhanced power of maps and communication technologies, there is a greater need for responsibility in practicing PGIS.

2.5.4. PGIS, Development and the Internet

Following the successes of PGIS in the mid-to-late 1990s, the role of communication technologies and especially the Internet began to emerge as a new frontier for mapping. As early as 1998, Doyle et al. were able to note the developments of web based mapping applications. In its first incarnation, web mapping was a migration of the same functions available in traditional desktop GIS to the Internet for those already familiar with traditional environments, such as city planners (Doyle, Dodge et al. 1998). However, over time, new online applications such as Mapquest brought the ability to visualize and query map data to non-expert users (William, Jeremy et al. 2001). Google and others began to develop and release their own online mapping programs, using the benefits of a new programming paradigm called Asynchronous Java and XML (AJAX). AJAX allowed developers like Google to be able to load new website content without the need to reload entire web pages using JavaScript and asynchronous extensible mark-up language (XML) (Garrett 2005; Paulson 2005). Using these online mapping platforms, users were able to travel across the globe and visualize it in new and different ways using satellite imagery, base-map data, terrain views, and even query address listings in much simpler ways.

2.6. Mapping Mashups

Online interactive mapping did not remain as simple cartographic tools for visualizing data prepared by the map providers. Google created the ability for users to aggregate and visualize data on top of online mapping platforms, combining data from multiple sources and presenting them on the map interface. These became known as “mashups” (Kendall and Schmidt 2007; Haklay, Singleton et al. 2008). Mashups have become very popular in online mapping, and there are examples of mashup maps with data ranging from crime data to public works locations (Pegg 2007). In providing the ability to mash data up, Google created new avenues for citizens to engage with their community, other communities and even the government. By providing free of charge a wealth of data to view and build on,

Google and other companies offered an opportunity to challenge the issue of data availability that Dunn (1997) recognized as a significant barrier to the use of GIS in the Global South. In fact, this move towards a mapping platform that was easy to use and develop led Wood (2003) to predict the ‘death of cartography’ as a professional domain .

2.7. Volunteered Geographic Information

Data access remains an issue for online mapping, as providers of online maps do not provide their base data for users to download. In response to the lack of freely-accessible map data and the ability to correct errors, collaborative, crowd-sourced, online mapping applications have been created such as OpenStreetMap and WikiMapia (Crampton 2008; Haklay and Weber 2008). These online applications seek to enable citizens to become the contributors, editors and owners of all data retained on the online map (Goodchild 2007). As citizens, rather than professionals, become more and more integrated into the process of producing data and reporting on events, Goodchild (2007) notes that they are increasingly acting like sensors embedded in the natural environment. Examples of this type of citizen sensor are becoming increasingly common, and include projects such as Ushahidi¹⁷, which gained popularity during ethnic clashes of the 2007 presidential elections in Kenya. Using Ushahidi mapping software, citizens of Kenya were able to report incidences of violence before national media, that proved helpful to citizens in avoiding exposure to violence (Okolloh 2009). Other examples of map-based citizen science influencing major ongoing events were noted during the 2010 tsunami relief in Haiti, as well as the Japan tsunami and related nuclear radiation crisis where individuals digitized damaged infrastructure on the ground for rescue workers (Neis, Singler et al. 2010; Sheng, Siong et al. 2011).

2.8. Critical Reflections on the Geoweb

While mapping on the geospatial web (geoweb) has led to an increase in citizen participation, there are still issues that need to be overcome to ensure that the technology is truly widespread. Tudge notes that while there is strong uptake in persons who are already familiar in geoweb and more broadly social networking technologies, there is a gap in uptake in older generations who prefer to “let the young ones do it” (Tudge 2010; Tudge

¹⁷www.ushahidi.com

2011). Elwood (2008) notes that the geoweb is prone to three issues raised by feminist and participatory mapping research, the first echoing Internet-based mapping's unequal access, for example in homeless communities; second, that each person interacting with the geoweb will bring with them their own personal bias, which can skew the information online; and third, that there are knowledge politics at play on the geoweb, as information, when presented in maps, has certain aspects of legitimacy, which in the case of volunteering information can be incomplete and lack rigour (Elwood 2008). Despite the possible pitfalls of the geoweb when using volunteered information, Elwood notes that, "VGI [Volunteered Geographic Information] initiatives have the potential consequence of vastly expanding diversity, heterogeneity, contradiction, uncertainty, and concerns about accuracy and verifiability in these data resources" (Elwood 2008, p.181).

2.9. Volunteerism, VGI and the Geoweb

From this review of volunteerism and the Internet, geography on the Internet and participatory mapping using the Internet, I have demonstrated there are strong traditions surrounding the role of volunteerism in geography and geospatial technologies for development. There are of course critical issues that must be addressed when applying these technologies, but there is also a strong potential to combine these fields in the creation of an online social network for to support volunteerism related to the use of geospatial tools.

This thesis describes research that sits at the intersection between volunteerism and participatory GIS. The Mapping Across Borders project aims to involve GIS capable citizens in applied projects using online volunteerism. In achieving this aim, Mapping Across Borders offers an avenue for Canadian geographers to continue the strong tradition of volunteerism within the discipline.

In this thesis I specifically seek to answer the following research question, How can Web 2.0 collaborative technologies support Canadian geographers and African NGOs in sharing applied geospatial skills and knowledge?

Chapter 3. Research Methods

In order to understand how Canadian geographers and NGO staff understand and relate to Web 2.0 social networking applications and their ability to impact online volunteering of GIS skills and knowledge, I undertook a series of one-on-one interviews, using an action research framework. The following research methods chapter looks at the epistemological framework used during this study, as well as the techniques used in interviewing, transcribing and analyzing data from key informants from the community of Canadian geographers and African NGO staff.

3.1. Orienting Myself within this Research

As Donna Haraway (1988) noted, when conducting interviews the researcher brings with them a partial perspective into their research. This partial perspective is to show that since the researcher is intrinsically involved with their research, it is impossible to understand the researcher as an objective agent. This is especially true in this study, as the research was carried out by an individual positioned both within the academic community while simultaneously working for a non-governmental organization. Building on the idea of non-objectivity, Davies (1999) encourages researchers to be reflexive, which allows the researcher to identify their voice within their research (Guillemin and Gillam 2004). As a result, this research is presented with an upfront statement of my partial perspective within it and is written reflexively within the first person where pertinent, which Mansvelt and Berg (2005) also call for, saying that first person, “reflects the researcher’s understanding of their position in time and place” (Mansvelt 2005, p. 257). This reflexive process allows me to better understand my partial perspective research as well as position myself within the research project presented in this thesis.

While interviewing the various participants of this study, I embody subjective perspectives. because I am:

- An educator of GIS and a student of GIS programs
- A student who will be looking for a job at the end of my degree and also as a director of a non-profit organization, which is a potential employer

- I have been a staff member at local NGOs in the Global South, and also have spent seven years as a student at higher-learning institutions in Canada

This presentation of multiple perspectives is similar to what Laurel Richardson (2001) refers to as the crystallized self, where the individual has many perspectives that affect their objectivity. However, the loss of objectivity is not something that need be lamented; as Haraway (1988) recognises that all research is subjective, and all researchers embody different subject positions.

However, abandoning objectivity inevitably leads to questions of rigour and validity in the data collected for a study. In recognizing that I am not objective, how can I present my findings in such a way that they can be understood as being unbiased toward the situation? I have chosen to tackle this issue by examining the underlying theoretical framework that my research sits within and then applying a set of methods that are well suited.

In *Essentials of Qualitative Inquiry*, Mayan (2009) proposes that researchers should take an “armchair walkthrough” of their methodological approaches, to allow the researcher to visually present an understanding of the frameworks and theories in their research project and to convey a macro level view of the entire project (Mayan 2009, p.14). To visually explain what this process is and what it means for this research, I have presented an “armchair walkthrough” (table 1), which can be read by column, from left to right.

Table 1: 'Armchair Walkthrough' of this study, following Mayan (2009)

Epistemology	Method	Research Question	Participants	Sample Size	Data Collection	Setting	Data Analysis	Results
Action Research	Descriptive - Qualitative	Motivations for Online Volunteerism	Students and Professors in Canada African NGO workers	80-90	Semi-Structured Interviews	University Offices, Cyberspace and Common Spaces	Thematic Coding	Rich Description

3.1.1. Epistemology

In this study, I am interested in how potential members of the Mapping Across Borders online community have engaged in online and offline volunteerism, as well as their motivations, reservations and abilities to do so. This type of question has led me to use action research from an interpretive epistemological standpoint. Action research is carried out with the understanding that the researcher and the participants in the study both take an active role in the learning and action of the study and stipulates that there is an outcome that serves the larger group (Denzin and Lincoln 2011). That is certainly the case with this research, as it has been carried out with participants who are eagerly interested in seeing the results of this research put into action, which will in turn make their interactions on the Mapping Across Borders website easier and more effective.

3.1.2. Action Research

In order to understand why action research has been chosen as the methodological approach for this study, it is important to understand what separates it from other research paradigms. While Kurt Lewin (1946) began writing about action research in the 1940s, the approach to action research has continued to be relevant for numerous research disciplines today¹⁸.

Action research uses a collection of ideas, methods for data collection, interpretation and analysis to allow the researcher to relinquish the burden of possessing expert knowledge, and instead “acknowledge the competence, experience, understanding, and wisdom of ordinary people” (Stringer 2007, p.170). Because the intent of this research is to determine

¹⁸see Adelman Adelman, C. (1993). "Kurt Lewin and the origins of action research." Educational Action Research **1**(1): 7-24.or Peters Peters, M. and V. Robinson (1984). "The origins and status of action research." The Journal of Applied Behavioral Science **20**(2): 113-124.for a history of action research; Meyer Meyer, A. L. and A. D. Farrell (1998). "Social Skills Training To Promote Resilience in Urban Sixth-Grade Students: One Product of an Action Research Strategy To Prevent Youth Violence in High-Risk Environments." Education and Treatment of Children **21**(4): 461-488.for action research in youth violence; Baskerville Baskerville, R. L. and A. T. Wood-Harper (1996). "A critical perspective on action research as a method for information systems research." Journal of Information Technology **11**(3): 235-246, Baskerville, R. L. (1999). "Investigating information systems with action research." Communications of the AIS **2**(3es): 4, Baskerville, R. and M. D. Myers (2004). "Special issue on action research in information systems: Making IS research relevant to practice." MIS Quarterly **28**(3): 329-335.; and Baskerville and Wood-HarperBaskerville, R. L. and A. T. Wood-Harper (1996). "A critical perspective on action research as a method for information systems research." Journal of Information Technology **11**(3): 235-246.for action research in information systems

the opportunities and challenges of volunteering online for professors and students learning GIS and for the NGO staff benefiting from those efforts, it is essential to interview key informants. In doing so, action research allows the researcher to “provide information that enables those responsible for making informed judgements about their activities, thus increasing the possibility that their policies, programs and services might be more appropriate and effective for the people they serve” (Stringer 2007, p.171). In focusing on the interpretations of non-experts however, action research has had to defend itself against the traditional approach of positivist research, which Denzin and Lincoln (2005) and Reason and Bradbury (2008) debate.

Action research is often considered alongside of participatory action research (PAR). PAR supposes that the researcher is not separate from the community at all and is instead a full member-participant. It stresses the relationships that exist and its ability to inform decisions within the community, instead of research emanating from the community to inform outsiders (Baum, MacDougall et al. 2006). This study has purposely chosen not to use participatory action research, as the research question, analysis and results of the work are done separately from the community, and serve to inform and benefit a much larger and potentially different community.

In this study of Internet-based communication and volunteering, action research is well suited. As Hearn and Foth (2005) investigate, new media and communication research using an action research approach is able to operate at individual, institutional and cultural levels as well as use whichever methods are most appropriate (both their case study and this one use qualitative interviews). Action research is rapidly gaining popularity in information systems (Lee A. S. 1997; Narayanaswamy and Grover 2007), information and communication technologies (ICTs) (Tacchi, Slater et al. 2003) and new media studies (Hearn and Foth 2005) which are similar to this study. Action research is also well suited for this study due to its ability to inform at the individual and community level, create ongoing feedback between participants and researcher, and produce outcomes that are useful for all involved.

Hearn and Foth (2005) go on to state that feedback loops are integral to the success of action research. These loops develop between the developer and designer of an online system and the constituents of the online community. In the case of the Mapping Across Borders project, the role of the researcher and the interview participants as the constituency of the online community has been a clear usage of this feedback loop. This feedback cycle started when the participant community of Mapping Across Borders was explored in chapter four and then used as a basis for the website design in chapter five. Once the website was designed, it was then presented prior to interviews conducted with Canadian geographers and African NGO staff, who provided valuable information which further refine the design. Within the interview process, feedback loops provided a useful method for gathering new information and refining the interview script. Every interview conducted not only informed the research record, but also informed the content and direction of the proceeding interviews.

3.2. Participant Selection

Selecting research participants was an important element of this research. While the processes of developing and understanding what participants were saying was important, it would be impossible to derive those findings if the correct persons, knowledgeable about the phenomena occurring, were not selected. In order to accomplish this, I chose to use purposive sampling while at the same time attempting to stratify my selection of candidates from the population of possible participants.

To ensure that I had a representative coverage of participants, I divided them into two groups. The first group were those from the academic institutions in the Global North and the second from non-governmental organizations in the Global South.

Within the Global North, I was able to interview both students of GIS and professors who teach GIS. Making selections in the Global North was relatively straightforward. As a student of a post-secondary education institution, my access to others in this type of organization was readily available. I wanted to stratify my participant selections to include participants from various institutions, as schools teach GIS differently from one another,

and with varying depth. In order to capture this demographic, I used the Association of Universities and Colleges of Canada website¹⁹ to obtain a list of all available institutions, and from this list went to each institution's website to look at their course calendars and faculty websites. From these websites, I was able to obtain course calendars and determine what professors were teaching GIS in Canada. I made a short list of the top two or three professors at each institution and emailed each to determine their interest in participating in a research interview.

Finding Canadian students was more difficult, as no school publishes lists of students taking particular classes. To overcome this, I made use of the rapport that I developed while talking with professors and asked them for recommendations of students that I could contact and interview. Overall, I found this to be a successful strategy.

Interviewing NGO staff members from the Global South proved to be more difficult. As I was in the Global South on behalf of the Canadian non-profit Mapping Across Borders, it would have been entirely possible to carry out the interviews, as a number of the organizations I met overseas were interested in the study. However, due to visa limitations, it was not possible to obtain interviews based on the regulations of this study's ethics approval which stipulated I adhere to country regulations that required a business visa that was not possible due to operational limitations²⁰. Instead, an opportunity presented itself when I was invited to present related research to a group of individuals working at non-governmental institutions across Africa at a Coady International Institute²¹ workshop in Eastern Canada. During this presentation I notified the group of my research and nine persons identified themselves as willing participants. The research interviews were held over a two-day period in classrooms of the Institute. When designing this survey I had

¹⁹ A full listing of universities can be found at <http://www.aucc.ca/canadian-universities/our-universities>

²⁰ Following guidelines posted to the Ethiopian consulate in Toronto, Canada I was required to apply for a business class visa to complete interviews with Ethiopians for my research. In order to be awarded this visa, I was informed that a letter from a supporting Ethiopian organization was required. The institution that I worked with in Ethiopia believed that I would be able to present this letter upon arrival at Bole International airport in Addis Ababa, however this was not the case and I was forced to enter the country on a tourist class visa. Efforts were taken in country to change the current visa to a business visa, including a visit to the department of immigration in Ethiopia which was unsuccessful.

²¹ More information about the Coady International Institute can be found at <http://coady.stfx.ca>

hoped to survey a wider range of participants in the Global South as an effort to avoid a selection bias, however due to the inability of conducting research overseas due to visa limitations this was not possible. As a result, it is possible that the participants in this study from the Global South do represent a selection bias, as they were brought together at the Coady institute for a particular course, and were selected out of a special session related to GIS which I ran.

3.3. Semi-Structured Interviews

Building an understanding of a particular phenomenon that exists in the ethereal world of virtual spaces is not something that can be easily defined nor predetermined. In an effort to understand the issues of online volunteering and differentiate the perspectives of the participants providing and receiving volunteered efforts, this study has chosen to employ in-person,²² semi-structured interviews. I chose to complete my interviews in-person because I believe there is much revealed through body language that an interviewer can make use of. Jennings (2005) shares my belief that use of body language is an important interview technique. Beyond the physicality of the interview providing a more holistic approach to interviewing, being with the participant provided two further purposes. It enabled me to establish a rapport with the initial contacts for each institution, which was integral to allowing me to find others to interview, and allowed me to contact the next subject immediately. Most of the time this meant interviewing a professor, who after participating in the study felt comfortable in sharing their student contacts with me.

The interview style was chosen to be semi-structured, because it allowed me to develop an overall strategy and structure for my interviews, yet also provided the flexibility to adjust as interviews evolved and as I learned from listening to participants.

3.4. Interview Schedule

Two differing interview schedules were developed for this research. The first was developed specifically for students and professors in Canada, and the second was developed

²²When it was not possible to be in the same physical location, video conferencing was substituted in place of in-person interviews.

for staff of non-governmental institutions of the Global South. The questions chosen for this study were informed by the guiding research question, literature reviewed, and the Mapping Across Borders organization.

3.4.1. Canadian Interview Schedule

For students and professors in the Global North who would be volunteering their efforts in Canada, the interview was divided into three themes:

1. Volunteerism and motivation
2. The collaborative Internet
3. Development and micro volunteerism

Volunteerism and Motivation specifically asked participants to review and reflect on their experiences with volunteering in traditional settings. It asked what they found to be limiting factors that prevented them from becoming more engaged in volunteerism, and what attracted them to volunteer organizations when they had volunteered or wanted to. Finally, this brought forward the concept of decoupling volunteering from a fixed time or location by asking, “Would volunteering be more accessible if it were not tied to a fixed time or place and could be accomplished at your own pace?”

The Collaborative Internet began with a very open-ended question, “how do you use the Internet, either at work or at home?” to start the process of reflecting and thinking about the ways they use the Internet. From this very general standpoint, the interview then focused, by asking if the participant used Web 2.0 technologies and to give some examples of how these technologies impact their everyday life. The purpose of these questions was to investigate the relationship between online activities and the impacts they have on the way we operate, just as a volunteer effort online would hopefully result in a real-life impact after being incorporated at a non-governmental organization project. *The Collaborative Internet* then moved on to specifically ask about how the participant could put their GIS knowledge and expertise into action online, and the ramifications of these actions with regards to privacy and comfort sharing expertise.

Development and Micro Volunteerism was perhaps the most focused section of the interview, building on the two previous sections. The goal at this point was to use the previous discussions as a backdrop for framing participant opinions on questions related to putting volunteerism into practice. The section started with questions about the efficacy of social networks, asking questions such as “Do you think that social networking items such as the ‘like’ or ‘thumbs up’ or ‘thumbs down’ buttons have measureable impacts? Do they modify how you experience social bookmarks?” and then moved on to the specifics of volunteering online by determining if the participant saw the medium as positive or negative, and asking if they themselves would get involved with online volunteerism in their classrooms and/or at home. The theme concluded with a discussion on how volunteering online could give back to its volunteers, providing resources such as online resumes, letters of reference and understanding what about the process employers may notice.

Finally, the interview ended with an opportunity for the participants to bring up any issues that they felt were not discussed, or any concerns they had with the interview questions and privacy.

