

# **Mapping Across Borders Final Report to the IDRC Small Grants Program for Innovative Research and Knowledge Sharing**

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**Abstract:** Mapping Across Borders is a Canadian NGO that has, with the support of the International Development Research Centre, created a website that facilitates the transfer of geospatial technologies knowledge and facilitates international project cooperation. This has been completed by creating a website that includes an open access knowledge centre, and a project space that allows multiple users to come together and complete geospatial projects.

**Keywords:** GIS, Mapping Across Borders, Online Volunteerism, Geospatial, Open Access Learning

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## Problem and Justification

In many countries of the Global South, the use of geographic information technologies is still being introduced. While some international NGOs can afford to hire dedicated (and skilled) staff and pay software license fees, local NGOs remain left behind. Ironically it is often these local NGOs working on the ground and implementing development activities that could see the most benefit from using GIS in the long-term planning, monitoring and evaluation of their projects.

This report outlines the implementation of a social media project on the Mapping Across Borders website that seeks to address these two interrelated barriers of implementing GIS programs and training end users at African NGOs. It will achieve this through connecting staff of local African NGOs with the largely untapped capacity of student experts from locations where GIS use is mature (initially focusing on Canada).

Using social networking technologies, the Mapping Across Borders website 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.

### Opportunity on both sides of the Digital Divide

Students graduating with GIS degrees often lack the practical experience to get jobs in their field at meaningful levels. This can be frustrating for graduates who understand that they have the capacity to accomplish much more sophisticated projects. Therefore, this project provides the opportunity not only for NGOs to incorporate spatial technologies, but also to provide recent graduates (and current students) with the opportunity to acquire real world experience. The project accomplishes these goals by connecting NGOs to experts in Canada to work together on a GIS-related project, as well as providing online training to local NGOs.

### Placement with respect to other International Mapping Efforts

There are other NGOs that provide expert GIS volunteers including MapAction, GISCorps and iMMap. However, these NGOs accomplish their goals by sending professionals to provide one-time services. This model requires substantial time investment, consumes large amounts of money and does not guarantee the sustainable transfer of GIS capacity. This project takes an integrative approach that leaves capable GIS talent in-country through long-term networking and thoughtful knowledge transfer. Many students and recent graduates are able to contribute their expertise without having to leave their home as Mapping Across Borders provides the framework for networking, as well as all of the required training materials in digital formats for NGOs.

### Assessing the Need for this Website

Prior to this project, lead researcher Michael Martin undertook a study with the approval of the University of British Columbia – From Sensors to Citizens, Exploring the Tensions of Using Web 2.0 Technologies to Support Online Volunteerism (published online<sup>1</sup>). This study involved interviews with 88 participants from universities and colleges in every province of Canada, as well as interviews and meetings with 15 NGOs in the Global South to assess the need for and the readiness of a website such as the Mapping Across Borders' outlined above. In all interviews, African NGOs felt that these technologies were not only appropriate, but offered a service which was not available elsewhere and urgently needed. Our Open Source GIS classes in Ethiopia, Kenya and the Coady International Institute have been attended beyond capacity. GIS students and professionals from across Canada said that they were ready for such a website to be created, and that they have been looking for a way to harness their unique skills in a socially responsible fashion.

While assessing the need and readiness of the Mapping Across Borders website and similar technologies, the above study also identified a number of tensions that were inherent in implementing Web 2.0 technologies in this context. The tensions covered a number of topics, from issues of overcoming geographical limitations, to work-life balance, to digital access. In completing that research the planning and organization of both the technical and social aspects of the Mapping Across Borders website were uncovered and considered. This pilot program benefits directly from this research and through applying the lessons learned has a solid foundation to build upon.

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<sup>1</sup> Available at <http://hdl.handle.net/2429/42826>

## Objectives

Mapping Across Borders was established as a Canadian not-for-profit organization in 2010. For the past two years it has been putting together reference materials for GIS related learning, taught open source GIS classes, begun to assemble initial elements of its website and built relationships with organizations overseas.