3.4.2. Interview Schedule for NGO Staff Members

The interview used with staff members from non-governmental organizations sought to determine if the efforts of online volunteers in the field of mapping would be not only appreciated, but also beneficial in the real areas of development initiatives. The format of the interview schedule was similar to the one used with Canadians, with the following three sections:

1. Applicability of GIS
2. The Collaborative Internet
3. Development, GIS and Mapping Across Borders

Applicability of GIS looked at the appropriateness of GIS as a technology to enhance development in the Global South. It began by inquiring whether the respondent saw benefits to using GIS in their organization and, if further training was provided, would the

respondent want to learn more about the technologies. This section then moved on to addressing if GIS was a skill that was appreciated by development organizations, specifically by those in hiring positions.

The Collaborative Internet theme in this interview started similarly to that of the Canadian interviews, asking generally how respondents used the Internet, in both their professional lives and at home. This open-ended question allowed the respondent to describe in their own words the reality of the digital divide in their life. However, in the interview's next topic, social networking use was investigated to examine its penetration in day-to-day life, looking to see if the Internet was considered to be more than an online resource. At the end of this section, the interview participant was asked about Web 2.0 and specifically about user generated content submitted to websites. This question was employed to judge how the organizational staff contributed to discussions on the Internet, and how they contributed to larger discussions beyond their social circle, and if they recognized its potential.

In *Development, GIS and Mapping Across Borders*, the ideas of institutional integration and learning GIS were combined with the understanding of the collaborative Internet and Web 2.0 sites. This allowed for a rich discussion focusing on how training programs are best delivered, and how those best practices of training programs can be combined with Web 2.0 tools. The final theme then moved from fostering GIS skills to interacting with online volunteers and mentors, to determine if the potential inputs from those persons could be integrated into the development organizations they were based in. The question of integrating the volunteered efforts into their organizations was crucial for the *action* part of this research, as it determined what difficulties might arise from online volunteering in the real area of the organization, with the pressures of deadlines, funding and overburdened project staff. The final question of the interview schedule focused on the employable skills involved in working with online experts, and how these employable skills could be expressed through the online medium to future employers.

When the formal questions of the interview were completed, the participants were given the chance to voice their opinions of the project, or bring up their concerns over privacy

involved in the process. As will be seen, this opportunity to discuss privacy became an important issue.

3.5. Data Processing and Analysis

The data processing and analysis involved in this project has been an ongoing and lengthy undertaking. With interviews averaging an hour and 88 completed, the sheer volume of data was immense. What follows is an account of how this data volume has been processed and effectively reviewed and coded for relevant and salient data.

3.5.1. Data Processing

In order to make full use of interviews recorded, it was imperative to catalogue them in an archive that made revisiting them quick and easy. I chose to use digital audio files due to the inexpensive nature of computer memory and the ease of backing up digital data to ensure its durability. During interviews, a Roland Edirol audio recorder was used, which was simple to operate and encoded high-quality files. These files were saved directly to a portable memory card that could then be directly imported and backed up to my laptop computer. The quality of audio recorded and audio files emanating from the device have proven to be valuable, as in working across Canada and parts of the Global South I encountered many accents along the way and high-quality audio has allowed me to revisit interviews with maximal audio clarity.

Having good audio made the next stage of the data processing easier, but it did not influence the volume of work. I needed to revisit and transcribe each interview fully into a word processor so that useful variables could be identified, quotations captured and a record established. To expedite the transcription process, speech recognition software was employed. However, speech recognition software is only powerful enough to understand one speaker at a time, based on a learned user profile of speech patterns. This necessitated re-reading the interviews aloud to the computer to make ensure that all speech interpreted by the speech recognition software was from the same person (myself). However, although this method required re-recording the interview audio, it is estimated that for each interview

approximately two hours of transcription time were saved. Over the course of the 88 interviews, that would equate to approximately 180 saved hours, or seven and a half days.

3.5.2. Data Analysis

In order to comb through the large volume of data generated by the transcription of audio interviews, I required the ability to quickly sift through each of the interviews, tagging the elements of each that related back to larger themes in this research. This process is known as thematic coding, and has been detailed succinctly by Richards (2009) in her book, *Handling Qualitative Data*. Following Richards' suggestions, thematic coding software²³ was used to annotate the transcription documents. This aide used qualitative analysis software specifically built to code large volumes of data into themes, and later cross-referenced the data for analysis purposes. Before the data was coded however, I developed an initial set of themes.

Creating a set of overall themes present in the interviews was first established by reviewing the underlying ideas upon which the interview schedule was constructed, and yielded roughly four themes per section of the interview schedule. However, if these were the only themes considered, this research would only serve as a validation of preconceived assumptions. To combat this, while conducting interviews, and again during the initial stages of data processing, reflection on emergent themes was undertaken to identify phenomena. This process of allowing research themes to “emerge” from the data is one that is common in qualitative research (Richards 2009). The process of allowing themes to emerge from the data meant that throughout the analysis process, new themes were identified and coded into the results. Adding new themes opened up new avenues, but also required revisiting previous interviews. However this method yielded superior results and analysis of the data.

Before progressing to the interview process of this study however, it was important to understand the communities that would interact while using the Mapping Across Borders

²³ <http://www.qsrinternational.com/>

website. The following chapter investigates this and provides a number of important considerations for building a positive Mapping Across Borders community.

Chapter 4. Understanding the Community for Mapping Across Borders

As an action research project, this research on Mapping Across Borders had two equally weighted objectives. Firstly, it sought to understand the realities of building opportunities for volunteerism via the web and secondly, it was engaged in building a fully functioning online apparatus to facilitate that volunteerism. In this chapter, I explore the Mapping Across Borders community and its sub-communities using personas and their subjectivities, which allows me to interpret important community and website design decisions based on their needs and abilities. In order to do so, we first need to understand community and persona based design.

4.1. Looking at Community through the Eyes of Individuals

When individuals come together by shared identity, purpose or shared trait, they form a community. The users of Mapping Across Borders are made up of a collection of communities who come together to create positive change in meaningful ways. Understanding these communities is a challenge, as they are created and sustained in an online world. To better understand these communities, this chapter uses a method commonly used in computer science called personas, where fictitious individuals are created by abstracting the personalities that I have worked with in both the Global North and South. Personas are created to be as realistic as possible and often include extraneous personal details, such as names, birthdates, photos, family members, social-economic status and other information. The purpose of including this wealth of unrelated information is to increase the realism of the fictitious character, so when making decisions, project stakeholders can attempt to think beyond themselves and their own needs (Cooper 2004). Using personas, Mapping Across Borders was able to create community identities to develop tools that better suit its users during potential situations they may face using the Mapping Across Borders website. During this chapter, the personas of Sara DiMaggio and Zemekail Solomon²⁴ (appendix E) will be used in the context of a fictitious mapping project based in Ethiopia, a context which I am familiar with.

²⁴ These names are fictitious and were chosen arbitrarily.

Personas emerged as a response to poor planning in software development. All too often, software has been design from the perspectives of software designers, and not necessarily those of the end users. The result of this is that software has often included extraneous, has been overly complicated, and can lack essential functions for the users it is intended to serve. As a result the method of using personas was developed for creating design that keeps end-users, rather than software developers, needs' in focus (Cooper 2004). Today, personas are commonly used for software development (Dantin 2005; Johansson and Messeter 2005; Pruitt and Adlin 2006; Panke, Gaiser et al. 2007) and allow developers to design software that reflects the needs of users who use the software. Use of personas have been criticized (Chapman and Milham 2006) for being imaginary and not reflecting the true users of the design, only caricatures. However, Panke (2007) successfully used personas to both create and evaluate design at the same time, which was able to address most of the concerns noted by Chapman and Milham (2006).

Mapping Across Borders has created a number of student, young professional and NGO staff personas²⁵ and uses them to explore a range of participants and their subject positions so that community identities can be abstracted and understood (Appendix E). Subject position refers to the way that an individual's subjectivity is related to a given place or topic (Haraway 1988; Sharp 2009). All of the characters embodied in the personas are subjective individuals and the way that they understand Mapping Across Borders is their subject position. It is fundamental to evaluate these subject positions in order to understand the individuals who create community. However, it is not without irony to note that the personas that are created for this paper were imagined by an author that is also a subjective individual and has their own subject position. To know where the personas came from the author must first be interrogated.

4.1.1. The Subjectivity and Subject Position of the Author

I am twenty-six years old, middle class, white, male and the product of a liberal education. I have spent my life living in Canada, a wealthy country in the Global North. I have a large immediate family and married parents. I have attended private institutions for my education,

²⁵The number of personas constructed for students and young professionals and NGO staff are four and five, respectively

most recently at Queen's University in Kingston, Ontario for an undergraduate degree and currently attend the University of British Columbia in Kelowna, British Columbia as a master's degree candidate.

In 2009, after graduating from Queen's University, I moved to Ethiopia on a four-month internship that was extended to a year-long posting with a domestic NGO, Agri Service Ethiopia, working on various mapping related projects. During the course of internship I became a mapping educator and activist for education in the field of mapping for institutions seeking positive change in Africa. As an educator I have taught mapping software and techniques to over a dozen institutions in Africa and as an activist I have started a non-profit organization called Mapping Across Borders, which I am pursuing during my Masters education.

With regards to Mapping Across Borders, the above autobiography highlights a number of ways that my subject position appears. When I moved to Addis Ababa to begin my work on mapping, I was quickly elevated from the status of student, which I occupied in Canada, to the level of expert. This promotion was very useful when teaching mapping to persons who had often achieved higher graduate degrees than I had. This happened not because I suddenly became quite knowledgeable, but rather because of my subject position. As a white man from Canada my voice was automatically granted more legitimacy. Ethiopian culture is patriarchal, which gave me power as a man, and by being from the Global North, it was assumed that I had far larger access to wealth (power) than I really do.

I have only taught mapping to persons who are older than I am. In fact, the average age of my participants is easily a decade my senior. My diminutive age should have negatively affected my credibility and legitimacy as an educator; however that was not the case. My liberal education at private institutions in the Global North was so powerfully well regarded that any lack of experience due to age became invisible.

Elaborating the ways that my background has granted me elevated levels of authority is not the objective of this section. Rather, it shows how my subject position is important for

understanding the ways that I was regarded and also the way that I approached others while working for Agri Service, teaching mapping. In this analysis, I could have spent time elaborating on the differences that exist between myself and the people that I worked with in East Africa; however it is more useful to see how these differences play out in context. In the next two sections I will look at the subject positions of the Canadian geographers and NGO staff that will work with Mapping Across Borders in the months and years to come.

4.1.2. The Subjectivity and Subject Positions of Students and Young Professionals in the Global North

Personas developed for Mapping Across Borders will be examined to look at the qualities from each profile that are common to the overall community of Canadian geographers. In this way, we will be able to understand not only the subject position of the individual, but also the subject position of the entire group's identity. This section will evaluate one individual, Sarah DiMaggio²⁶ (Appendix E).

Sarah is a 22 year old female from Toronto, Canada. Due to her father's career at one of the major banks in downtown Toronto she is in the upper-middle class of Canadian society. Sarah is of mixed race, as her father's family is Italian and her mother's family is from the Philippines. Sarah went through the public school system and is now attending Ryerson University, a private institution in Toronto.

Sarah's subject position on the Mapping Across Borders website has a duality. While interacting with other Canadian students on forums and through social media, her insightful contributions have resulted in a reputation as a bright individual and as a beginner in the field of GIS. However, she is seen quite differently by her partners in Ethiopian NGO's. From her name alone, a specific understanding is formed by an Ethiopian. Much like myself, she will be automatically thought of as a knowledgeable expert due to her background and schooling but her name may also elicit a negative response from Ethiopian partners. Ethiopia is a male dominated society, so Sarah will have to work harder to be regarded as highly as her male counterparts. Her last name DiMaggio is recognizably

²⁶ This persona was chosen at random from a pool of four possible

Italian, which may also impact the response of her partners. Ethiopia is exceptional in an African context because it is the only country on that continent that was never colonized. It was, however, invaded and occupied briefly by Italy in the late 19th century. Despite the passage of time, this invasion remains a delicate matter for Ethiopians. Sarah will automatically be viewed in this light, even though she has never been to Italy herself.

A comparison of Sarah's subject position with my own illustrates some similarities. These are further informed by examining the rest of the personas created (Appendix E). The community of Canadian geographers is an emerging community for all manifestations of social media. Correa (2010) conducted a study in the United States to look at some of the emerging demographics. This study of college students contributing to social media in the United States showed that the majority of online contributions were made by Asians, blacks and Hispanics, while whites trailed. This research is echoed by other studies as well (Jones, Johnson Yale et al. 2009; Lenhart 2009) and suggests that Mapping Across Borders may find that it too will have a diverse cultural makeup of students and young professionals.

The emergent trends from this reflection using personas shows that Canadian geographers working through Mapping Across Borders will often be in complex situations involving heightened and lessened influence based on their education, gender and race:

- Universally, Canadian geographers who have western, liberal educations will be put in a position of authority, regardless of their real experience levels with mapping and GIS. Assuming this position of power has certain implications and information that Canadian geographers provide should be kept as free from fallacies as possible, in order to maintain the credibility of Mapping Across Borders. False information can become a legal liability; for example, if Canadian geographer were to give advice to a NGO staff member on a disease spread mapping project and the results mislead the NGO to reduce or remove operations, it could put persons at greater health risks or even result in death.
- Research indicates that gender online is fairly equally represented (Correa 2010), which is different from the way that gender is represented in Ethiopian NGOs. In Ethiopia there is a disparity as men hold most of the jobs in development work.

Mapping Across Borders uses a social job-posting system to allow Canadian geographers to apply to work with NGOs on specific projects. This system allows the NGOs to choose the applicant and the administration of Mapping Across Borders will need to monitor applicant choices for gender discrimination.

- While the race of a Canadian geographer who works with Mapping Across Borders is not recorded, their race may become apparent by the name or photos posted to their profile. In Ethiopian society, some races are preferred over others. White students will be well regarded for their perceived education level, Italians may face unspoken animosity and Asians may face mistrust due to the practices of foreign nationals who have built infrastructure in the country in recent years and their support of previous regimes who committed gross human rights violations (Legum 1977; Cingranelli and Richards 1999; Bosshard 2007). Mapping Across Borders will need to be sensitive to these race related issues as they arise, providing avenues for any user to report abuse.

When analyzing the ways that the subject positions of Canadian geographers interlock as an identity both individually and as group, there are particular sensitivities that must be accounted for by Mapping Across Borders. In the above analysis only education, gender and race have been explored, although the experience of the author suggested that are the most important factors related specifically to Ethiopia. In other countries, other issues could be important to consider, such as religion or post-colonial sentiments.

Recognizing these differences and sensitivities will allow Mapping Across Borders to be proactive in its mission to provide an equitable and safe virtual environment for Canadian geographers and NGOs to work together in. Mapping Across borders will foster a positive community using a set of community guidelines, implementing and monitoring an abuse reporting system and implementing a system where users can socially regulate one another.

This social approach to community management has been applied to many websites recently and is particularly relevant within the recent trend of incorporating social media and mass participation into the web, which Mapping Across Borders is steeped in. Lampe

and Resnick (2004) present a case for online “karma” where a popular technology-news website²⁷ which allowed users to provide instant feedback to other users who submit content to their website. Lampe and Resnick (2004) noted that the karma system allowed website users to self regulate, without the need to assign the task of policing their website to an administrator, freeing the time of administrator to focus on other important tasks. Mapping Across Borders intends to learn from this technology and implement it within its website to encourage users to become online citizen sensors for both textual and geographic data (Goodchild 2007).

4.1.3. The Subjectivity and Subject Positions of NGO Staff in the Global South

The personas of NGO staff created for Mapping Across Borders will be analyzed with the understanding that I cannot fully understand the perspective of NGO staff in Global South as well as I can of Canadian geographers in the Global North. In doing so, it should be recognized that they have been informed by my interactions working with more than two dozen NGOs in East Africa for approximately 17 months and will contain bias from my own subject position. This analysis will again begin with the individual and then abstract to the community. The persona used here is Zemekail Solomon who is a young Ethiopian male working for the government in the Southern Nations region of Ethiopia.

From a Canadian perspective, he would be considered black; however, in Ethiopia it would be more accurate to describe him as Amhara. The Amhara are a defined ethnic group from the central and northern provinces of Ethiopia and have a lighter complexion than the Oromo and Omo peoples from more southern regions (Kaplan 1999). It is important to be aware that there are differences in race between online users and interaction online can unearth frictions at regional, national and international levels. However, hopefully the effects of this will not become relevant for Mapping Across Borders and its online components. The Mapping Across Borders website will, as a policy²⁸, be a place where discrimination on the basis of race is not tolerated, but it is recognized that due to the subject positions of users like Zemekail situations may arise where users feel superior to

²⁷ The popular website Slashdot.org was used in the case study by Lampe and Resnick (2004).

²⁸ Every user who agrees to participate on the Mapping Across Borders website is subject to a set of terms and conditions which explicitly state the website policy of non-discrimination

others because of race (Kaplan 1999). The system for reporting abuse mentioned earlier will be important for identifying racial discrimination and users found to be engaging in these actions will have their accounts removed and IP addresses²⁹ blocked.

Zemekail is considered young³⁰ by many of his counterparts even though he is nearly thirty, is married, has his own land and contributes the most to his family's income. Zemekail is able to hold his position in the government – which is usually reserved for older persons with more experience – because of his education. Zemekail was able to attend university because he is the oldest child in this family and is male. If his sister had been the eldest, he still would have been the first child in the family chosen to pursue further education. This is one the ways that gender inequality manifests itself in Ethiopia. In situations where there is only enough wealth in a family to send one child to school, that child will always be the first born male. The repercussions for this type of gender inequality is felt when NGOs – or government agencies – hire staff. Two examples of repercussions of gender are noted below, although many others that have been noted by Glick and Sahn (1997), Mehra and Gammage (1999) and Klassen(2000).

- When organizations collect resumes for positions they find that there is an overwhelming high number of male applicants, which leads to a sample bias in the favour of a male candidate selection.
- A number of organizations will have gender hiring quotas. A result of this is an understanding that female staff are not hired because they are competent at their jobs, but because it allows the organization to meet their gender equity quota.

This lesson learned from gendered education and hiring is important for Mapping Across Borders. Participants from the Global North are projected to represent by both genders equally (Correa 2010), however the participants from the Global South may have a male gender skew. Mapping Across Borders will not use gender quotas, however it will try to encourage female staff from NGOs to participant in its seminars and online when it can.

²⁹ An IP address (Internet Protocol) is a tool that allows users' online locations to be recorded.

³⁰ In fact, all persons between the ages of 15 and 35 are considered "Youth" by the African Union *African Youth Charter* (http://www.africa-union.org/root/au/Documents/Treaties/Text/African_Youth_Charter.pdf)

By participating on Mapping Across Borders, it is understood that Zemekail believes he will benefit from the experience. This is due to his subjectivity and subject position. Zemekail is new to his career and is always on the lookout for ways to advance professionally. Mapping Across Borders will provide an interesting opportunity for him as it will expand his ability to work in the field of agronomy using the cutting edge of technology and because it connects him with people in the Global North.

Zemekail had the benefit of being exposed to mapping technologies during his university education. He was unable to learn about the technology in a deep and meaningful way during his education, however he now understands it to be relevant to his work. Mapping Across Borders presents an opportunity to learn from educational resources online and to leverage the work of students and young professionals who offer their time participating in ongoing projects. This education will make Zemekail more marketable when applying for senior positions within his government ministry and to international NGOs that are much sought after. Connecting to students and young professionals in the Global North is something that Zemekail will also be particularly interested in. It allows him to be able to implement mapping in his ongoing projects without taking time away from other commitments. The result of integrating mapping is that his projects will get noticed by his superiors and ease promotions.

Because of Zemekail's subject position, there is the possibility that there may be other motives for his participation in Mapping Across Borders. Because persons from the Global North are thought of as wealthy, it is possible that he may attempt to use Mapping Across Borders as a platform solicit for funds from students and young professionals, which is against the Mapping Across Borders user policies. Another possible issue that may arise is that Zemekail could use it as a system to attract a sponsor for a visa application to move himself and his family to a country in the Global North (Mains 2007). This type of action is an abuse of the connections that Mapping Across Borders provides. All users of Mapping Across Borders will be made aware that this type of activity is prohibited and users found in

violation will be removed warned and/or have their account removed from the Mapping Across Borders website and have their IP banned.

Using the persona of Zemekail, a number of issues have been explored. These issues centered on race, age, education, gender, and geopolitics. Where possible these issues, raised by Zemekail's subjectivity and subject position, have been abstracted to the wider context of the community of NGO staff from countries in the Global South. However, it must be recognized that by this is by not a reflection of all of the issues that all NGO staff in the Global South will face. It is impossible and impractical to consider all of the different subjectivities and subject positions that would come from evaluating the other personas and beyond. Each person who participates with Mapping Across Borders will connect with and react to the initiative differently. Instead, this evaluation has provided a way to investigate a number of issues Mapping Across Borders could face.

4.2. Learning from Subjectivity and Subject Position

Fictitious personas created from the personal experiences of the author have allowed for a discussion of the ways that the lives of participants alter their contributions to Mapping Across Borders. From this analysis the ways that the community of Canadian Geographers in the Global North as well as NGO staff from the Global South will interact together online has been studied, in terms of race, age, sex, geopolitics and geography. This has resulted in the following operational objectives for Mapping Across Borders:

- Develop a set of policies, practices and guidelines that clearly explain what is and is not appropriate when working with Mapping Across Borders.
- Make users aware of potentially inappropriate situations that may arise
- Foster a positive community attitude by implementing social systems for users to regulate one another's commentary
- Implement and monitor an abuse reporting system that is able to track when users break policies and guidelines as well as take the appropriate action in response through warnings, account suspension, account removal and/or IP banning.

Implementing the above recommendations allows Mapping Across Borders to be proactive in its quest to create a positive online space. In this space students and young professionals in the Global North, NGO staff in the Global South and others not from these communities can come together to share their experiences, facilitate knowledge transfer and work together for the purposes of developing themselves as global citizens who contribute to a better future or all of society.

Additionally, this understanding of community was an integral part of the action research process that has been used in the overall implementation of Mapping Across Borders project. By knowing what the community may look like as a starting point, the Mapping Across Borders website was designed with these users, communities, and sensitivities in mind.

Chapter 5. Mapping Across Borders Website Purpose and Overview

In the previous chapter, the personas have been used to learn about the Mapping Across Borders community, as a first processing in an action research framework. This chapter continues this methodology by using the lessons learned and putting them into practice to serve the Mapping Across Borders community.

The Mapping Across Borders website³¹ (figure 2) is the implementation of the Mapping Across Borders concept in chapter 1 that enables Canadian geographers to engage with Non-Governmental Organizations in teaching, knowledge transfer and poverty reduction projects (Martin 2011). The Mapping Across Borders website will serve two needs directly: Firstly, Canadian geographers close to graduating will gain critical work experience and participate with the international civil society community regardless of global mobility, and secondly NGOs will have access to training, backstopping and expert services in GIS that will aid in their planning, monitoring and evaluation of development initiatives.

³¹ At the time of writing this thesis (April 2012), the Mapping Across Borders website is in development. The development includes the creation of both front end (articles) and backend (programming code) content; both are complete to varying degrees. On the front-end of the website, much of the content for the information space has been written and is currently available for users. Content has been written for the learning space (which will be described in more detail below), however it is not yet publically visible because Mapping Across Borders would like to wait until a critical mass of content is developed before releasing these materials. On the backend, each space of the website has started development, to varying degrees. The wiki-media component of the learning space is currently in place, however additional components, such as the comment system, has not yet been implemented. The project space is perhaps in the most rudimentary shape, as Mapping Across Borders is focused on developing other elements of the site. The social network of the community space is implemented and currently functions, however it requires further refinement and customization to allow for the activity feeds explained below.

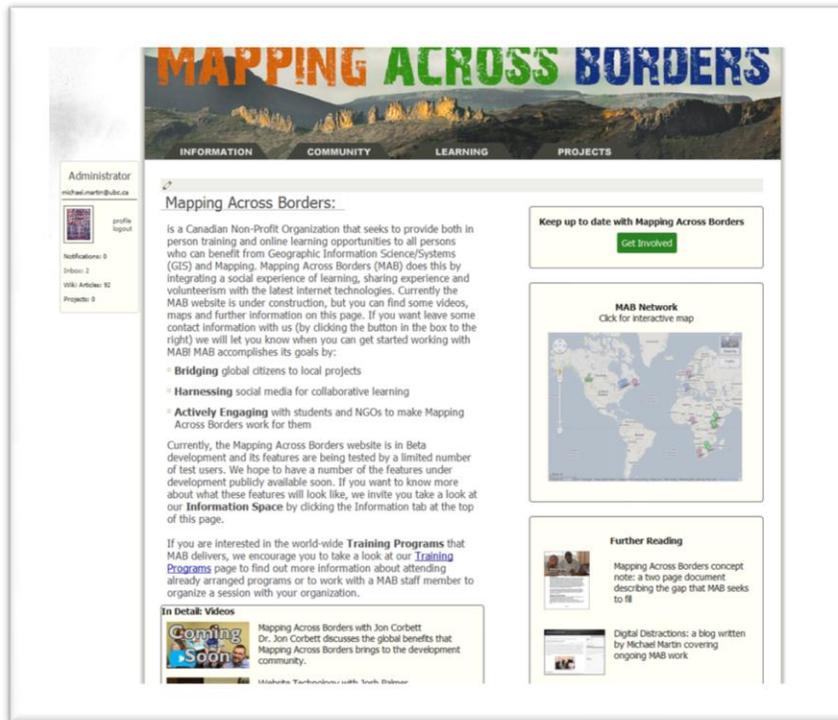


Figure 2: The Mapping Across Borders website

The Mapping Across Borders website will address these two objectives through four component online spaces:

1. **Information Space**, where new Canadian geographers and NGOs can learn about how Mapping Across Borders operates and see showcases of ongoing projects;
2. **Learning Space** where any person (regardless of their status of being a Canadian geographer or NGO) can learn GIS interactively and submit assignments that are graded by the MAB website community;
3. **Project Space** where NGOs and Canadian geographers can work together on projects sharing data, analyst services and backstopping of lessons learned in the Learning Space and;

Community Space where users can dialog openly about GIS and unrelated topics, Canadian geographers can post profiles and CVs to engage with ongoing projects, NGOs can solicit the services of Canadian geographers, and finally where public and private companies (domestic or abroad) can submit job postings for full time positions and contract work

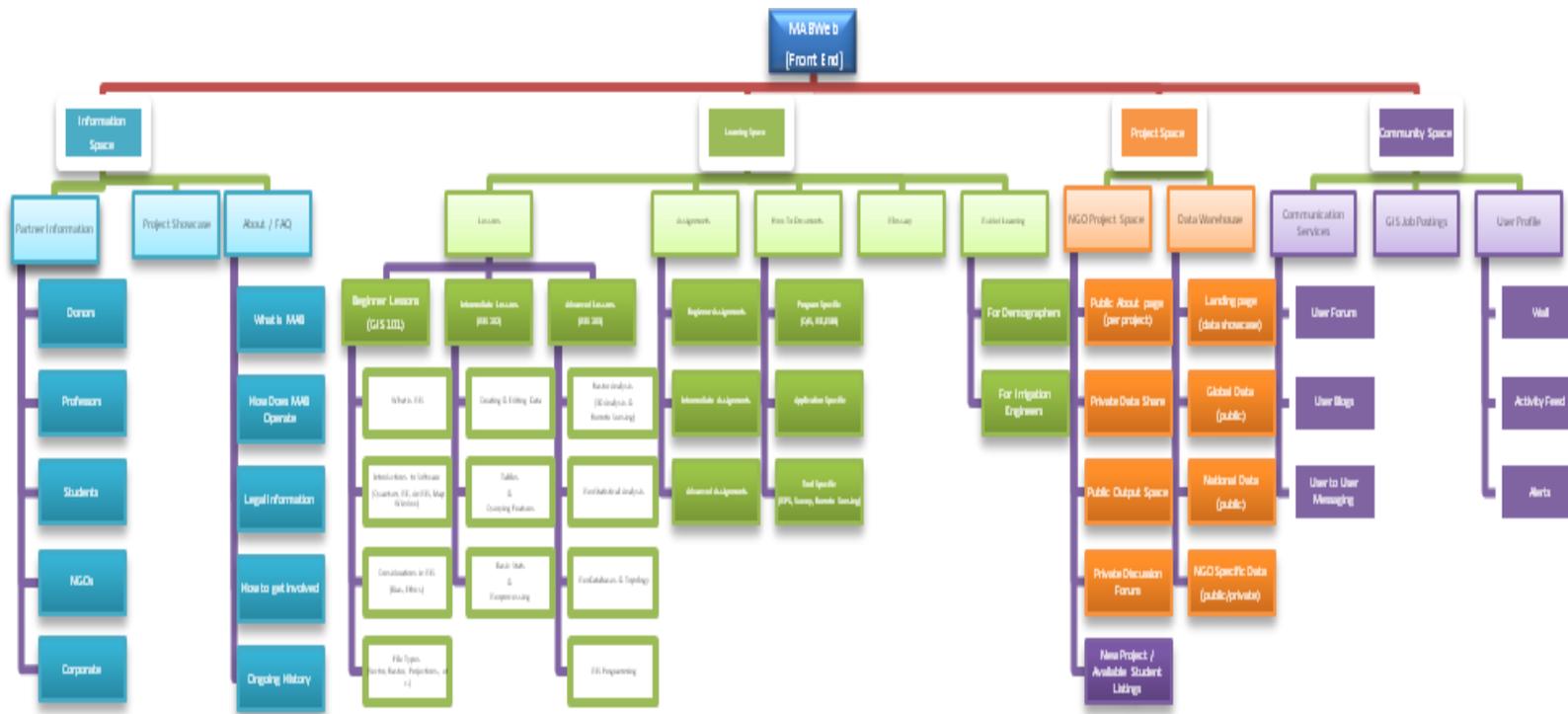


Figure 3: Mapping Across Borders Website Component Spaces. Larger sections of this figure are presented in figures 4 -7.

Each of the four spaces (figure 3) of the Mapping Across Borders website could be standalone web products and there are ‘out of the box’ software applications that could adequately serve each need individually. However, no other website to date adequately or directly addresses the opportunities of NGOs and Canadian geographers directly in a holistic approach, from promotion to education, from volunteered services to careers.

The following sections of this chapter looks at each of the four component spaces in greater detail, explaining the individual parts that make up any one space and how they fit with the greater goals of the website.

5.1. Information Space

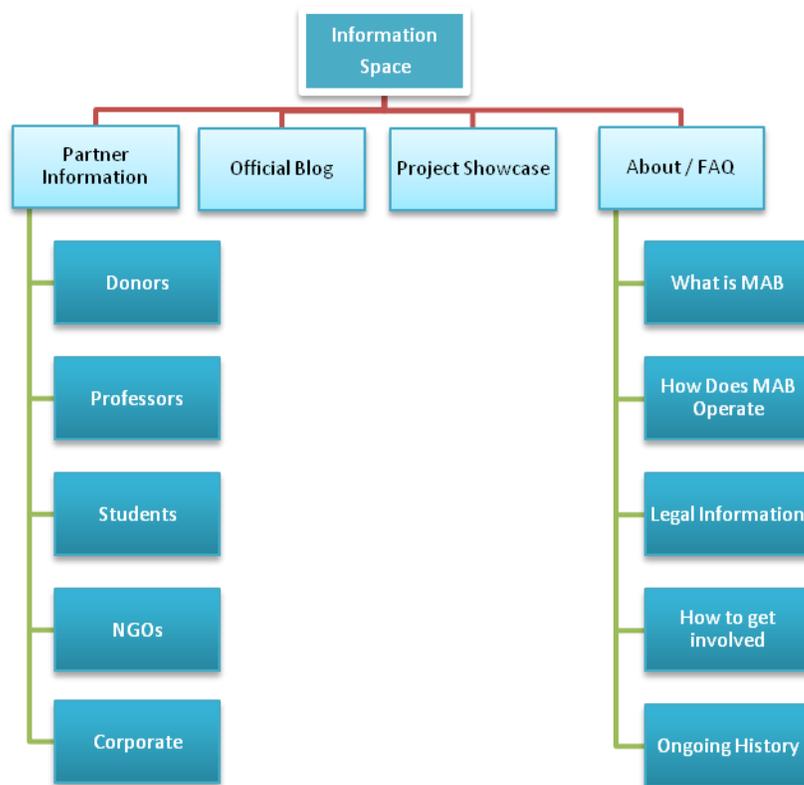


Figure 4: Mapping Across Borders Website: Information Space

The information space of the Mapping Across Borders website (figure 4) is designed as a place containing information about the Mapping Across Borders organization, an official blog of recent organizational news, a showcase of successful projects, and a section of frequently asked questions.

The information space aspires to be attractive and welcoming to a range of different communities including; potential funding sources, Canadian geographers who have limited experience with civil society organizations, NGOs wary of participating and sharing information online, and private corporations that are looking for potential employees. These communities need to feel that the website was designed with their needs in mind. Because the information space is the first experience users have with the website it must be the most polished segment. Critical information should be available at a glance and further knowledge for interested parties must be engaging in order to start a meaningful rapport with Mapping Across Borders.

5.1.1. Partner Information

To accomplish its goals, the information space puts new users first. The landing page for the information space contains introductory information on the organization and then leads each category of user on to information tailored to their needs. As the use of the website is community specific, a user's introduction to Mapping Across Borders must follow this model. The landing page for information space is composed of text and images to give the user information and links to subpages for each of the target user groups. Each user group is then be led to media combining text, images, audio and video that give in-depth information about how Mapping Across Borders operates and is of use to different organizations.

5.1.2. Official Blog

Once a user of the webpage is familiar with Mapping Across Borders, they may want to be updated regarding recent information and activities the organization has completed. The official blog will be a location where new and returning users can find articles on recent partnerships, successes, opportunities, live training sessions, and other notable activities.

This area of the website will be written and maintained by the staff of the organization, as it is an official source of information.

5.1.3. Project Showcase

A showcase of the recently completed and ongoing projects that Canadian geographers and NGOs have worked together on will also be an important part of the information space. This element accomplishes two different goals as it showcases the work that Canadian geographers and NGOs are doing and demonstrates the synergies that Mapping Across Borders enables. By appreciating the work of Canadian geographers and NGOs, it encourages collaboration and allows both groups to be proud of their accomplishments in and communicates this to and possible employers.

The project showcase is generated by individual users in the regular course of their ongoing project work. Each individual project will have its own space to write progress reports, blog entries and post ongoing results (images, maps, videos). From this content, project administrators (both Canadian geographers and NGO staff members) decide what to put on their Project Showcase page. This is one of the few requirements imposed by Mapping Across Borders on projects entered on the website, and the content will be aggregated from already created project content, to keep the reporting burden to a minimum.

5.1.4. About/FAQ

The About/Frequently Asked Questions section of the website will be one of the only sections of the website that is composed of static information. It will include some basic information about the Mapping Across Borders organization, legal and contact information and a history of the organization.

5.2. Learning Space

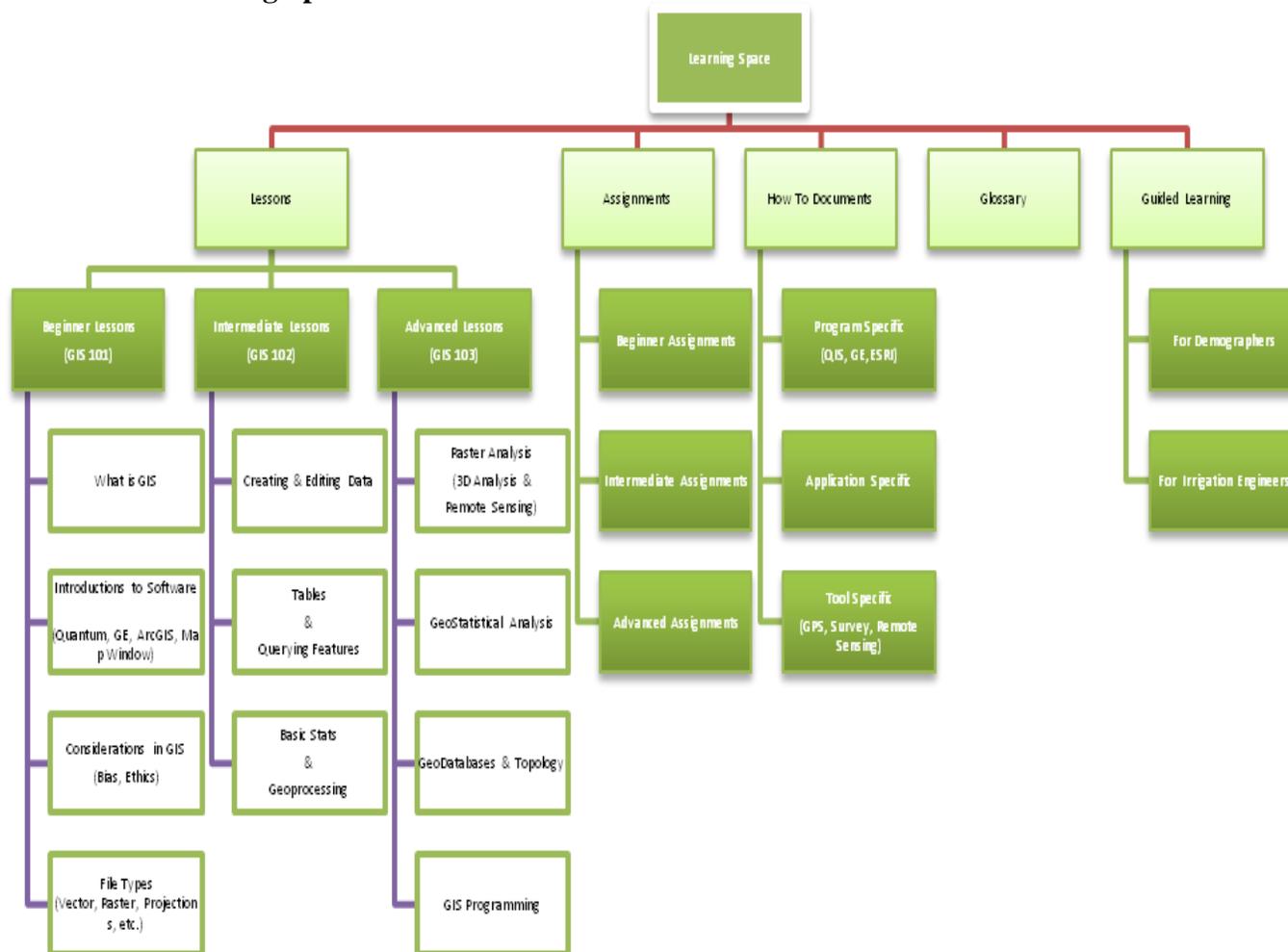


Figure 5: Mapping Across Borders Website: Learning Space

The learning space (figure 5) is the section of the site that enables Mapping Across Borders to achieve its knowledge transfer goals. It supports NGOs in learning to use GIS with pragmatic objectives in mind and creates an opportunity for Canadian geographers to be interactive during the knowledge transfer process. The learning space consists of five components: lessons, assignments, how-to documents, a GIS glossary and guided learning.

The learning space is designed to be in a state of a public ‘permanent-beta,’ meaning that pages will be continually refined via wiki-media tools (i.e. similar to the tools that run Wikipedia.com) as well as being accessible by all users who visit the website. It is designed with two user communities in mind, Canadian geographers as teachers and content providers and NGO staff members as students. However, this is not to suggest that Canadian geographers cannot learn from the resources, nor would the NGOs staff be unable to teach to one another or Canadian geographers. These two communities are loosely defined, and as the content on the pages change, the user communities of students and teachers are in a constant state of flux, as students graduate and others take their place.