Prior to this project, Mapping Across Borders had sufficient funding to ensure that they were able to follow up with projects that they had been working on, and some funds for the development of our website functionality<sup>2</sup>. However, the largest challenge was to gather the funds required to build a website upon online frameworks and content. Our specific objectives for funds requested were to:

1. PHASE 1: Build an online social network and tools to support that network in online volunteerism and mentorship using open source technologies online
2. PHASE 1: Create engaging multi-media web content for learning geographic information technologies
3. PHASE 2: Support development organizations who will be integrated in the first cohort of online projects (Information on PHASE 2 can be found in Annex A)

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<sup>2</sup> Prior to this study, Mapping Across Borders spent \$5000 (CAD) on web development

## Methodology and Activities

To accomplish the objectives, the project contained two phases, one for building the necessary online infrastructure, and another to implement it with two development organizations in a pilot program. Phase One lasted twenty months and Phase Two is set to begin now. To complete our objectives we accomplished:

1. **Creating Multi-Media Open Source GIS Education Curriculum:** In order to facilitate the transfer of knowledge on geospatial technologies, Mapping Across Borders (MAB) created an open access learning platform on their website. To do so, MAB carefully surveyed the options available in existing online content management systems, such as Joomla!, and decided that the time required to re-engineer these systems to fit its purposes would take too much time, and never provide the secure and purpose driven experience that it wished to provide. Instead, MAB chose to leverage a much more flexible platform called CakePHP, and build its environment the way that best suited its mission. This proved to be a very valuable decision, and the resulting website is a fantastic learning environment.

The learning platform that Mapping Across Borders (MAB) built also contains a wealth of information, due to the transformation of its classroom ready materials into online media. MAB hired a curriculum developer in the summer of 2013 to create text, images and videos in the form of Lessons, How-Tos and Assignments. To create these resources MAB purchased a media editing computer and a video recording device.

2. **Building an Online Social Volunteerism platform:** After building an open access learning platform, Mapping Across Borders (MAB) set its sights on providing an avenue for users to come together and work on GIS projects. This part of the website facilitates the creation of international partnerships between Canadian students and International NGOs with GIS projects in mind. MAB's hope is that users can learn to use GIS software through the learning space on its website and transition to putting that knowledge to create effect with the help of knowledgeable users.

## Project Outputs and Outcomes

Mapping Across Borders (MAB) main mission is to provide the resources to bring people from all over the globe together to learn geospatial technologies, and complete projects with one another. Funding from IDRC has allowed Mapping Across Borders to realize these goals by providing concrete tools and services available to users anywhere. We have locally trained two young professionals, and now provide well over fifty multi-media learning resources via our learning platform, and because it is open access, our pool of knowledge can be expanded by

any user, at any time. We have also put together the a project space on our website, that we are close to releasing to the public. While it is currently in its final stages of preparation, we hope to have it ready to share in early 2015.



Figure 1: The Beginnings of the Mapping Across Borders Learning Centre



Figure 2: Mapping Across Borders Homepage

## Web Output

### Learning Space

During the course of our development, we have moved beyond the simple beginnings of our early website (figure 1), and moved on to the fully interactive and user friendly site of today (figure 2).

The learning space of our website is a fully integrated learning platform. From the beginning of development, we believed in a strong learning environment was integral for ensuring the sustainability of GIS training in the global south. From experience, we learned that there are many challenges facing learners of GIS, the most difficult being that students have a hard time getting the follow up support they need once a short course (usually 1 week) is finished and the instructor is no longer available. To combat this, the Mapping Across Borders website provides all of our curriculum to anyone, not just those that attend our courses.





Figure 3: the Mapping Across Borders Learning Space

On our learning space, you will find lessons on the theory and practice of GIS, how-tos that demonstrate the ways to accomplish many GIS tasks, assignments that test knowledge learned, and a glossary clears up many of the confusing terms in GIS. All of these elements have been integrated into a holistic experience through the production of courses, which users can follow along with, from *What is GIS?* to *Sampling and Geoprocessing Tools* (Figure 4).