5.2.1. Lessons

Each lesson in the learning space will be written so that they can be read independently and begin by identifying the skills that the reader is assumed to have. A link to the appropriate lesson will be provided for each skill required, or the opportunity to contribute a lesson regarding the prerequisite will be identified.

The lessons are organized into beginner, intermediate and advanced lessons, which are branded as the materials for the courses GIS 101, GIS 102 and GIS 103, respectively which Mapping Across Borders has developed. The lessons are divided into these categories in order to allow users of different abilities to begin learning at the level they are most comfortable.

Each lesson posted on the learning space will also contain a question and answer section that can be used to ask any questions users may have. These questions will then be put to the attention of other users who may be able to answer the question. This question and answer system will also identify the weaknesses of lessons, and can be used as revision guides for future edits.

5.2.2. Assignments

The assignments section of the Mapping Across Borders website is a socially enabled system. In the traditional learning environment of brick and mortar classrooms there is an understanding that the teacher issues assignments based on their lessons and in return assigns marks based on the correctness of the assignment. However, learning space lessons are written by potentially hundreds of teachers, and students are not grouped into cohorts that enrol in courses. How then can students receive ongoing feedback based on comprehension of lesson material?

The solution is to allow users to submit assignments to a crowd of Canadian geographers to have their assignments graded. However, there are two immediate concerns that are created by this model. First, it makes the non-expert vulnerable to mass criticism when they are most unsure of their abilities. Second, it calls into question quality of the teacher.

To circumvent this problem, two solutions will be put in place. First, when a student completes an assignment, it will go to a public board where any user can see the assignment, but the authorship of the assignment will be kept confidential. Second, only users who have already completed the same assignment or have been certified by a website moderator will be allowed to grade assignments submitted.

Once the student receives comments on their assignment, they are encouraged to make their assignment publicly available to others who are working on the same assignment so that the entire community can learn together. At this point the user's name will be placed on the completed assignment as well, so when others run into similar issues they can communicate and learn together.

5.2.3. How-to Pages

The how-to pages are where common procedures can be written to help with software and tool specific questions. While lessons will teach concepts and are unrelated to software, the how-to pages are intended to explain how to accomplish software specific tasks. An example of one of these tasks could be how to create a multiple ring buffer using Quantum GIS³² or use of physical tools such as GPS and computer hardware. The how-to pages will link related lessons and assignments, and users will be able to ask questions, similar to the lessons pages.

5.2.4. Glossary

A frustrating learning curve in GIS is becoming familiar with the jargon. To make this easier for new students of GIS, a glossary will be provided. The authors of articles are encouraged to link words in their articles back to the glossary, so that there is a seamless integration between the two.

It is hoped that it will be possible to integrate glossary terms throughout the Mapping Across Borders website. All words used on website pages that appear in the glossary will be automatically linked to its page in the glossary. If a user hovers over a term, the glossary definition will pop into the page, with a link to the glossary where they can find more information and find related terms.

5.2.5. Guided Learning

The guided learning section of the learning space is where lessons and assignments are organized into a cohesive curriculum. The guided learning section is similar to an extended syllabus, providing a place where students see how the lessons and assignments fit together. This not only ties lessons and assignments together but provides trajectories for students in the larger picture of learning GIS. It is where students can track their progress as well be awarded achievement levels regarding complexity of assignments or completion of a specific domain, such as all of the lessons and assignments for water engineers.

³²Quantum GIS is a Open Source GIS package available at: www.qgis.org

5.3. Project Space

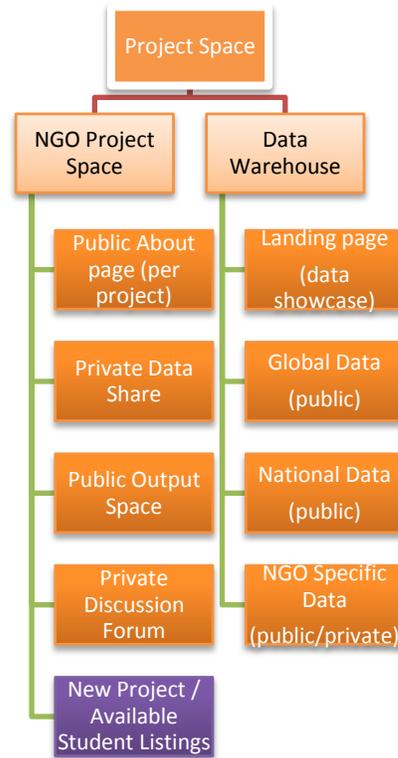


Figure 6: Mapping Across Borders Website: Project Space

The project space of the website (figure 6) is where Mapping Across Borders fulfills its promise of using GIS to produce tangible results and allows Canadian geographers and NGOs to work with one another to complete sophisticated projects. This space is dedicated to managing ongoing project work, sharing data, and preparing outputs from projects. To facilitate these goals project management software and spatial data infrastructure will be used.

When a user first enters the project space they will see a page that is specifically crafted for their user group. This page will show the ongoing work they are involved in, items that require their attention and will allow NGOs to create a new project. This page will also be linked to a user's profile, showing what other projects are open to contribution.

5.3.1. NGO Project Space

Each project that is started by an NGO will be provided with a number of resources that they can access to facilitate public and private knowledge transfer. Privately, the NGO will be able to share data between authorized stakeholders, engage in discussions, and prepare reports for public consumption. Publicly, the projects space will serve as an access point for publishing reports and maps, fulfilling donor output requirements, attracting new donors, and displaying their accomplishments. The project space is then a dual purpose section of the website as it serves as a place that NGOs and Canadian geographers can interact and as a place where NGOs can publish materials they produce using the Mapping Across Borders website.

While the community space of the Mapping Across Borders website is an arena for individuals and community to interact in a general sense, and the learning space allows individuals to work together on knowledge transfer, the project space is the true core of Mapping Across Borders' online goals. The project space is the area where rapport between Canadian geographers and NGO is nurtured and developed. It is in this space where both communities of users interact and learn from one another and the relationship between Canadian geographers and NGOs is a two way learning platform. NGOs will benefit from the expertise of Canadian geographers, learning new techniques and refining their understanding of GIS, while Canadian geographers will become more aware of the work NGOs are engaged in.

5.3.2. Spatial Data Infrastructure

The Mapping Across Borders spatial data infrastructure (SDI) is different from the system that manages project reports or assignment files in the learning space. While other files are unconnected, the SDI is specifically tailored for the purposes of collecting, manipulating and disseminating geospatial data in a common repository (Rajabifard and Williamson 2001). SDIs do more than just provide files for users to download; they have the ability to perform spatial queries, such as slicing data tiles by geographic region, time, or attribute data. Further, SDIs conform to specific standards – such as the Web Feature Service (WFS),

Web Mapping Service (WMS) and others – so that GIS software is able to work directly with the data held in this repository.

The goal of the Mapping Across Borders website SDI is that data that projects use to get started – such as land use data, remotely sensed images, demographic data, political features, etc. can be provided to all NGOs and Canadian geographers to work with. By providing a central SDI, the amount of data transfers on low bandwidth Internet connections can be significantly reduced. Using a central SDI, a large database of geospatial information can be housed online, requiring only slices of data to be transferred between NGOs and Canadian geographers each time a project is started or changed.

The SDI will be designed with privacy in mind, so that organizations can optionally maintain data security. Data security is extremely important in the geopolitical locations where Mapping Across Borders operates. National governments are often wary of data provided on the Internet for public consumption and if organizations provide their data publicly it can affect relationships with governments. The SDI seeks to avoid this issue by paying strict attention to the security of data held on its servers and by allowing each project to determine its own data sharing policy. Mapping Across Borders believes in the philosophy of open technologies and data, but not if those policies restrict the freedom of the individuals participating, or the individuals who are impacted by the work facilitated through Mapping Across Borders' website.

5.4. Community Space

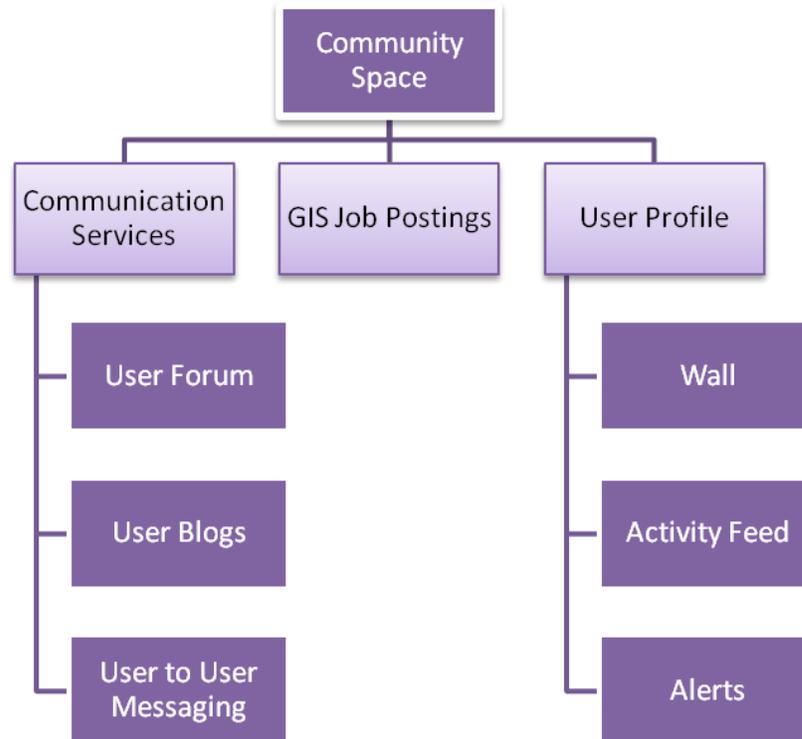


Figure 7: Mapping Across Borders Website: Community Space

The community space of the Mapping Across Borders website (figure 7) is an essential part of ensuring that all other areas of the website work together. The community space is where users are able to manage their online Mapping Across Borders identity, connect with other members, find new opportunities, and track their contributions and activities while using the Mapping Across Borders website.

Many other websites currently provide opportunities for users to view and interact with NGOs however few of them are able to connect volunteers the way that the Mapping Across Borders website foresees. The website will not only allow users to see and read what NGOs are currently working on, but will support organizations in their projects and in their learning objectives. This engagement is orchestrated through the social system that Mapping Across Borders provides including its user profiles, communication services and its GIS job posting boards.

5.4.1. User Profiles

A user's profile page is the default page a user will see after they login to the Mapping Across Borders website. The user's profile page contains three main components: the wall, activity feed, and alerts.

The wall of a user profile is all of the information that other users can see about a particular user. This can include basic information including their name, contact details, personal website, skills, and resume. However, the wall will also include a number of other details of the accomplishments of the user through the Mapping Across Borders website, including edits and answers contributed to the learning space, contributions to the project space and awards received from contributions to the site. In essence it is a review of all that a user has completed and wishes to share with other users. Any element of the wall can be shared outside of Mapping Across Borders as well to other larger social networks, such as Facebook³³, Twitter³⁴, or Google Plus³⁵.

The activity feed on a user's profile allows them to know what else is happening on the Mapping Across Borders website. By collating the activity feeds of other users, current users are able to find out what has been happening on projects while they have been away and what other users they follow have been working on. This way, although a user may be away from the website for a period of time, they are able to easily learn what has happened in their absence.

Alerts in a users' profile tell them that something has happened on the website that requires their immediate attention. These alerts can cover a range of different requirements, for example if a question is asked on a lesson they have written, an assignment is submitted that they are certified to assess, or an element of a project is awaiting their input. Alerts remind users of the ways that they can contribute and make a difference on the Mapping Across Borders website.

³³ Facebook is available at <http://www.facebook.com>

³⁴ Twitter is available at <http://www.twitter.com>

³⁵ Google Plus is available at <http://plus.google.com>

5.4.2. Communication Services

The explosive growth Web 2.0 has demonstrated that communication between users is an important part of modern websites (O'Reilly and Battelle 2009). Mapping Across Borders will provide its users with three avenues of communication within the community space: via a forum, user blogs, and user-to-user messaging.

The forum of the Mapping Across Borders website allows users to publically discuss a number of different topics that relate to the way that Mapping Across Borders operates, and to discuss topics that are unrelated to GIS as well. The forum provides users the opportunity to voice ideas and opinions in a way that is not otherwise available in the learning or project spaces. This is important because it not only opens a discussion about general policies of Mapping Across Borders and its offline activities, but is also a way for users to establish a rapport with one another.

Users of Mapping Across Borders are given the opportunity to express their opinions about GIS, their experiences with Mapping Across Borders or other topics by writing a user blog. These blog entries are attached to their user profiles and can be made available to ongoing projects private spaces, or more publically to their profile walls.

User-to-user communication is the most private of all the methods of communication in Mapping Across Borders. When a user creates a private message, they are able to share information and attachments between only themselves and the recipients of the message. This communication mechanism is important for users to be able to develop relationships that go beyond project work.

5.5. Job Postings

The last element of the Mapping Across Borders community space is the job posting boards. These boards are an avenue to connect the work of NGO staff members and Canadian geographers on the website with the job market and opportunities that exist. The benefit of Mapping Across Borders being a socially enabled website where activities are

posted to user profile walls is that employers are able to see exactly what skills and qualities have been demonstrated on the Mapping Across Borders website. By being able to see this work, an employer is able to know more about the potential candidates, which can potentially help them achieve career goals.

5.6. Website Design in Action Research

As action research is a cyclical process of learning from the participant community, the website design presented in this chapter was created with the lessons on the Mapping Across Border community from chapter 4 in mind. The next stage of the action research methodology was the last phase undertaken in this thesis, during which I presented the website design to Canadian Geographers and African NGO staff and conducted interviews about issues surrounding the implementation of online volunteering using Web 2.0 tools.

Chapter 6. Results

In this chapter, the results of 88 participant interviews are reviewed. These interviews sought to move the action research framework forward this thesis follows, having already incorporated lessons learned about the Mapping Across Borders community (chapter four) in its website design in the previous chapter. The study results presented here are part of the next action research cycle, where again the community was approached with the lessons learned and actions carried out, and new research is gathered from the community through semi-structured interviews with participants.

Following these 88 interviews with students, professors and development professionals, I transcribed the quantitative data and applied thematic codes (detailed in Chapter 3 – Methods). In this chapter, I will present quantitative data results and charts, dominant qualitative themes that emerged, and a discussion built around the tensions that I observed. The information presented in this chapter is not an exhaustive examination of the possible themes, ideas and lessons that can be derived from the full dataset. Instead, I chose to look for themes that specifically answer the research question. In presenting these results it is important to recall that different interview questions were used with Canadian geographers and African NGO staff members. This means that in presenting these results, there will be different quantitative and qualitative results for each. In the discussion of these results however, I have brought together lessons learned from each.

6.1. Quantitative Analysis

Before conducting interviews, baseline information about the participants was collected. This information included name, institution, and position. The study involved interviews of 88 participants, of which there were 49 professors, 27 students, 5 research staff and 7 African NGO staff members. From this set of interviews, 37 key informants were identified³⁶, which include fifteen professors, fifteen students and seven African NGO staff members. For quantitative analysis, I have looked at data collected from Canadian interviews first, and then those of African NGO interviews.

³⁶informants were chosen based on their ability to inform the research question

6.2. Canadian Geographers

6.2.1. Basic Statistics – Canadian Interviews

From the interview texts, a number of quantitative variables were also identified. However, although 26 possible variables were identified, only six proved to be ultimately useful, due to heterogeneity in the data. These six variables are presented in table 2, and summarized below.

Table 2: Data for non-heterogeneous data

Variable Name	Response (Number of Participants)	
	Yes	No
Current Volunteering Status	18	12
Would you volunteer more if it were accessible online?	27	3
Do you use Web 2.0 sites?	20	10
Do you use Web 2.0 sites, after discussion	25	5
Do you have concerns or reservations from sharing information with an online GIS knowledge portal?	5	25
Have you contributed to a public Web 2.0 site?	13	17

From these responses, the following charts have been created.

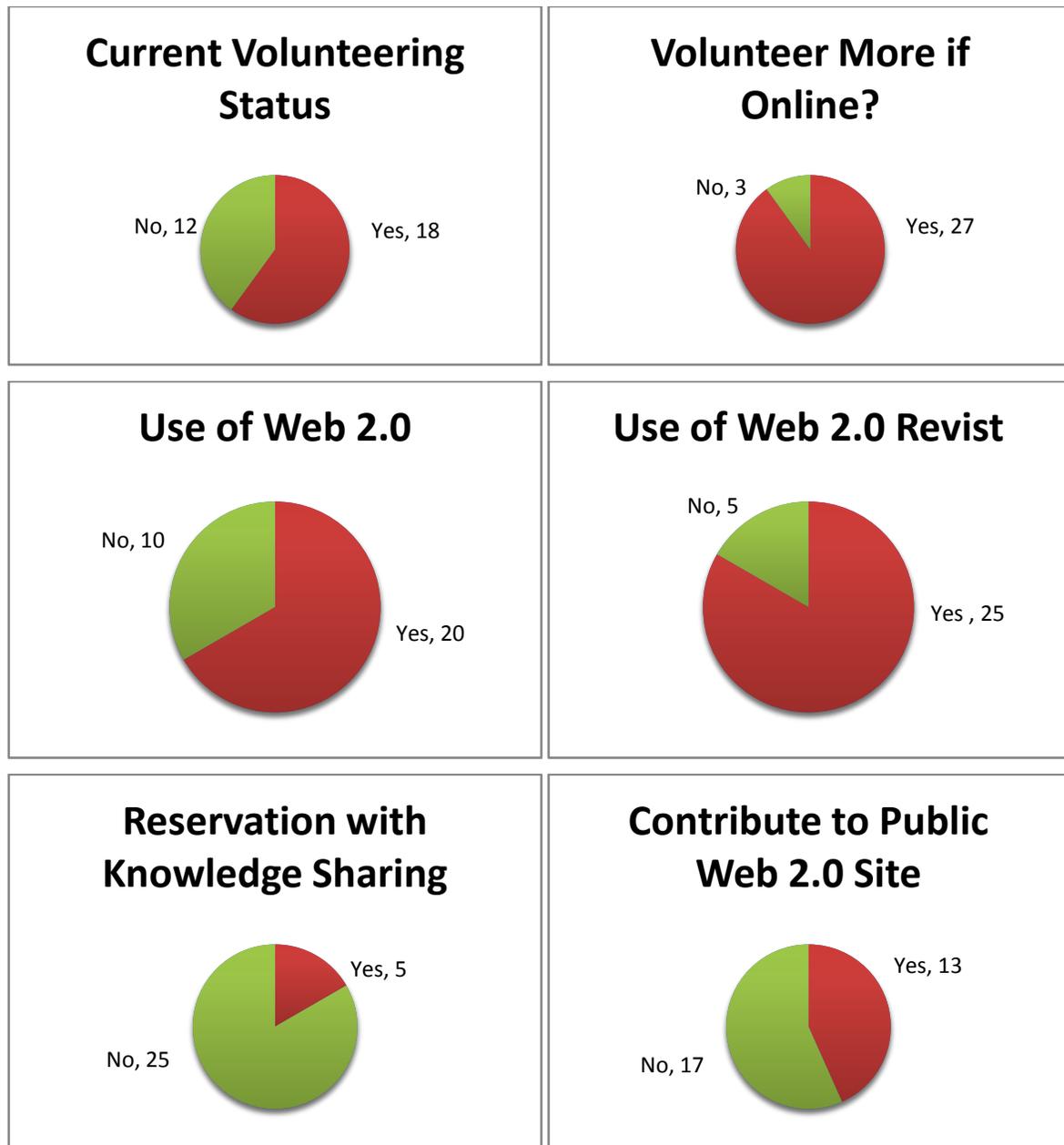


Figure 8: Responses to Canadian interview questions. A) Interviewee volunteering status. B) Volunteer more if online. C) Use of Web 2.0. D) Use of Web 2.0 revisit. E) Reservation with knowledge sharing. F) Contribute to public Web 2.0 site

The quantitative data derived from the interview participants illustrate a number of interesting points. In regards to current volunteering status, the interview group is already active, with the 60% of participants currently engaged in volunteer activities (figure 8A). Furthermore, of that group, an additional 30% indicated that it would be possible to increase

the amount of volunteering they were already doing if they had the opportunity to participate in an online environment.

Use of Web 2.0 websites was also prevalent, 67% of interviewees were already actively using and well informed about relevant Web 2.0 topics. In the Figure 8C and 8D, there was a marked difference in the way that respondents answered this question at the beginning of the interview and at the end, after discussions on topics related to Web 2.0. I found that although some participants indicated they did not use Web 2.0 at the interview onset, once our discussion reflected on various modalities of using these applications an additional 26% of participants were able to recognise that they in fact were users.

An overwhelming number of the participants (83%) indicated that they would not have any reservations contributing information to a web-based, open-access knowledge sharing platform for GIS and mapping knowledge (figure 8E). Those that did have concerns identified that these were due to perceived negative judgment online by their peers and because of the potential for plagiarism, this issue will be discussed in greater detail later in the thesis. However, they suggested simple methods for reducing or removing their concerns and were ultimately agreeable to submitting information online. Comfort with sharing skills online is not an indication that participants would contribute to an online knowledge space. In fact, when participants were asked if they had ever contributed to Web 2.0 sites that publish their submissions publically, less than half indicated they had (figure 8F).

6.2.2. Word Frequencies

I also performed was a word frequency analysis on the data. Using qualitative analysis software, this method provides a list of every word and the number of times it is present in a selection of text. In this study, I reviewed the full list of words that were reported and selected words of direct relevance for the study. In some cases I have chosen to amalgamate two related words, as in the case of “wiki” and “Wikipedia” because they are synonymous in this context. For the purposes of visualization, figure 9 provides a bar graph of the most popular, but still meaningful words that I have chosen and their associated frequencies. I

have also chosen to visualize the word frequencies using a tag cloud, which arranges the words in a semi-random pattern, with the word frequency dictating font size, in figure 10.

The word frequencies presented must be viewed critically. They do not offer conclusive evidence that any one word was more important than any other in the study, and those representing different technologies cannot suggest the relative importance of those technologies to the participants. However, it provides an interesting method for considering what was talked about most often during the interviews, and provides useful insight with which to approach the forthcoming qualitative analysis.

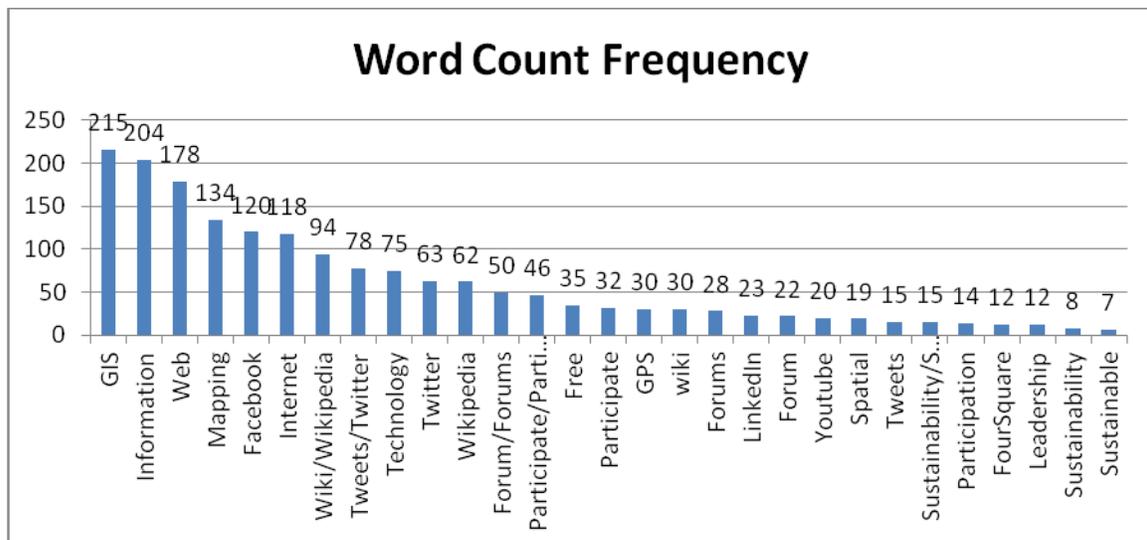


Figure 9: Canadian interview transcription word frequencies



Figure 10: Canadian interview transcription word frequencies as a tag cloud

6.2.3. Qualitative Data Themes

In order to be able to code the transcribed interviews thematically, a set of emergent themes was required. While reviewing interviews during the transcription process, I reflected on common ways interview participants expressed themselves, and about the issues that they most commonly spoke about. From this reflection a set of themes emerged within each of the three interview sections. Additionally, while coding the transcriptions, supplementary themes emerged and were added to the list of thematic codes. Eventually, a final list of themes was evident, summarized in table 3. The coding process yielded a total of 973 coded passages, and a breakdown of the number of coded passages is noted in the references column.

Table 3: Canadian interview qualitative data themes. The columns of this table show the name of a qualitative theme, a short description of the theme and the number of interview transcription passages that have been coded to the theme.

Qualitative Theme	Short Description	References
1. Volunteerism		148
1.1 Scheduling	Constraints of time and place for volunteering	68
1.2 Motivations	Why participants volunteer	80
2. Internet – General		134
2.1 Internet Mediums	The sites that participants frequent	80
2.2 Place based usage	Where/how participants access the Internet	54
3. Internet – Web 2.0		233
3.1 Connectivity & Access	How participants connect with Web 2.0	92
3.2 Social Web	Implications for using Web 2.0	141
4. Volunteering Online		216
4.1 Value of Contribution	Participants philosophies of Web 2.0 content	99
4.2 Freedom of Online Medium	Strengths/Weaknesses of open access online	88
4.3 Micro Vs. Macro Volunteerism	Small vs. Large time commitments online	29
5 Recognition & Increasing Participation		138
5.1 Classroom integration	How online volunteering can be used in classrooms	89
5.2 Online Recognition	How participants can be recognized online	18
5.3 Integration of feedback from the field	Importance of feedback for online efforts	31
6. Professional Development		104

Qualitative Theme	Short Description	References
6.1 Usability of Online Volunteerism	Online volunteerism and future employers	16
6.2 Demonstration	Does online volunteerism show Skills or Qualities?	29
6.3 Deliverables	How can online volunteerism be documented?	59

6.3. African NGO Staff

6.3.1. Quantitative Data

Using transcriptions of African NGO staff interviews, I again identified key data which emerged. From these data the non-heterogeneous information has been presented. These data have been summarized in table 4, and visualized into charts in figures 11A – 11D.

Table 4: African NGO Staff data for non-heterogeneous data

Variable Name	Response (Number of Participants)			
	Yes		No	
Familiarity with term Web 2.0	1		6	
Used Web 2.0 Technologies	7		0	
Submitted user generated content to a publically published site	5		2	
Stress issues of the digital divide in their country	6		1	
Training Follow up prevalence	0 - Often	2-Occasionally	4 - Rarely	1 - Never

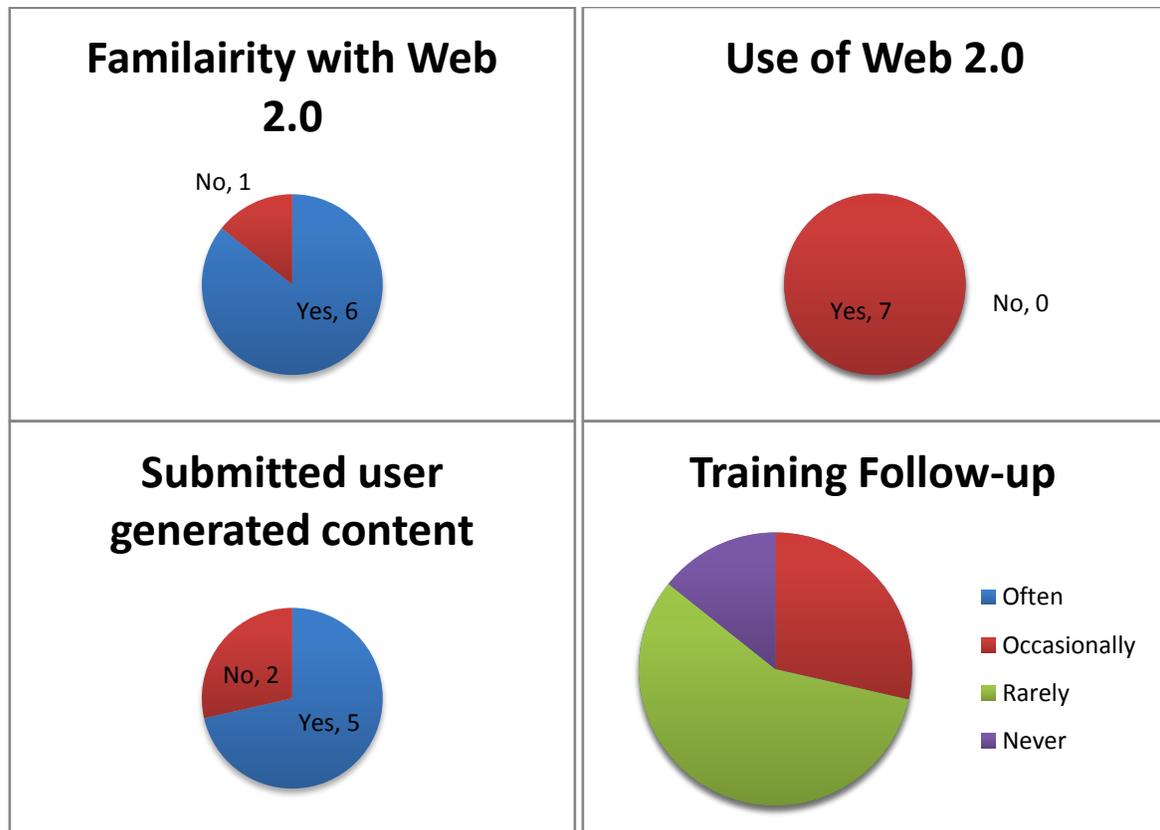


Figure 11: Responses to African NGO staff interview questions. A) Familiarity with Web 2.0. B) Use of Web 2.0. C) Submitted user generated Content. D) Frequency of training follow-up

These Figures 11A-D (above) illustrate two key points. The first two figures 11A and 11B show that while use of the term ‘Web 2.0’ was foreign (14%), all participants used Web 2.0 sites. The majority of participants (71%) submitted publically published content. This is in direct contrast to Canadian Geographers where only 43% had.

Another important detail that emerged from the interviews was the efficacy of GIS training events. This is important to Mapping Across Borders, as it provides training events, and its website provides follow opportunities for these events. Figure 11D represents the prevalence of follow-up activities conducted by training facilitators. Although training follow up was something that all participants desired, 57% of participants said that this never occurred. In fact, one participant noted that they had resorted to using a local newspaper to facilitate training follow-up in the place of training organizations, forming a

question and answer column. These data is important as it shows that the resources which the Mapping Across Borders website offers are desired.

6.3.2. Word Frequency

Word frequency analysis from the African NGO Staff interview transcripts is summarized in figure 12. This chart shows the words that are relevant to this study and their totals. The tag cloud presented in figure 13 shows these words in relation to each other using text size as a visualization of relative frequency. Similar to the word frequency analysis from Canadian participant’s interviews, this analysis must also be understood critically, and it is not presented as a proxy for the importance of different terms. Comparisons between the Canadian and the African interviews are also problematic, as different questions were asked to each group. However, in both interviews the words GIS, Information and Internet were most frequently mentioned.

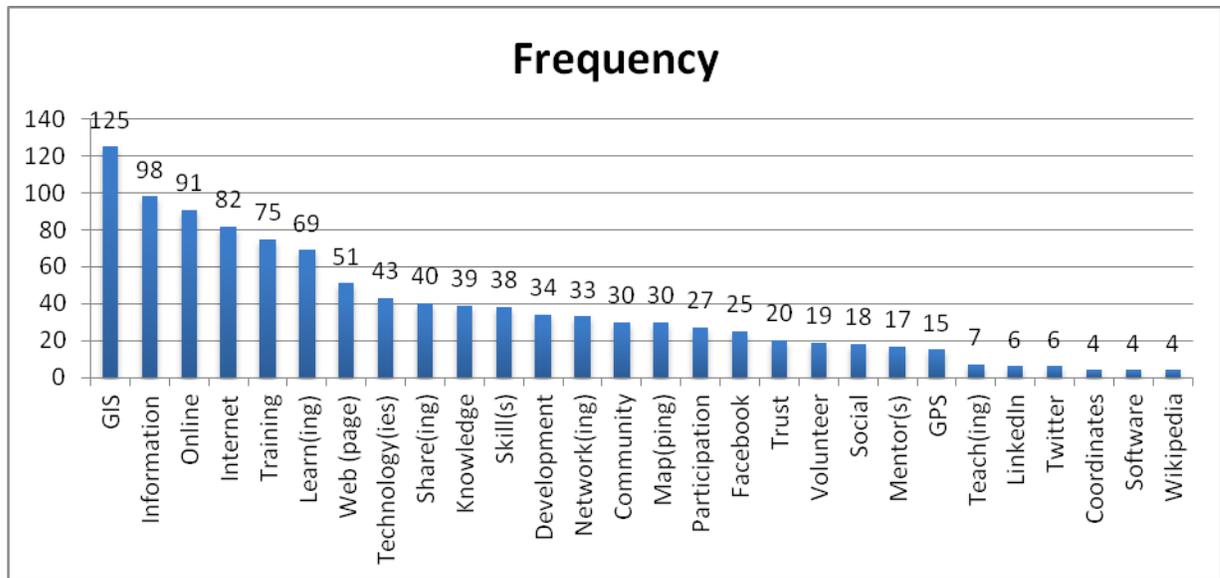


Figure 12: African NGO staff interview transcription word frequencies



Figure 13: African NGO staff interview transcription word frequencies as a tag cloud

6.3.3. Qualitative Data Themes

While transcribing African NGO staff interviews, I found there were fewer digressions than the Canadian geographers. As a result, the interviews were shorter and the number of qualitative themes was fewer. Following the fewer number of codes, there were also less coded passages, 105 (compared to 973). The difference in the number of coded passages can be explained because there was a quarter the number of interviews, which were on average a third of the length of the Canadian participants'. Taking the number of interviews and their lengths into account, the coding density is roughly equal between the two groups. While there are far fewer interviews from African NGO staff members, these interviews do provide a good basis for analysis on a number of different themes (table 5), strengthening the emerging discussions and providing interesting tensions that emerge when utilizing Web 2.0 technologies for volunteerism.

Table 5: African NGO staff interview qualitative data themes. The columns of this table show the name of a qualitative theme, a short description of the theme and the number of interview transcription passages that have been coded to the theme.

#	Qualitative Theme	Short Description	References
1	GIS		43
1.1	GIS for participant	What GIS means to the participant	16
1.2	GIS for NGO	Relevance of GIS to NGO landscape	27
2	Internet		82
2.1	Usage	Internet usage at home, work and evidence of digital divides	27
2.2	Use of Social Networking	How the participants uses online social networks	21
2.3	Use of Web 2.0	How the participants uses general Web 2.0 applications	34
3	Training		46
3.1	Effectiveness	Reasons why training programs are effective or ineffective	20
3.2	Learning Online	Issues related to online learning	26
4	Online Partnerships		62
4.1	Usability	How online projects and partnerships can connect NGOs and GIS experts	26
4.2	Opportunities & Constraints	Considerations for online projects; trust, place, scheduling and employment	36

The results presented in this chapter illustrate the breadth and depth of the qualitative interviews undertaken in this study. In this chapter I have shown a number of qualitative and quantitative data which has been gathered from reviewing the interviews conducted as part of this action research project for Mapping Across Borders. However, presenting these result in graphs and tables with supporting text has not allowed for an in depth discussion of the issues that were most important to participants. In the following chapter, I look at these in closer detail.

Chapter 7. Discussion

In this chapter, the data gathered during this study could be used to address a wide variety of research questions, themes and discussions. However, I have chosen to look at the most relevant findings that relate to how Web 2.0 collaborative technologies may support Canadian geographers and African NGOs in sharing applied geospatial skills and knowledge. In doing so, this chapter completes the final cycle of the action research framework used in this thesis. After approaching the Mapping Across Borders community with actions taken through website design the community reflected in their views in interviews and the learning from these lessons is presented in this chapter.

7.1. Tensions

Much has been written regarding how Web 2.0 is able to facilitate discussions in relation to sharing information, connecting with others socially, and working collaboratively (Aguiton and Cardon 2007). However, unequal access to technology (hardware and software) and Internet infrastructure persists. This unequal access has been referred to as the “digital divide” and is most often used in reference to differences in access between the Global North and the Global South. While discussions surrounding this divide has been well researched, research literature often polarizes the divide into two categories, those who have access, and those that do not (OECD ; Sciadas, Statistics Canada. Science et al. 2002; Gebremichael and Jackson 2006; Chinn and Fairlie 2007; Ayanso, Cho et al. 2010; Robison and Crenshaw 2010).

While this binary perspective in regards to Internet access is relevant, other issues appeared to be equally important during my research. This discussion will examine these issues and demonstrate that there are inherent tensions in bridging this divide. Tensions in this study are explored to illustrate issues involved in using Web 2.0 technologies to connect Canadian geographers and African NGO staff for volunteerism using applied GIS skills and technical knowledge. Others have looked at the tensions involved when using Web 2.0 technologies however most of these exist within the praxis of teaching (Beer and Burrows 2007; Crook 2008; Dohn 2009). This thesis focuses on the tensions inherent in the specific research question. Through the examination of the coded interviews, I have identified 7 key tensions

(table 6). These tensions will structure the interpretation of my research interviews, as well as this discussion chapter.

Table 6: Key Tensions in use of Web 2.0 for applied GIS projects and knowledge sharing between Canadian Geographers and African NGOs

Tensions		
Inclusion	vs.	Exclusion
Omnipresent Internet	vs.	Desire to Disconnect and Work-Life Balance
Ability of the Crowd	vs.	Data Quality
Value or Micro Volunteering & Freedom	vs.	Value or Macro Volunteering & Project Management
Freedom from geography	vs.	Placelessness
Contribution to open access education	vs.	Online Commentary and Judgement
Work put in	vs.	Measurable outcomes

7.1.1. Inclusion vs. Exclusion

One key element of Web 2.0 technologies is their ability to connect people, regardless of location or geography, to a wealth of information. The daily uptake of Web 2.0 has become so successful that conversations that have previously only existed in physical spaces have moved online. In this transition to online communication, some conversations have moved entirely onto specific websites, as evidenced by a Masters student saying, “It’s not like anyone calls anyone anymore,” (Participant 9) in reference to social networking’s prevalence. Ironically, this has had the effect of making information less accessible to individuals who are not regular users of these applications where these conversations now take place. Furthermore, even when individuals are members of these websites, many online communities have ways of restricting certain types of information to only members of particular groups or sub groups.