Figure 4: Courses available at Mapping Across Borders

In order to ensure that our materials are as helpful as possible, we have taken a multi-pronged approach to providing useful resources. The easiest approach is to provide easy translation and PDF creation on the website. Each learning resource page has the ability to do these without leaving the page. Secondly, we have included introduction sections to resource that include prerequisite lessons and important definitions used in the lessons, integrated from the glossary. At the completion of the lesson, users have the ability to check that they've understood the lesson by completing supplied comprehension questions, and are also able to ask questions about concepts or procedures that they haven't understood completely in the questions section. Finally each learning resource includes a section to show where to go next, the lessons following on from what they have learned in the current resource.

### *Social Profiles*

To make sure that users are able to participate in learning with one another and track their progress, Mapping Across Borders has implemented a fully functioning social space to its site. This means that users not only have profiles, where they can fill in information about themselves, they also can befriend other users, carry on conversations, and also track their learning and projects underway (figure 5). This page shows what lessons a user has completed, and the badges they have earned from the actions they complete on the site. Badges can be earned through many different actions, including completing a lesson on the site and getting the comprehension question correct or fixing up an error on a page. We currently have fifty five badges that can be earned by users.

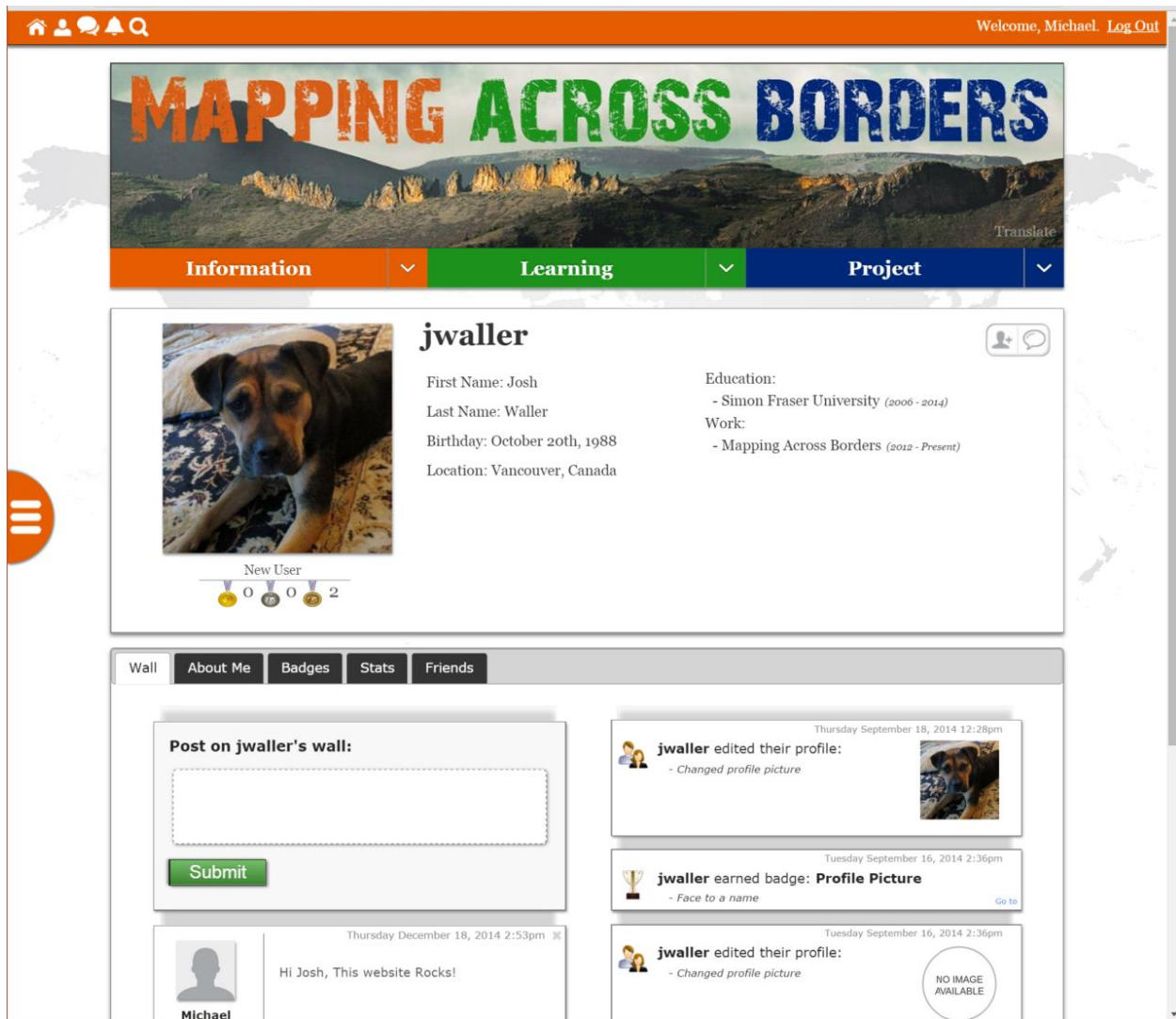


Figure 5: Profile Page on Mapping Across Borders

### Lesson Curriculum

An important part of the Mapping Across Borders site is the content we provide. By hiring a content creator, Mapping Across Borders has been able to turn their in classroom content into 14 Lessons, 53 How-Tos, 5 Assignments (Currently under review, and will be online shortly), and well over a hundred Glossary items. Nearly all of the lessons and How-To resources also include a video tutorial users to watch and understand (figure 6).

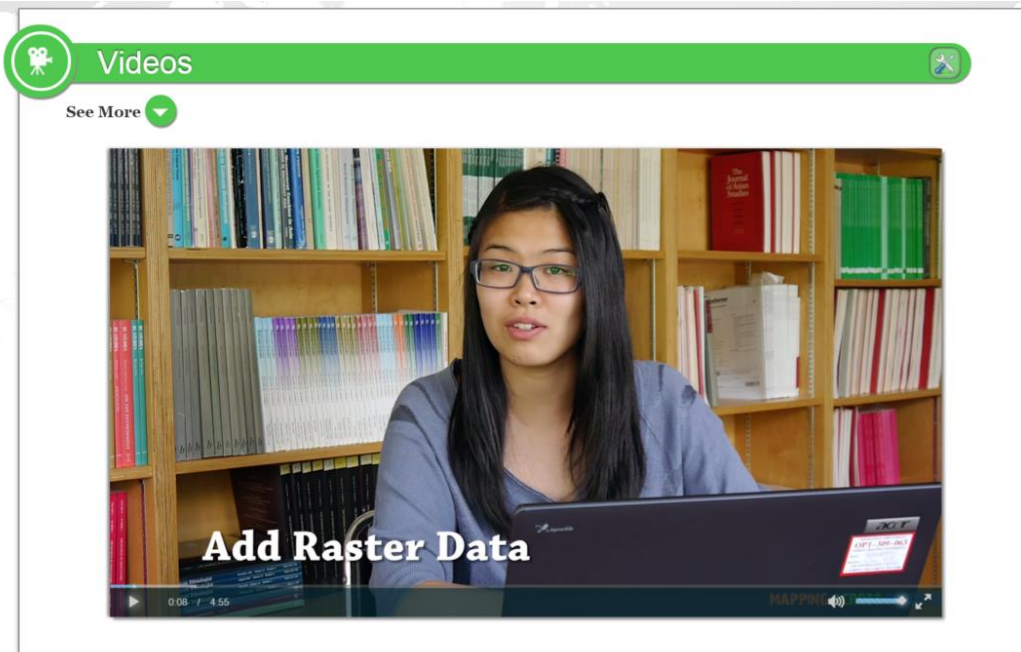


Figure 6: Embedded Video "Adding Raster Data" on Mapping Across Borders featuring Casey, our Curriculum Developer

#### *Project Space*

The project space of the Mapping Across Borders remains the final task set out for us. We have been working on this aspect of the site steadily and hope to have it available to the public soon. In this element of the website we have provided tools for users to create and promote projects for other users to help with, work together on timelines to complete the projects, swap digital files back and forth, and have project specific conversations (figure 7). We think that it is very important to be able to create output from these pages, so we have also included a way for users to curate a page about their project where they can show the people they have impacted and the resultant GIS outputs for all to see, such as maps, image or videos.