Research into the phenomenon of the digital divide and digital exclusion has often focused on this issue as a problem to be solved, where users who do not participate in digital

discussions are those who are lacking access by physical connection or education on digital resources (Roycroft and Anantho 2003; Gebremichael and Jackson 2006; Chinn and Fairlie 2007). However, during the course of this research, participants expressed a different opinion—that while they had the means, they chose not to become a member of the digital communities in which the information was shared. Reasons for this often related to concerns of privacy. This concern is evident from material gathered in two interviews:

“I’m definitely not a Facebook advocate or anything like that I’m very concerned about personal privacy issues online so I tend not to engage with that, other than just to try and maintain some semblance of fitting in with the rest of people are using the Internet right now” Participant 23, Masters Student.

and

“I looked at Facebook and was completely turned off, not by the model but the company and the privacy issues related to it so I think it’s an interesting model I just hate the company” Participant 22, Professor.

There were significant perceived consequences of this self-exclusion from using Web 2.0 applications. Participants noted that they felt left out of important conversations in both social and professional situations. For example, one informant complained about not being invited to certain social events because they chose not to use a Web 2.0 site:

“People ... rely on these digital networks as social networks now. And it’s not the traditional way of thinking about a social network, and so I feel like I’ve been much less connected socially to my friends since I stopped using Facebook” Participant 2, Undergraduate Student.

This was mirrored by one participant from the Global South who indicated a strong desire not be excluded from online professional conversations saying,

“It’s an instant communication and also many people have been involved in such networks so I want to be one [of them]. I want to be in the group therefore I need to say, ‘why am I not in the group?’ So it's a sense of being in the group” Participant 35, African NGO Director.

Participant 35 further expressed their desire to be included as a part of the digital conversation when they said, “I want to recommend that this kind of technology be disseminated in other countries as well because if it's not there we shall remain behind.” Participant 35 is implying that they have observed that NGO staff and organizations in their region are not using these tools and are therefore being excluded from online conversations. The interviewee believed that others should start using these tools because it was important to the progress of development in Africa. Some other interviewees indicated that not using Web 2.0 conversation tools led to a feeling of being excluded socially and professionally. This shows that the desire to feel included in digital conversations beyond individual social situations.

This has ramifications for both volunteering online and the use of Web 2.0 tools in general. While some are involved in and contribute information to online conversations as a way to engage with social and professional peers, others purposely exclude themselves from the conversation based on their perception of the tool’s tendency to consume time or privacy. For these users, the ability to interact occasionally and a transparent philosophy on user data is important. Interestingly, while user data should be private, an effort should also be made to ensure that publicly submitted data is kept as open as possible, to make sure that those who do not contribute to online conversations can still feel included.

With regards to Web 2.0 based conversations this tension of inclusion and exclusion has the potential to polarize those who become a part of online conversations and those who choose not to. It is important to note that this tension exists within those who have the ability to access these conversations but choose to exclude themselves. This, perhaps, is a digital divide that users impose upon themselves. While Mapping Across Borders will need to be aware of this tension, users who have already chosen to exclude themselves from Web 2.0

conversations may continue to stay out of reach. However, for those users who are using the Mapping Across Borders website, a transparent user data policy should be easily available, so that it does not alienate users.

7.1.2. Omnipresent Internet vs. Desire to Disconnect and Work-Life Balance

Web 2.0 technologies and mobile devices have made it easier to connect to others and the Internet in unprecedented ways. The Pew Research Centre now estimates that nearly half of all Americans are smartphone users; this indicates that not only are many people integrating the web into their life while at the computer screen, but that the Internet is with them all the time (Smith 2012). This has resulted in both benefits and drawbacks for those people, especially those under the age of 35 (Anderson and Raine 2012). This always-on technology has been the focus of an increasing number of research articles that elaborate the ways that mobile and social technologies are becoming increasingly useful and continually impact us to greater degrees (Mascolo 2010).

Mascolo (2010) uncovered a number of users that were removed from the trend towards increased connectivity. Many informants noted that they wished to create greater distance from computers, citing a difficulty in creating work-life balances. Some informants noted that once they leave work, they disconnect completely saying, “When I get home or when I am done at school I don't really want to be on the computer.” (Participant 3, Masters Student). Others found it more difficult to disconnect, so much so that it caused participants to feel overwhelmed, increased stress and in the case of one informant, even physical injury.

“I know it’s happening in [my] whole family but I couldn't keep up with that ... too much information, I find that stressful ... you're like a sponge but after while the water is starting to leak out. It is just, you can't take it anymore you just have to turn it off” Participant 8, Professor.

and

“Honestly, I haven't even [used Web 2.0]. If you were to ask me to tweet someone I wouldn't know how to use it. I'm just not there and *I couldn't care*

less about sending a 140 character message to anyone. I'm sending about 100 e-mails a day and that is enough. I just don't need anything else. I already have way too much e-mail management to do in my life” Participant 18, Professor.

and

“[I find I] really need to make sure I'm not on the computer all my waking hours. I have [developed] repetitive strain injury problems as part of my needing to separate those things. It's a problem when your personal interest and your job responsibilities all have the same sort of taxing demands on your body and you need to get outside that sometimes you get some fresh air” Participant 20, Professor.

As a result, some informants are taking steps to limit the ways they are connected. One informant noted that with a mobile device they no longer want or need a telephone or television, rather they preferred to have only one connected device, “It depends and I [was thinking about] getting rid of the TV altogether. And the phone I might get rid of it. I have a cell phone and I've got Skype what do I need them for” (Participant 14, Professor).

When considered together, participants interviewed in this study indicated that while they are appreciative of the benefits that Web 2.0 and connected devices can bring, they often also found that they longed for ways to disconnect from technology. The desire to disconnect has the potential to undermine contributions to online volunteering, as many of the participants noted that they felt uncomfortable introducing another use of technology during times previously reserved for down time. Whether or not this desire to disconnect will be strong enough to prevent widespread adoption of online volunteering is yet to be seen, but perhaps it is possible to integrate online volunteerism into the everyday actions and course curricula of students and professors, instead of making it an activity that is done outside of work. Many students and professors noted that the greatest opportunity was to formally incorporate online volunteering into the classroom. One professor noted that it had the potential to make the least exciting topics of GIS courses more relevant and interesting for students,

“A really good point there that never occurred to me ... is that replacing something that we’re already doing that's really demotivating [sic] with something that's just less demotivating... in some of the exercises that we give and that we kind of have to give [them] because ... even though it feels painful something that sucks less is a good deal. Digitizing for Uganda may not be as bad as digitizing for [a nearby location] and that's a good point. Hopefully we can do better than that, but at least that's better than what we're doing. ... I tend not to think about things that suck less, I tend to think about things that are good and right, when in fact in a lot of situations there's no way – it's going to suck regardless” Participant 22, Professor.

Other professors and students spoke about the possibility of integrating online volunteering into the classroom to make assignments more relevant and interesting. This sentiment is particularly relevant to geography classrooms because of the clear history of service-based learning (Yarwood 2005; Bednarz, Chalkley et al. 2008). Many informants noted that by making online volunteering available during peoples’ regular activities might make it possible to overcome or avoid the tensions of the desire to disconnect. Mapping Across Borders take use this tension to its advantage, positioning itself as an opportunity for students and professors, rather than a burden.

7.1.3. Ability of the Crowd vs. Data Quality

Crowd computing has received considerable interest in the press in the past few years. From the social uprising of the Arab spring, to the Iranian election protests, Haitian Earthquake relief and more, the power of a crowd of individuals connected with technology to affect social change has been demonstrated (Brabham 2008; Goodchild and Glennon 2010; Zook, Graham et al. 2010). Specifically related to the Mapping Across Borders project, the ability of technologically savvy volunteer crowds has also been demonstrated. Examples of this crowd sourced ability are the online encyclopaedia Wikipedia³⁷ and the global map

³⁷www.wikipedia.org

OpenStreetMap³⁸ which were created entirely by volunteer efforts (Kittur, Chi et al. 2007; Chilton 2009).

The Canadian geographers interviewed in this study were a highly engaged group in terms of volunteering, with 60% currently active (figure 8A). It was little surprise then, when an undergraduate student acknowledged that there was an “unwritten code that everyone helps each other,” (Participant 2, Undergraduate Student) in online communities of mapping practitioners. Participants also recognized that online crowd participation had the potential to produce large results through the micro contributions of individuals.

“It’s kind of a little goes a long way, like it’s kind of –it’s the incremental steps of something way bigger. So it all starts from you, as an individual and everybody puts a little bit in [and] it will all aggregate to something bigger”
Participant 1, Undergraduate.

Interviewees also noted that the crowd was able to generate more than simply large volumes of information. They noted an additional benefit of creating a voice for differing perspectives,

“The biggest strength that I see is that you’re able to pull from such a large community of people. So, you’re not limited to [only one] perspective, you get outside perspectives that will make a project interesting” Participant 23, Masters Student.

However, in reviewing the participant’s responses there was a clear understanding that the information and data submitted may be of limited value due to the potential for poor data quality, which echoes the views of several researchers on volunteered geographic information (Elwood 2008; Goodchild 2008; Haklay, Singleton et al. 2008; Haklay 2010). This is especially relevant to the Mapping Across Borders project, which relies on crowd-sourced data to generate GIS lessons and how-to articles and complete development

³⁸www.openstreetmap.org

projects. Students noted that as a core user community in Mapping Across Borders, they may not be knowledgeable enough to make informed contributions, with one informant asking,

“How reliable would the expertise be? This is always the problem with using students...if they’re busy doing other things and they don’t really understand what they are doing but just want to help and they’re willing to do something [but don’t have the right skills], projects are turned upside down just because the expertise is not there” Participant 19, Professor.

Another professor recognized the potential for students to make mistakes while working with organizations, but suggested that with an upfront understanding of available skills and expectations, these could be managed,

“My only concern ...is that students make mistakes. Students fail or don’t do very well and so long as that sort of expectation is there and that’s where the challenges are. We have only had students do things for NGOs or local groups [when it] is very clearly stated up front that you may not get what you want in the end, we will strive to give you what you want and the students will strive to give you their best” Participant 11, Professor.

Beyond the contributions to projects online, a student informant provided a suggestion for quality control mechanisms for online knowledge resources by using students to provide the bulk of information online and professors to verify that the information in the article was correct.

“I think that would motivate me more to create it because I’m someone who’s hesitant to put something up not knowing one hundred percent if it’s right ... I’m someone who wouldn’t want to put something up without it being checked by someone else. Perhaps other [students] might find that as a demotivator

[sic], knowing that the professors are going to look at it, but for me I find that to be very important” Participant 24, Masters Student.

The participants of this study demonstrated an understanding that crowd sourcing projects and information have the ability to be both useful and potentially harmful. Professors noted that there is a significant risk to involving a student who may not have mastered the techniques required for a specific project, but that if expectations are managed correctly there is still the potential to produce useful results. In the case of online generated learning resources on the Mapping Across Borders website, both students and professors stated that crowd sourced information has its drawbacks in terms of quality, however students themselves recognized that with proper guidance and auditing from professors, they could still make reliable contributions on a regular basis.

7.1.4. Macro vs. Micro Volunteerism and Freedom vs. Project Management

Web 2.0 technologies have been the driving force behind crowd computing, though a tension exists between using crowd efforts in complex mapping projects. While non-complex tasks such as writing an article on Wikipedia or digitizing streets from satellite data on Open Street Map have proven to be possible, more complex tasks are more difficult to manage online (Kittur, Chi et al. 2008). This is especially true for mapping projects, which require analysis and expert skills.

This thesis identifies two opportunities for participation in online mapping projects: firstly, activities that can be completed in short efforts by the crowd; and secondly, those that will require longer term involvement to complete more complex problems. This tension of micro vs. macro volunteerism was noted by Canadian geographers, as two students demonstrate,

“I think that there are many ways you can look at it and find a way of dividing the problems that can be solved [by] micro-volunteering those that cannot that are going to need fixed timelines – it could be spread over a couple months” Participant 17, Ph.D. Student.

and

“There’s an enormous setup required, [we] are not giving up an hour here or there, because you need a partnership, you need a working relationship with an organization and on one end they need to be able to trust somebody with the data and on the other hand the volunteer needs to be able to get the satisfaction to get results” Participant 15, College Student.

Between students and professors, there was a mix of those who wanted to take on micro and macro opportunities. One professor noted that in fact they would prefer not to take on micro level activities, favouring the ability to interact in a more in depth way with organizations saying,

“I think honestly probably it’s something I do anyway, but if it was in the small bite-sized chunks I would be less inclined to get involved actually, simply because I want to get the job done and so if they have something that needs doing that I can do as a volunteer, fantastic – I’m all over it.” Participant 14, Professor.

Conversely, others noted that due to the time restrictions of their career or studies their only avenue to volunteering would be during short periods of time.

“What we have now is a way to actually capture someone that’s got two hours to give on a Saturday night. [They say] I won’t volunteer because they can’t give the time or days or weeks or whatever it is going take to be to volunteer, so it gives you a chance to capture those bits and pieces and make them something bigger” Participant 11, Professor.

The tension between micro and macro involvement is important beyond scheduling, as interviewees noted that it could impact their ability to demonstrate experience on a resume or CV,

“...this would be a good thing to add to a CV...[but] it doesn't really make sense unless somebody contributes [over the] longer term like a few months and is more involved [than only in class]” Participant 19, Professor.

The quote above demonstrates that in order to reference online volunteer work professionally, the level of involvement cannot be seen to be only a short term project. They posit that in order to get students engaged in longer usage of an online volunteering framework, the classroom might be an ideal way to encourage students to participate over a longer term, either at a micro or macro level.

Another concern regarding micro and macro contributions are their respective abilities to create project leaders, often referred to as champions, which has been shown to be very important for the successful completion of online volunteer projects (Ellis and Cravens 2000; Cravens 2006; Dhebar and Stokes 2008; Butgereit 2011). One study participant voiced their concerns about champions in online learning and project completion as it relates to micro-volunteers,

“There are certain things that I think [NGO staff] can be taught at a micro level and I think there are certain things that certain projects which are so big that it's really hard to manage a continuous kind of champion. There could be a base there [of users], but there are no champions” Participant 21, Professor.

Participant 21 is illustrating that even in micro-volunteering projects, where people work independently, there is a need to have a project manager to coordinate efforts and keep projects on track. This was a recurrent theme for participants and it allowed another tension to emerge; the balance between regulating activities and the freedom of open contribution on the Mapping Across Borders website. The freedom to engage using the Internet was expressed by a student in terms of the enhanced ability to work directly with NGOs in Africa, an opportunity that they might not otherwise have access to,

“People who don’t necessarily have the options to go to Africa or going there to there to try and help, you can do it from home because of this Internet, we can connect with people and get information so from wherever you are” Participant 13, College Student.

Participant 23, a professor, also notes the value of having a large, free crowd participating. They state that even though a crowd likely to engage in unproductive activities, ultimately the quality and quantity of positive efforts is great enough to achieve better results than more traditional non-crowd based mediums.

“I think that’s exactly what you have to tease out and you have to pay attention to is the fact that a quick answer from one person present [can be important], ... the Wikipedia process, even though it has flaws and edit wars and so on, ultimately their articles have the quality that’s better than [encyclopaedia] Britannica, so clearly that is working” Participant 23, Professor.

At the same time, other interviewees expressed that while crowd participation and freedom to contribute are important, there are significant challenges. One participant, when asked what the weakness of micro volunteerism was replied, “the weakness is when there is nobody in charge.” (Participant 10, Professor). Participants provided a number of reasons for needing project management, the most common of which was to be able to reach desired goals and see results from volunteered efforts.

“The weaknesses that I can think of are two, one is management of all of that, managing the participants, I don’t mean controlling here, I mean whatever you put together in terms of volunteering, leads to something that is real at the end” Participant 7, Professor.

and

“Weaknesses have got to be ...the coordination of effort and not the recognition of it. But making sure it is used efficiently and so everything that

is done is towards a purpose and a goal and ... there is continuity that exists. The long-term benefit, rather than the short-term ego. That's basically it for me, It's got to be kept on track. Otherwise it disintegrates into the hypothetical mess that you see in a lot of organizations and not just the volunteering organizations and NGOs, a lot of organizations" Participant 14, Professor.

The tension of micro vs. macro volunteerism and freedom from control vs. structured project management were important to interviewees. While many participants said that being able to make contributions to a project in short time periods and on their own terms was integral to their participation, others noted that they would not want to participate if they were not involved in a longer term project that was highly regulated and had a clear set of objectives. For Mapping Across Borders, this will mean that there will need to be different modalities for volunteers to engage, from short to longer term lengths and also those that are, and are not, managed by others.

7.1.5. Freedom from Geography vs. Placelessness

The Internet is a place that can be accessed at any time, in any place. It exists in an ephemeral location, shared between fibre optic cables and orbiting satellites that connect continents and people all over the world. This makes defining the geography of the Internet difficult. Where does cyberspace exist? At the same time, when do the conversations of Web 2.0 happen? Is it at the time when a user posts content to the web, when another responds to that comment, or perhaps when an anonymous user reads that comment without posting their own views? The time and place of a connection between users on the Internet is one without a definite place or space.

This lack of place and space on the Internet is a question that geographers have studied since the early growth of Internet usage in the late 1990s and continues today (Dodge 1999; Dodge and Shiode 2000; Kolko 2000; Zook 2001; Sinai and Waldfogel 2003; Takhteyev, Gruzd et al. 2011). Participants in this study also frequently discussed Place and Space on the Internet.

Participants continuously expressed both their appreciation for and against the freedom of time and place that is afforded via the Internet, illustrating a clear tension. Interviewees who appreciated the freedom from geography often expressed this in terms busy lifestyles. One professor noted how the requirements on their time are very fluid during the course of a semester,

“My schedule varies so commitment of the same time every week is the huge issue...because my schedule is so variable. So yes, flexibility in volunteerism would be a huge factor” Participant 22, Professor.

A Ph.D. student brought up a different issue than the time available to them. The student noted that while time and place are important, it was also important that persons with specific skills be able to work together in the same place at the same time as with traditional volunteering, which Web 2.0 technologies can eliminate.

“The big struggle with volunteerism is that they try to meet at a time schedule where everyone has to be there with different skill sets, but it’s that I can just go and do my part and someone else can just do their part at their own time. That sounds great to me.” Participant 17, Ph.D. Student.

A college student brought up another point regarding the flexibility of online volunteerism as students often have free time unexpectedly. They contrasted this with a previous experience of travelling overseas to complete volunteer work. Online volunteering exists as a more accessible option.

“If I could do it in my own time[If I]Wake up at one o’clock in the morning, instead of reading the newspaper again [I could spent that time volunteering]. You know I’m not going to give up months of my life anymore. But, I will give up hours of my life.” Participant 15, College Student.

One informant noted from experience that volunteering online made it more accessible because it allowed them overcome their introverted nature.

“For me it was always a bit different because I was more of a shy student and my English [was not very good, and I] did not know anyone in that term either, [it allowed me to be] someone as a part of the group and a bit more active” Participant 10, Professor.

Accessibility was also important in a physical space, one student noted that due to their lack of mobility they had been unable to participate in a volunteering activity, “I didn’t have a car, so I could not get there. So it makes it more accessible” (Participant 9, Graduate student).

While the Web 2.0 technologies have created opportunities for volunteerism for some, others felt that it reduced their motivation to participate. Many participants noted that being able to volunteer in a physical space was important, as it allowed them to see that they were doing something tangible. This was the case for one professor who found that the lack of physical contact in online volunteering led to a lack of control and distrust in the efficacy of the activity.

“In this instance it is difficult because obviously it would go through different types of filters from what’s going on on the ground to me in front of my computer, I may not have any control ... so this would stop me slightly” Participant 19, Professor.

Others noted that not being physically present meant that they would be unable to make a personal connection with those they were helping. These participants found that in their experiences meeting the people that they were helping was a decisive factor in engaging in volunteerism, “to me it’s once you meet them, touch them and shaking their hands, ... then it’s easier, that’s a big thing” (Participant 21, Professor).