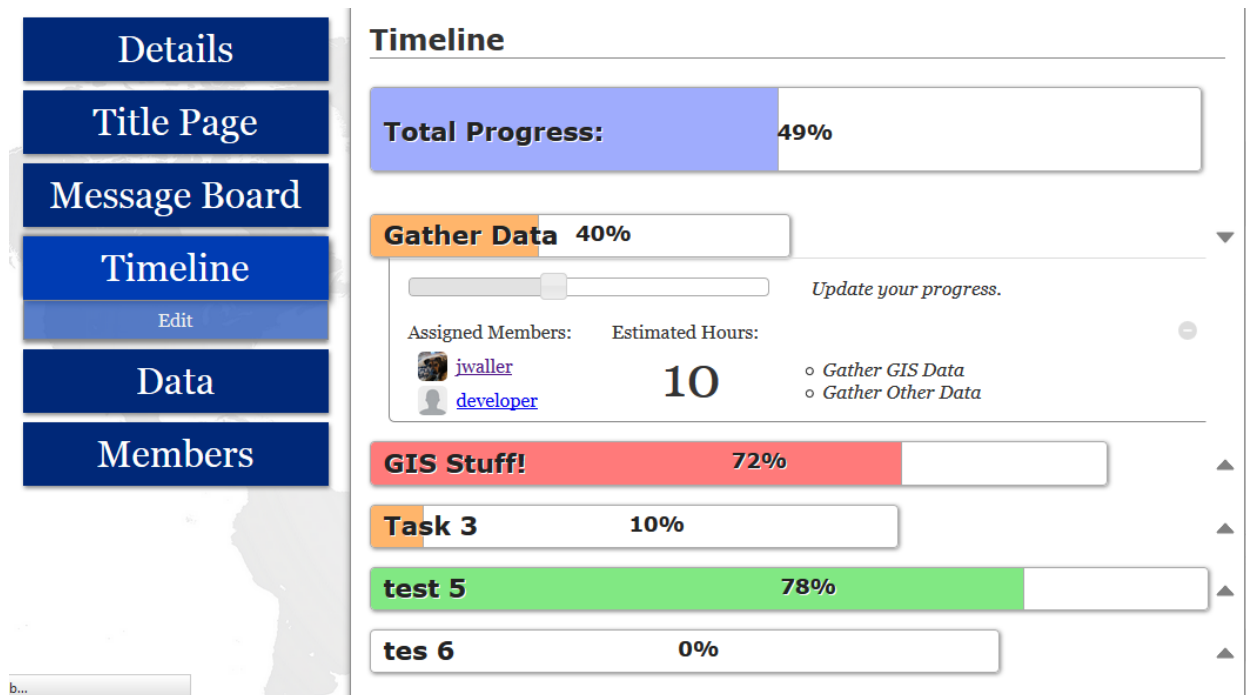


Figure 7: Mapping Across Borders Project Space Timelines

### Capacity Output

During the course of this project, Mapping Across Borders has developed the means to train anyone in the world on the subject of GIS. However, as that is a general output, and difficult to demonstrate, we can show three examples of specific capacity development.

First, is our Curriculum Developer, Casey Yang. Casey has just finished her undergraduate degree in Geography as Simon Fraser University, and while working for Mapping Across Borders, she was under her senior co-op term. During her tenure, Casey learned about Open Source Mapping alternatives to the Industry software that she learned during coursework. Open Source software education, is especially important for GIS as closed source software currently widespread is an expensive proposition for any company. By learning how to use Open Source GIS, Casey is now able to apply her skills and training to any future employment or socially responsible venture. Additionally, as curriculum developer, Casey learned how to use many media editing software. At the beginning of her job, Casey undertook several training sessions with the director of Mapping Across Borders to learn how to operate multiple video cameras, audio recording equipment, computer screen recording software, and also the media software to pull all of the content generated together in easy to follow videos. The videos on the Mapping Across Borders website are a testament to her learning.