One student noted that meeting the recipient of the volunteering effort was important for feeling satisfaction from their volunteering efforts, and without this they would be unable to engage with the project,

“There’s no satisfaction gained at all from, or very little in comparison, to face to face volunteering; it is not minimal, it’s a fraction of a percent of the satisfaction that you gain from actually helping somebody. I don’t think you can get the same level of engagement from people working directly with you or next to you” Participant 15, College Student.

Others noted that the social aspects of being with other volunteers, rather than those you are volunteering for is a deciding factor. One participant noted that their reason for volunteering was so that they could enjoy the time working with others towards a goal, in a physical space.

“If I’m being socially involved then and it’s a case where I want to be with people if volunteer work involved just sitting in front of a system then I’m not sure I guess I have to think about that I would do some of that but not to the same extent, it would have to be fun. It has to be a social payback for my time” Participant 16, Professor.

Another important social motivator was the social contact that is created when you know the person who is organizing the event, or who you are planning to work with. By knowing the person in a physical space, it creates a reminder to participate each time you see them. Conversely, in an online medium it is easier to avoid contact with people the volunteering involves.

“It’s so easy to walk over to walk [away] because of your volunteering to the person next door there’s a social contract between you and seeing them the next time ... the web is ephemeral and you might not come back” Participant 22, Professor.

Lastly, one student identified that the interactions online do not allow for the development of relationships that exist offline. They mentioned that the lack of physicality limited their ability to connect emotionally because they would not know how their efforts were being used and the extent to which they were appreciated.

“The most important thing I could do before getting involved is knowing what they need and how they’re planning on using what I’m doing....[Also] knowing that they would be very thankful of that because I think it’s really important to create those relationships otherwise its very detached and I wouldn’t really feel that motivated” Participant 24, Masters Student.

The interviewees in this study clearly demonstrate the geography of the Internet can create new levels of accessibility and freedom to participate, but that it also creates a sense of placelessness that was integral to their participation in volunteerism. From these quotes, we can infer that the participants felt that while the Internet allowed them to explore new avenues in volunteerism, it also distanced them from it. This resulted in reduced enthusiasm to continue to volunteer.

This tension is important for Mapping Across Borders. It shows that careful attention must be paid to creating an online system that not only allows volunteers’ to access the technology whenever and wherever they are able, but also that social connections must be supported at all times. Participants need to know that there is a person who values their efforts and is able to interact with them in real-time (Butgereit 2011). Video conferencing was stressed by many as an appropriate way to accomplish this.

7.1.6. Open Access of information vs. Online Commentary and Judgement

In software development and research the concept of ‘open’ resources is increasingly significant. Most commonly, ‘open’ is used as ‘open access’ or ‘open source.’ In these usages, the word ‘open’ signifies that there is equality to access and usage of the resource. In software development this means that not only is usage of the software free, but the

computer code used to design the software is available for anyone to see and to change (Raymond 1999; Lakhani and Von Hippel 2003). In research, the idea of open access literature means that publications are freely available to access and read, and as well that the copyright remains with the writer (Hajjem, Harnad et al. 2006; Willinsky 2006). This means that the writer of an article can freely republish the article in whatever way that they wish.

Open source and open access are particularly important to the Mapping Across Borders project and its website content. The Mapping Across Borders project believes strongly in promoting open source software, and the resources that it develops for education are all open source publications. Open access to information is also important and contributions that users make to the knowledgebase on the website are available to all visitors of the website, whether they are registered users or not. Registration is required in order for users to contribute to the knowledge base, but registration is free and easily achieved.

During this study, many of the participants agreed that open access and open source software are not only the correct direction for the Mapping Across Borders project, but that it was something that they strongly supported,

“Knowledge today is money, knowledge is power and knowledge empowers these local groups to be able to go out and do things for themselves. That’s where I come from” Participant 6, Professor.

This professor also went on to show his support of open access resources for development saying, “knowledge has to be placed in the hand of the grassroots level people, NGOs and stuff like that” (Participant 6, Professor). Many other professors also felt this way and had taken steps to make their own education resources open access,

“I’m sort of a real open net kind of guy, like all my lecture slides you can just go get them – I don’t care” Participant 21, Professor.

and

“in terms of sharing skills and training I’m very much on the open side of the spectrum. ...people taking [my resources] and using it? I don’t have a problem with that, I think it’s great. Personally, I think it is fine for everybody to make their own judgement, and they put their effort into it and they want there to be more private benefits. I don’t judge that negatively but I tend to be very happy about making my stuff available and sharing it with anyone who wants to share it” Participant 20, Professor.

Other professors went further with their conviction that educational resources should be open access, saying that it was, in fact, their duty as publicly paid professionals to provide their resources openly.

“I would not have any problem with ... sharing my expertise ... and I think it’s part of my job as a university professor” Participant 18, Professor

However, this idea of providing professional resources and knowledge for free was not supported by all participants. At least one participant felt that providing services for free may make it hard for businesses in the same field, saying, “it’s a competitive process, so how do you balance that in a capitalist society?” (Participant 12, Professor). However, another professor noted that when efforts online are for those who are unable to pay for GIS services, “maybe it’s not about competition, it’s about just trying to share that knowledge with people” (Participant 11, Professor).

Participants found that they were encouraged to contribute open resources to their professional community, saying “there is an unwritten code that everyone helps each other” (Participant 2, Undergraduate Student). However, one professor noted that this ‘unwritten code’ had the potential to go too far, as they explained a previous situation at their university,

“I am very happy to share, knowledge is meant to be shared. It’s just a measure of how long and how often I can share it. ... when I started five years ago there were a lot of people saying I need to make a map, I need to do a map, at one point we needed to set up a formal system to say, okay map library, they are here to help you.... I’m happy to help [but] I can’t set half my week [aside] to [produce maps] for Ph.D.’s and other Profs” Participant 10, Professor.

Other issues that came up when considering open access to resources surrounded issues of privacy. One student noted,

“I guess with geographic information you want it to be accessible so people that people are making informed decisions, [but] maybe there are some things that you would want to keep private” Participant 13, College Student.

This issue of privacy that the student broached was taken up by another professor who had experience working with non-profit organizations. In this professor’s experience, although they wanted to keep data they collected and the lessons they learned in an open access format, the organization refused to allow the collected information to be accessible to the public, even after explaining the positive outcomes that can result from open access resources,

“We try to put more data out there, as much as possible we have sort of open data philosophy underlying our work. But, at the same time there is some data that people are not comfortable having in that format, that while you can encourage them and talk to them about the philosophy about why open [access] is a good thing, at the same time you have to listen and to respect that limit” Participant 5, Professor.

Conversely, African NGOs had a different opinion of privacy. While Canadian geographers were in favour of keeping everything online open access, African NGO staff expressed their

concerns over releasing data to the general public, or even working with a volunteer who could not guarantee they would keep their experience working with the organization private.

Organizations have an interest in privacy in part due to the fact that their ability to secure funding can often depend on providing services that others are unable to. Furthermore, organizations often feel pressure from government agencies that prohibits them from working on issues specific to contentious matters. The consequences associated with allowing organizational data to be open in this context could mean losing staff salaries or worse.

“Both sides need to build trust and confidence among each other so it needs to be some kind of mechanism that binds both side not to release information to a third party and also not to utilize that information for other purposes except for the agree terms of engagement so this is very critical in that sense, especially when we see the situation in [my country]. You know, the [country I live in] has new [legislation] on civil society organizations that’s really affecting the work on issues like children, women, humanitarian [response] and human rights, so information that is very sensitive like this cannot be shared to others third parties. It is very important to build those kinds of trust” Participant 31, African NGO Staff.

Therefore, there is a tension related to the open access to resources. Participants indicated a number of situations where open access is not appropriate, or where it leaves them open to be exploited. However, while these situations exist, the overwhelming response from participants was that they believed in open access to information and data, so long as its sharing and use would not cause foreseeable negative consequences. Participants felt that knowledge transfer was able to contribute to empowerment, and that was a goal worthy of contributing what knowledge they could.

However, there were problems in providing this information beyond making contributions to a knowledgebase. Interviewees focused on the way that Web 2.0 facilitated how data could be manipulated once submitted, especially in a social network. When information is posted and connected to user profiles, individuals can be identified and judged. Mapping Across Borders will need to be aware of this as it allows for open commentary on user-contributed information. Interviewees noted two challenges related to social commentary on Web 2.0 sites: firstly, the quality of opinions expressed through social networks can be poor and secondly, concerns related to being judged by peers.

The value of social comment systems, and online social commentary in general, varied from interviewee to interviewee throughout the study. Some participants found that social comments and conversations on websites were “a bit crap” (Participant 10, Professor) while others thought they were “extremely successful” (Participant 15, College student).

Participants who felt that social commentary was helpful noted that they were useful because they were on an open system that provided avenues to responding to authors of articles, without any control exerted on the user. One participant noted that while they do not use the social commentary systems, they thought they were very important as a way to increase dialog and for users to express themselves in a free and open manner,

“You know, there is a lack of control and that’s good. I love that because you put anything up and it is very few that they take down ... and you can do stupid things on there and they don’t mind. I love that part and I like that people can comment on it. I think that’s fine, I just don’t use it very much, but I think it’s important” Participant 21, Professor.

Another participant noted that using a social commentary system allowed them to expand their existing social network, because they were able to follow the comments of users they enjoyed. Eventually this lead to a social way to browse the web and form relationships that might be carried offline.

“For people who do interesting things that you think are interesting that you can connect to [them]. You can meet people that way, then you can meet them in person later on ... [at] a conference or something or if you’re going somewhere that builds that relationship over time. [Also] if you’re mobile and you are bored and you have a smart phone it’s a nice way to browse the Internet with people you trust” Participant 22, Professor.

Interestingly, the response from African NGO staff was almost entirely in favour of being able to contribute to online discussions, as they allowed sending corrections to article authors and to feel included in the news process, with one participants noting that they, “mostly comment on news articles ... quite often ... back home and just keep up to date and have my say” (Participant 37, African NGO staff). This process of commenting on articles online was also appreciated by NGO staff who wrote articles as well saying, “once I write an article it gives [me] the opportunity to also make corrections and to make something more clear ... and make it more understandable for that public,” (Participant 35, NGO staff) and, “through collaboration [and] reaction from many people, you can come up with a validated and more acceptable document at the end” (Participant 31, NGO Staff). Others noted that by using social systems online they were able to express themselves more freely, one participant noted,

“One of the things I like about Facebook is that you are free there, you can say whatever you want to say, and you can say it without thinking about the consequences – you can do that later. You can just talk your mind there and like when you are talking to a person you can see his or her face you have to consider their feelings, but on Facebook you can just say what you want to say however you want to say it” Participant 34, African NGO staff.

Many others however, felt that the opinions expressed on websites were of less use. Many participants felt that while a comment could be contributed by users who understood the topic being discussed, they often found that they, “miss something ... and actually create more mess” (Participant 6, Professor). Others found that the comment systems were often

of limited use because users, “comment too much with their emotion” (Participant 10, professor). Participants often found that comments posted online were ineffective because users had already made up their mind before engaging in conversation. This issue made one participant question, “do they help people, or it is just noise?” and another professor who noted the little value of social indicators on YouTube,

“I found a bunch of stuff [online] and from there I went in and found that there is a bunch of YouTube videos ... all I was interested in was [finding] current stuff and it wouldn't matter to me whether two people have been watching this thing or 22 ... in other words, I wasn't affected by popularity, I was only affected by my own sense of, ‘this is what I want to see’“ Participant 12, Professor.

Some students noted that while submitting commentary to Web 2.0 sites allowed them to provide useful information to others and solve GIS problems, it also left them open to judgment from others. Because their answers to questions were linked to an online social profile it had the potential to impact their standing among their peers and even to potential employers. One student expressed their concerns saying,

“I would worry about student putting their work online or their ideas online and having other students or professionals saying, ‘no, that's really wrong,’ and giving a lot of negative criticism. I think that student would – instead of being motivated to learn more [about] how they're done something wrong – probably not want to deal with the site anymore because effectively they have been bashed by the online community” Participant 24, Masters Student.

Another student noted that their online comments might affect their ability to become employed if they provide an answer that may only be partly correct because they do not have the time to write up a fully researched contribution,

“If that’s a place where I’m looking for a job ... [I would have to] put so much effort into making sure that it is correct for fear of it being incorrect and me being perceived as nonprofessional ... people don’t realize that it’s off-the-cuff or whatever and some advice is to be taken with a grain of salt [because] I’m not researching an entire literature review for you kind of thing” Participant 23, Masters Student

What the above section has shown is that there is an uneasy tension between the promise of open access information and Web 2.0 technologies. Participants, while voicing several concerns about open access content, were largely positive about posting helpful information online. They made connections between posting information online and the positive benefits it can create for organizations who want to learn to use GIS. However, when that information is connected to social Web 2.0 technologies it can have a differing ability to be useful. Some found the addition of commentary would be helpful to ensure that information is correct and to further their understanding, while others felt that commentary was useless at best and damaging most often. Others worried about how participating in online discussions and producing materials that were open access might negatively affect them among their peers and employers if the information was less than 100% accurate.

This tension has consequences for how Mapping Across Borders develops its interactive components and its social network. It also has useful lessons for the wider Web 2.0 and social networking discussion. It would appear that Mapping Across Borders should provide the opportunity to allow users to submit information anonymously, as it gives users the ability to contribute without feeling vulnerability to judgment. Conversely, this may make it easier for others to submit comments that are less productive or are not well informed. However, as the system is implemented it will need to keep these findings in mind.

7.1.7. Work Put In vs. Measureable Outcomes

Mapping and GIS allow its practitioners to see the world in new ways, learn new information about the land, and enhance decision-making processes. In their analysis of GIS use for business , Thomas and Ospina (2004) note that GIS has brought value to businesses

in North America in many ways, from reducing vehicle operating costs to eliminating redundancy in operations. However, while there is a business case for GIS in large markets, it is more difficult to demonstrate its value within the non-profit sector. During conversations with over a dozen organizations, I have found that while many do understand that GIS can have significant value, the financial and human resource cost associated with licensing and training are simply not possible for non-profits to bear in the long term. One NGO staff member noted that while they were able to attend an introductory course in GIS, they were unable to acquire the software license necessary to use that knowledge.

“I have been trained for five days on ArcGIS and how to use the GPS apparatus to collect data and how to transfer data to synthesize the data for decision-making. Honestly speaking, I didn't follow up and use the ArcGIS because ... ArcGIS is very difficult to access because you have to buy the software itself ... and that is one of the constraints” Participant 33, NGO Staff member.

The difficulties with using GIS for NGOs also continues with its implementation in community groups, and is linked to the critical discussions of sustainability and the GIS/2 movement (David and David 1991; Taylor 1991; Pickles 1995).

Illustrating the value GIS to NGOs in Africa is not the only challenge. It can be difficult to demonstrate to volunteers that their efforts have value results can be noticed as downstream effects. This is problematic, because as literature in virtual volunteering has indicated, the ability to show measureable outputs in a timely manner is important for ensuring that volunteers feel that they are making a valuable contribution to an organization (Cravens 2006; Dhebar and Stokes 2008).

This was a significant concern in regards to utilizing virtual volunteers for GIS, as shown by the participant responses to the question, “could you see yourself making a regular contribution to an online mapping project with a non-profit organization.” Volunteers consistently said that while they saw excellent opportunities and value in volunteering online using mapping tools, they felt that an inability to see direct results from their efforts

would most likely stop them. As one participant noted, “volunteering also means getting out and getting your hands dirty and this would be sort of at arm’s-length type of volunteerism” (Participant 6, Professor). This creates a problematic tension, because GIS projects do not always lend themselves to tangible results that other projects like infrastructure building or sponsoring a child’s education. Two participants, highlight the need to see real changes from their efforts,

“I want to see a physical change. I want to see a better way of doing things if I give them a good map of where the best places to sell their farm produce. I want to see and hear stories about [how] they get the better market value on produce. [Before] they got 10% and now, they get about 100%“ Participant 17, Ph.D. Student.

and

“What I want to know [is] the before-and-after. What was the situation prior to your intervention and what is it now, and how much of this is due to your input. It is always nice to know that you've contributed specifically to something” Participant 18, Professor.

However, GIS projects produce analysis and visualizations of data that aid decision-making processes, which participants noted is not conducive to immediate feedback. This is especially true if a volunteer makes a contribution to a crowd-based initiative as participant 22 illustrates,

“Capturing a picture of a person doing ... is much more powerful than the number of edits that I've made in the last year [to online mapping tutorials] and so ...I think people want to feel connected” Participant 22, Professor.

The often indirect linkage between creating a map and seeing results that are directly attributable to ones work is a significant tension that must be considered when connecting online volunteerism with GIS. This tension will need to be carefully balanced in

implementing Mapping Across Borders. One way to tackle this tension is to emphasize dialog between the map-maker and map-user as participant 1 says,

“I’m all about practicality, I don’t want to just build these [maps] and nothing gets past that. I want people to actually use them and interact with them, I want to see how the end-user [uses them] and what they think of it” Participant 01, Undergraduate.

7.2. Summary

This thesis set out to answer the question of whether the integration of Web 2.0 technologies foster applied geospatial skills and knowledge transfer between Canadian Geographers and African NGO staff. This study has shown that there is no simple answer to that question. Instead, the thesis has found that both Canadian Geographers and African NGO staff experience a number of tensions when using Web 2.0 technologies. The answer to the research question is not as simple as illustrating a potential for using collaborative technologies for online volunteering – clearly this exists – instead, this is a complex and nuanced question of key opportunities and challenges.

Investigating the emergent trends in this study led to the adoption of seven distinct tensions. While these tensions are not exhaustive, a much researched tension is missing; intrinsic vs. extrinsic motivation to volunteer. This omission is intentional, as it is already well researched (Clary and Snyder 1999; Ryan and Deci 2000; Finkelstien 2009), and is implied in many of the tensions in this study.

7.2.1. Connections to Research Literature

Of the seven tensions that emerged through the interviews, some have been expressed in other research literature on online volunteering and the geoweb. Many participants raised questions regarding management of volunteer activities that can be partially answered by best practices mentioned in earlier literature (Murray and Harrison 2002; Cravens 2006; Dhebar and Stokes 2008), while questions over the validity of user submitted data have been discussed by Elwood (2008), Goodchild (2008) and Hacklay (2010), and issues of

geographic freedom online have been explored in literature of Elwood (2008), and Goodchild (2008).

Previous research literature in online volunteerism and the geoweb illustrates that there has been interest from the academic community to look at the issues surrounding these tensions. However, these investigations have been completed in isolation from one another, as activities on the geoweb do not usually involve in depth GIS projects. This study allows volunteerism to be understood with reference to the production of GIS projects and knowledge of the framework of Web 2.0 technologies. While geoweb research has previously looked at ways to submit and visualize geographic data online, this study looks at the way this data can be processed into new information by volunteers, fusing the research domains of the geoweb and online volunteering.

7.2.2. Contrasting Views from the North and South

This research also examines the views of Canadian geographers alongside those of African NGO staff. While the research sample sizes were small (30 Canadian geographers and 7 African NGO Staff), interesting comparisons were present. In regards to Web 2.0, all Canadian geographers indicated that they were familiar with this term, while none of the African NGO staff were. However, in contrast the majority of Canadian Geographers were not active contributors to public Web 2.0 content, while African NGO staff were. Related to this finding, I found a difference in the way that Canadian geographers and African NGOs felt about privacy and Web 2.0; Canadian Geographers far less likely to trust Web 2.0 with personal information, while African NGOs were more concerned with misuse of organisational data.

Another key difference between these communities was what they perceived to be the goal of participating in Mapping Across Borders. While Canadian geographers often focused on individual benefits, many of the African NGO staff chose to focus on the value that Mapping Across Borders to the community of NGOs in Africa as a whole.

While there were differences between these two groups, there were also commonalities between them. Both Canadian geographers and African NGO staff expressed a need for strong project management on the website, albeit from different perspectives. Canadian geographers felt that crowd-based micro inputs on projects would need strong leadership to keep projects focused, while African NGO staff were interested in ensuring that volunteers were responsible in their use of organizational data.

Another similarity between these groups was feelings of inclusion and exclusion online. Both Canadian geographers and African NGO staff noted that they felt excluded from important conversations, both professionally and socially if they did not keep up with Web 2.0 conversations. Both groups felt that keeping abreast of trending Internet topics was an essential part of their professions. Relatedly, participants in both groups noted that the Internet was increasingly an always-present element of their lives.

Chapter 8. Conclusion

Web 2.0 technologies have created new opportunities for linking Canadian geographers to NGOs for the purposes of aiding in the transfer of applied GIS knowledge and skills. This connection is well suited to Canadian geographers as there is a precedent within the discipline towards being civic minded and supportive of development-related research and theory. The Internet has been a fast growing space for volunteering and new technologies are enabling new avenues to continue this trend. However, some of the rhetoric that has been used to describe the potential and simplicity of this opportunity has been overstated. Differences in context and culture can create concealed power relations and use of Web 2.0 technologies does not necessarily mitigate these relations. At the same time, the way that Web 2.0 technologies impacts everyday life is evolving and this can create new challenges which must be overcome.

This study set out to understand how Web 2.0 technologies can be used to facilitate connections between Canadian geographers and the staff of African NGOs to learn and apply GIS skills via Web 2.0 infrastructure built into the Mapping Across Borders website. During this research process, a website was designed. The design process included not only generating schematics and functionality, but also a critical reflection on the subjectivities and sensitivities of its target users. This thesis also set out to gather empirical evidence on the ways that its target communities would be able to use its website, asking specifically:

How can Web 2.0 collaborative technologies support Canadian geographers and African NGOs in sharing applied geospatial skills and knowledge?

This chapter will briefly restate the major research findings that emerged while designing the Mapping Across Borders website and critically reflecting upon the research question.

8.1. Designing For Communities

The Mapping Across Borders website is designed to bring Canadian geographers and the staff of African NGOs together via Web 2.0 technologies. In doing so, bringing these two communities with different subject positions together will likely create the potential for

friction between users. In Chapter four I described the creation of personas and used these to illuminate how frictions might emerge in specific scenarios. These fictitious situations provided a basis to uncover ways that Canadian geographers and African NGOs may be regarded on the Mapping Across Borders website and the safeguards that must be put into place, including the site policies, terms of reference and reporting mechanisms.

After reflecting on these different users, I set out to design in detail the Mapping Across Borders website. At the time of writing this thesis, the site is still in development, though it will include four main user spaces, each fulfilling an important role. The information space of the website introduces all potential users of the website to its functions and encourages organizational transparency through upfront reporting mechanisms. The learning space of the website aims to support the transfer of GIS knowledge using lessons, how-to articles, assignments and a glossary. The learning space is built around a wiki-media paradigm, where any user can create new content and edit what is already in place. The project space of the website acts as a location where NGOs and Canadian geographers can work together on GIS projects, sharing data using a spatial data infrastructure or SDI. Finally, the community space of the website ties the functionality of the learning space together with the project space into a social network. The social network enables full project management capabilities where users can track what has been done, what others are working on and promotes communication among these users to achieve the goals of the project.

8.2. Research Findings

This study has not produced a singular answer to its original research question. Instead it has uncovered a nuanced understanding that surround issues related to connecting Canadian geographers and African NGOs using Web 2.0. This understanding has a number of key findings:

- There are a number of significant tensions that exist in using Web 2.0 technologies for geospatial volunteerism.
- Respecting the rights and privacy of users and organizations is paramount, especially because users are increasingly wary of Web 2.0 technologies and services.

- Some users, because of Web 2.0's pervasiveness in their lives, are choosing to exclude themselves from Web 2.0. These people feel less connected to their social and professional community.
- The omni-present Internet has numerous benefits, but many feel that they need to schedule time to disconnect. Some participants noted that over use of the Internet and Web 2.0 caused stress in their lives.
- Online volunteerism, especially when connected to crowd participation, is seen to offer considerable opportunity. However, many users worry it leads to disorganized and wasted efforts.
- Volunteers often want a social experience and a connection to a finished product, both of which remain a challenge for Web 2.0.
- Online opportunities offer new avenues for volunteerism for the Canadian geographers interviewed. However, pressures of academic and professional life have made it difficult to volunteer regularly. Many participants felt that Web 2.0 made volunteerism more accessible.
- Participants recognized that Web 2.0 is productive for learning, especially when this learning is social. However, participants also recognized that sharing their professional skills and knowledge left them vulnerable to criticism if they were not completely accurate.

In the tradition of Action Research these results will be put to use in the ongoing design and eventual deployment of the Mapping Across Borders website as well as throughout the organization as a whole. They will both help to enhance participation online and ensure that all parties engaged benefit from their experience. The findings are also relevant to the discourse on Web 2.0 in general. In previous research literature on Web 2.0 the role of online volunteering has been presented as simply an opportunity for civic engagement (Rheingold 2007; Amichai-Hamburger 2008; Shirky 2010). This research moves beyond the explanation of these possibilities, to the realities of putting Web 2.0 into action for volunteerism, blending efforts by actors on different continents.

In conclusion, this study has shown the ways that a community of Canadian geographers and NGO staff can be brought together online for volunteerism projects using Web 2.0 technologies. In understanding these communities clearly, the Mapping Across Borders society will be able to make informed decisions about how they will develop their website as an inclusive space, and also how they will need to be aware of, accommodate and avoid the inevitable tensions which emerge in using Web 2.0 technologies for applied GIS learning and volunteering projects.

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Appendices

Appendix A - Recruitment Letter

THE UNIVERSITY OF BRITISH COLUMBIA

Dr Jon Corbett, Principal Investigator
IK Barber School of Arts and Sciences
UBC Okanagan
3333 University Way
Kelowna, B.C. Canada
V1V 1V7



Mapping Across Borders: Online Collaboration, Social Networking and Micro Volunteering for Development —Recruitment Letter

About the Project

This project is a collaborative project involving members of African non-governmental organizations (NGO), students of and young professionals in the field of Geomatics at Canadian higher learning institutions. The project is being conducted with the help of The Mapping Across Borders Society (A Canadian Non-Profit Organization) and the University of British Columbia Okanagan. The goal of the project is to bring together persons seeking experience in real projects and development institutions who can benefit from implementing mapping into their development projects in the Global South.

Through this project we hope to create an online space where persons can contribute to a knowledgebase,, dialog with one another while learning and work together with one another on geomatics projects. The online community for Mapping Across Borders will start its operations beginning in March 2011.

Invitation to Participate

We are looking for persons who are students, recent graduates, staff and faculty of higher learning institutions as well as persons with are members of development organizations to participate online with Mapping Across Borders. From time to time, Mapping Across Borders may ask for your help in answering surveys or for your participation in interviews. All of the information that is collected will be used to inform our study and make Mapping Across Borders a better place to learn and work together. All user data is kept private and securely stored at the University of British Columbia Okanagan.

All participation is strictly voluntary. The time requirement is flexible to suit your needs. At the conclusion of the project we may conducting interviews with participants about the project. We do not foresee any direct benefits or potential harm to you as a result of participating in this research.

If you are interested in participating please contact Jon Corbett at (250)-807 9348 or by email at jon.corbett@ubc.ca, or Michael Martin at (250) 300-0586 or by email at michael.martin@ubc.ca.

Appendix B - Statement of Informed Consent

THE UNIVERSITY OF BRITISH COLUMBIA | OKANAGAN



February 16, 2011

Dr. Jon Corbett, Principal Investigator
IK Barber School of Arts and Sciences
UBC Okanagan
3333 University Way
Kelowna, B.C. Canada
V1V 1V7

Statement of Informed Consent for Audio Recording

Mapping Across Borders: Online Collaboration, Social Networking and Micro Volunteering for Development

This study is being conducted through the University of British Columbia Okanagan. You are being asked to participate in this interview because of your ability to inform the project **Mapping Across Borders: Online Collaboration, Social Networking and Micro Volunteering for Development**. We are grateful that you have agreed to be interviewed. The interview should take about 60 minutes to complete and your responses will be tape-recorded by the interviewer. You are free to end this interview at any time, with no consequences.

The goal of the project is to connect Canadian students and young professionals with skills to non-governmental organizations who want to learn and implement GIS and mapping technologies. Through this project we hope to create measurable outcomes and also to study the appropriateness of online collaboration, social networking and micro volunteering. We do not foresee any direct benefits or potential harm to you as a result of participating in this research.

We are committed to respecting your privacy. The data we collect during this interview will be securely stored at UBC Okanagan. All information released for external use will be purged of anything that might identify you, such as names, addresses, telephone numbers, etc. If in the future we would like to follow up on some of the information you have given us, you will be contacted first to request your further participation. No other use will be made of the contact information that we have collected.

For questions related to this research, please contact Dr. Jon Corbett at 250-807-9348, or email at jon.corbett@ubc.ca. If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at 1-877-822-8598 or the UBC Okanagan Research Services Office at 250-807-8832.

Ver. 1 February 16, 2011

Page 1 of 2



By signing this form, you are indicating that you have read and understand the points outlined above, and consent to having the information you provide used for research purposes. Note that you are signing two copies, one of which is for you to keep.

I have received a copy of this consent form.

Signature of Participant

Date

Signature of Investigator

Date

Appendix C - Canadian Research Schedule

THE UNIVERSITY OF BRITISH COLUMBIA

Dr Jon Corbett, Principal Investigator
IK Barber School of Arts and Sciences
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3333 University Way
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Mapping Across Borders: Online Collaboration, Social Networking and Micro Volunteering for Development —Interview Script

You have been invited to participate in this interview/focus group session based ability to contribute to *Mapping Across Borders*. The interview will take no more than 60 minutes. For the duration of the interview I will be tape recording our discussion to allow me to concentrate on what you are saying, if you are uncomfortable at anytime please let me know and we can stop the interview.

I have a series of questions to guide our discussion, please answer to the best of you ability and if you have anything additional to add, please let me know. Thank you again for agreeing to participate in this interview/focus group.

About the Project

This project is a collaborative project involving members of African non-governmental organizations (NGO), students of and young professionals in the field of Geomatics at Canadian higher learning institutions. The project is being conducted with the help of The Mapping Across Borders Society (A Canadian Non-Profit Organization) and the University of British Columbia Okanagan. The goal of the project is to bring together persons seeking experience in real projects and development institutions who can benefit from implementing mapping into their development projects in the Global South. Through this project we hope to better understand how technologies facilitate participation in the mapping process and how they can be used to engage stakeholders in creating positive change in the rural development projects. Any and all participation in the project is purely voluntary, and you are free to withdraw from the project and/or this interview at any time.



Semi-structured Interview Questions:

Theme one – Charity and Volunteer work

- 1) Do you engage with any charity, non-profit or volunteer groups?
 - a. What motivates you?
 - b. What limits you?
 - c. If volunteering your time was more accessible or fit your schedule better, would you contribute differently? What would you change to make it that way?
- 2) What (kinds of) organizations are you most supportive of?
 - a. What draws you to these organizations; media, vision, partnerships, results?

Theme Two – The Collaborative Internet

- 3) In general, how would you describe your use of the Internet?
- 4) Do you participate in any web 2.0 activities? (i.e. Wikipedia, Twitter, Foursquare, Facebook, Forums, etc.)
 - a. What motivates you to participate in these programs/products?
- 5) How have you felt the benefits of Web 2.0 in tangible ways? How have your online activities affected your offline life.
- 6) What of your skills and expertise would you share of online – if it were a few minutes at a time, here and there – to help other to learn?
- 7) Do you have reservations that would keep you from being comfortable from putting this information online? How could those reservations be addressed?

Theme Three – Development and the Internet: Micro Volunteering

Definition: Micro Volunteering. Micro Volunteering is the idea that many people can work together on a project intermittently with a little bit at a time, to create a large results.

- 1) What impact do you think online causes have (such as Facebook Causes or Twitter 'retweets')?
 - a. Do you think that the 'Like' button (or, 'thumbs up' on Youtube or news sites) have a measureable effect?

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- 2) What do you think at the biggest strengths of Micro Volunteering?
 - a. What are its Weaknesses?
 - b. How could it be more effective?
- 3) Do you think that you would be motivated enough to contribute regularly to the Mapping Across Borders Micro Volunteering project, why or why not?
 - a. What if you could be given course credit for your efforts? Are there other ways you would want to be recognized?
 - b. Do you think that being able to put your Micro Volunteering efforts on your CV is important?
- 4) If you could directly impact and engage with the people who benefit from your efforts and see the social justice that it created, how would that affect your motivations for working with a project such as Mapping Across Borders?
 - a. What would you like to know from the people using your contributions?
- 5) If your efforts in a Micro Volunteering project could be documented appropriately what do you think an employer would be interested in seeing?
 - a. What would you want to be able to show the employer from your work related to a micro volunteering project like Mapping Across Borders?
 - b. How can Mapping Across Borders provide these materials to you, and in what format?

Thank you again for participating in this project and informative interview/focus group session. I will have available a digital copy of my thesis to all participants on completion and a summary option of my findings. If you have any further questions or feedback don't hesitate to contact me.

Appendix D - African NGO Staff Interview Schedule

THE UNIVERSITY OF BRITISH COLUMBIA

Dr Jon Corbett, Principal Investigator
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UBC Okanagan
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Kelowna, B.C. Canada
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Mapping Across Borders: Online Collaboration, Social Networking and Micro Volunteering for Development —Interview Script

You have been invited to participate in this interview/focus group session based ability to contribute to *Mapping Across Borders*. The interview will take no more than 60 minutes. For the duration of the interview I will be tape recording our discussion to allow me to concentrate on what you are saying, if you are uncomfortable at anytime please let me know and we can stop the interview.

I have a series of questions to guide our discussion, please answer to the best of you ability and if you have anything additional to add, please let me know. Thank you again for agreeing to participate in this interview/focus group.

About the Project

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Semi-structured Interview Questions:

Theme One – Applicability of GIS

1. How does GIS relate to the development work that you or your organization is involved in?
 - a. What benefits do you think GIS has for your projects?
2. Are you interested in learning more about GIS, or do you wish that the projects that you are working on utilized GIS more? Why or Why not?
3. Do you think that skill in GIS is one which employers value?
 - a. Do you think that having skills using GIS is something that could make you more desirable as a candidate in a hiring position?

Theme Two – The Collaborative Internet

4. In general, how would you describe your use of the Internet?
5. Do you currently or have you used social networking sites such as Facebook, Twitter or LinkedIn?
 - a. If you haven't used these sites previously, do you think that you might in the future?
 - b. What motivates you to participate on these sites?
6. Are you familiar with the idea of Web 2.0?
 - a. Can you provide some examples of Web 2.0 sites, to what degree have you made use of them?
 - b. Do you participate with any sites where you submit user generated content to?
 - c. What do you see as the benefits of using Web 2.0?

Theme Three – Development, GIS and Mapping Across Borders

- 7) When participating in Training Events with outside organizations, do you find these to be effective?
 - a. Do the organizing partners follow up with trainees to see how the training is being used, or to make sure that the training was effective?
 - b. Do you think that having an online resource for follow up training and mentorship after the training session has completed is useful?
- 8) Do you think that the web can play a role in learning new skills?

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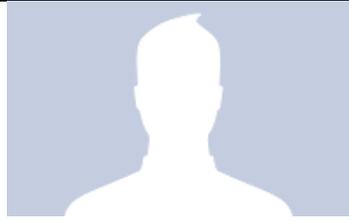
- a. Do you have any examples of where you have learned a new skill from an online resource?
 - b. Do you think that there is a limit to the amount of help that an online resource can have? Where does this line exist?
 - c. Can online mentors help to cross this barrier?
- 9) Do you think that having a Student or professional from Canada work with you complete a project would be beneficial to you?
- a. Do you think that you would be able to communicate effectively using the internet (via text, audio, photos or video) with an outsider about your project to facilitate their help?
 - b. Do you think that there are any potential considerations that would prevent you from sharing information privately online with a mentor/intern volunteer? Does this change between online/offline interactions?
 - c. What would you want to know about a Canadian Volunteer first before starting a project together?
- 10) Do you think that you could be motivated enough to contribute to Mapping Across Borders online?
- a. Do you think that you could put the required time aside to work with an outside expert on a project?
 - b. What other time considerations do you have? What might prevent you from being able to follow a GIS project through to its conclusion?
- 11) If your efforts on Mapping Across Borders were documented well and could show the abilities and talents that you have, would you show these to a potential employer?
- a. What do you think that an employer would take away from a Mapping Across Borders Experience?
 - b. How can Mapping Across Borders provide these materials to you, and in what format?

Thank you again for participating in this project and informative interview/focus group session. I will have available a digital copy of my thesis to all participants on completion and a summary option of my findings. If you have any further questions or feedback don't hesitate to contact me.

Appendix E - Personas

Sarah DiMaggio	
	Age: 22
	Location: Toronto, Ontario, Canada
	Profession: Undergraduate student, Ryerson University. Student of Geomatics and Environmental Science
	Marital Status: Single
	Family: Parents, One older brother
	Know-How: Four GIS specific courses.
<p>Sarah grew up in Mississauga, Ontario just outside of Toronto, Canada. Her Dad works for one of the major banks in Toronto and her mom decided to leave her career to take care of Sarah and her older brother Michael. Her brother Mike went through university before Sarah and graduated with a liberal arts degree and in the current economic climate, Mike is struggling to find work in consumer marketing. Sarah participated in various sports teams growing up, but after playing volleyball in her first year of school decided to leave the team and concentrate on school.</p> <p>Sarah attended local primary and high schools before attending Ryerson University for her undergraduate degree. Starting in geography, Sarah realized quickly that she wanted to be able to find a job after her degree was finished so she changed her degree focus from a general geography degree to a more focused Environmental Science degree in second year. During her second year she became aware of GIS and saw how much use the technology would have in the environmental sector. In her third year she decided to get a minor in GIS and now in her fourth year she has taken Introduction to GIS, GeoDatabases, Spatial statistics and Environmental modeling.</p>	

Zemekail Solomon



Age: 27

Location: SNNPR, Ethiopia

Profession: Environmental Extension officer

Marital Status: Married, No Children

Family: Mother and Father, oldest of seven siblings of various ages and genders.

Know-How: Has used GIS in University for one course

Zemekail grew up in Amaro, Ethiopia and lived with his parents on a small farm that the family worked on. Being the oldest and male he was able to attend primary school locally and high school in nearby Yigre Chefe. After finishing high school he attended Alamaya University and studied Agronomy, graduating three years ago. After finishing university, Zemekail chose to come back to Amaro to take a job at the Amaro Woreda office as a field officer, implementing the projects that the Woreda office has planned. In the past three years at his post, he has become known in his community as a bright young professional who will go far in the governmental system.

Zemekail is eager to pick up new skills at all times. He approaches his assignments as opportunities to excel and sees well completed projects as the way to move forward in his career. The bulk of the work that is happening in a new Eco-Region project has fallen into his lap and he is quite energized by the scope and possibilities that the project involves. Technically, Zemekail is conversant in all productivity software. At university he was exposed to a number of agro forestry programs, including a brief stint with ArcGIS. While he is not a spatial analyst, he wants to know how to use maps that international NGO staff have produced. Any software that international NGOs use will only need to be explained once, as he will pick up the software and use it as best he can. He also acts as technical support for other staff in his office who encounter trouble with their computers updating virus software and installing software.