Josh Waller was hired during this project as the Website Developer. Josh has completed his degree in computer science as Simon Fraser University recently, and came to Mapping Across Borders as a co-op student. During his time at Mapping Across Borders, Josh was required to learn many skills. From efficient ways to track concurrent user edits to documents on the site, to designing visually appealing and easy to use pages all the way to documenting his code and performing code reviews, Josh learned

these valuable skills while at Mapping Across Borders. Additionally, Josh learned to work in a SCRUM sprint environment, which pushed him to produce tangible results for Mapping Across Borders throughout his tenure at six week intervals. Josh thrived in his role as web developer and has recently moved on to another, highly competitive job after Mapping Across Borders, and credits part of his success to the learning that he obtained through working with Mapping Across Borders.

Finally, anecdotal evidence from an educator of GIS. Britta Ricker is a professor at the University of Washington. She has recently moved there after completing her PhD at Simon Fraser University. Her proximity to the Mapping Across Borders team meant that she was able to hear about the development of the site as it progressed, and she has integrated the learning resources into her classes on Open Source GIS. Today, Britta is helping to spread the word of Mapping Across Borders through social media (figure 8). Other professors have integrated Mapping Across Border materials into their classrooms as well and we hope to promote our resources widely as more is developed.



Figure 8: Mapping Across Borders presence in Social Media

## Overall Assessment and Outcome

The Mapping Across Borders IDRC project has been a very productive and rewarding experience. We set our goals high and we are well on our way to achieving our goals of providing online resources for GIS to persons all over the globe and to furthering projects that incorporate GIS at civil society organizations. We are almost complete in our first phase of development, building the online platform. Our next phase is the promotion and dissemination of these tools widely and for them to be taken up by organization in the global south. It is a very exciting time. We will be working with a select number of students and NGO partners to complete the first of projects facilitated through our site, proving its utility and purpose of creating an online community of practice constituted by individuals that work together online.

During the course of this work we have learned several important lessons. Perhaps the most important for future project regards the use of content management systems for website development. These web frameworks are very good at their intended use – providing tools to manage the input of articles online. They can be manipulated through the use of extension modules to include functionality of social networking and semi-open access content creation as well. However, with the integration of each additional extension, there requires the work of deconstruction that extension to make it work in the exact context that you wish it to. For Mapping Across Borders we learned that to provide the functionality of our website we would need to augment dozens of these extensions that all required their own learning curves and ways of thinking. In our preliminary work this made our website code



almost impossible to work with and the product we were creating was not fulfilling our original vision. To accomplish our goal, we found that rather than force other's work, including that of the content management system and its extensions, we really needed to pick framework of coding that helped us best. Once we freed ourselves from using a content management system, our development speed increased dramatically and we were able to produce a website that we are proud to say meets and exceeds our vision of online partnership.

We feel strongly that this project has enabled a new tool for all persons, especially those in the global south. The Mapping Across Borders website enables persons who learn the basics of GIS in the classroom to implement those skills to new challenges and to further refine their skills through interactive learning with others. We are very happy to see that educators are starting learn about our site and integrate it into their classrooms, and we will continue to foster this relationship. We are committed to making sure that this technology impacts the developing world, and are building a robust framework to facilitate projects between persons around the world so that they can complete social good, regardless of where they are.

The Small Grants funds at IDRC were a catalyst for this project. Gathering the required funds for this project would have been difficult if it were not for the Small Grants program, and we are very thankful for their support. As we transition into our implementation phase of development we are eager to demonstrate the sites potential. Mapping Across Borders would like the opportunity at some point in the future to show our site to the IDRC staff that made this possible and plan to be in touch as we move forward. Thank you for this opportunity.