# A Free and Open Map of the Entire World: Opportunities for YouthMappers Within the Unusual Partnership Model of OpenStreetMap

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## Abstract

OpenStreetMap (OSM) is a very unusual kind of partnership, not only in the context of the United Nations Sustainable Development Goals (SDGs) but also frankly everywhere. YouthMappers has expanded OSM through localized engagement on a global scale. Examining this unique approach is instructive to learn not only about partnerships (SDG 17) but also about innovation in the open technology industry (SDG 9). We consider this joint journey so far and ponder on how to amplify our collective impact in the future.

## Keywords

Geospatial industry partnerships ·
OpenStreetMap community · Communication
· Innovation · SDGs

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## 1 The Unusual Model of OpenStreetMap

To join the more than 8 million registered users of OpenStreetMap (OSM), there is no agreement to negotiate. Simply start to contribute to the map in your part of the world where you are. The ultimate aim is a clear, shared, and measurable mission to accomplish one thing: Map the entire world in the open. This simple but provocative invitation leaves room for creativity in the technical methodologies of mapping, and particularly in the models for organizing people together to build the map.

That said, getting involved in the OSM "partnership" has many of its own complications. There are almost two decades of implicit understanding increating the map within OSM, and it's not always obvious or transparent what kinds of best practices have been loosely adopted over time. It takes extensive engagement, experimentation, and patience to understand how OSM works in practice. There's no official front door, so for an individual, group, or organization to

enter OSM requires jumping in and participating and building alliances across existing communities.

OpenStreetMap is a community of communities (Hagen 2019), and is not a static thing frozen in time. It adapts and expands. OSM as a whole has a lot to learn from the success of YouthMappers in engaging youth and rapidly expanding across the world. Participation in the project as a whole is still heavily weighted in the advanced economies where it started, and in some ways has saturated awareness in the areas of open-source software and geography. To continue to grow and map an ever-changing world requires expanding engagement.

## 2 The OSM and YouthMappers Journey

Growth is not always easy, and the OSM+YouthMappers journey has seen its pain points. These have centered on different online communication expectations in geographies across the world; the different contexts of learning environments vs. the development of map data in an accessible, production database; the tension of scale of entire groups editing *en masse* relative to the ability of others in the OSM community to monitor quality; and the swirl of global cultures clashing and cooperating.

For students, OSM represents a platform to realize opportunities to do something real and contribute to something that will make a difference right now. This is among the few opportunities to have an impact from within a learning environment. Further, YouthMappers are working right alongside professional humanitarians, university researchers, open-source volunteers, and paid corporate mappers. This innately leads to accelerated learning.

Other approaches to partnership can learn a lot from the OSM approach, as it allows widely divergent interests – from individual enthusiasts mapping their local parks to the largest multilateral institutions working on disaster risk reduction – to collaborate in the same shared database. OSM involves nontraditional partners and addresses power and inclusion in new ways.

YouthMappers demonstrates a decentralized network with open principles and "starfish and spider" approach (Brafman and Beckstrom 2008). We are in a time when the humanitarian and development industry needs a flipped model with locals at the forefront. The opportunity of YouthMappers for OSM – and vice versa – centers on the fact that students are already a part of many local communities and a global network. By taking a more strategic approach to local partnerships from hubs and labs and universities to local NGOs and governments, this alliance could become stronger and have more impact. And, in that impact, we can build OSM together, via sustained leadership while maintaining a youth-led approach. This kind of partnership innovation adds a new way of working and collaborating which can and should modulate traditional modes.

### 2.1 The Origins of OpenStreetMap

OpenStreetMap was started by a student. OSM began in the United Kingdom in 2004 to build freely accessible geographic data where none existed before. Specifically, OSM was a youthful rebellion against the expensive data licensing of the UK national mapping agency, the Ordnance Survey. As a student, Steve Coast wanted to program mapping applications, but could not do so without free to use road network data (Coast 2015). This was difficult to obtain, so he decided to create the map data himself.

Taking advantage of the new availability of consumer-grade GPS devices, decent internet connectivity, and open-source software, OSM was modeled after the contribution model of Wikipedia. It was not the first "wiki map," but was perhaps the first with the audacious goal to create a free and open map of the whole entire world. OSM rapidly gathered adherents among open-source software user groups, frequently hosted by computer science departments of universities. Interest and contribution from many others quickly followed, from artistic communities, startups, and established companies in the mapping industry. The first State of the Map con-

ference was held in 2007 – hosted at a university, no less – and featured talks on everything from commercial mapping for cycling to disaster response, highlighting the growing breadth of applications enabled by open geographic data (The State of the Map 2007).

## 2.2   Expansion of OSM User-Creator Communities

OSM is essentially a platform for anyone who wants to produce or use open data of any kind. No permission is necessary. Although sometimes newcomers experience gatekeeping attitudes or barriers as noted above, as long as data is collected that accurately represents the world, and can be freely shared and attributed, contribution and use are welcome. This has allowed for completely unexpected developments and innovation.

Among the most notable is the Humanitarian OpenStreetMap Team (HOT; See also Chap. 31). Many areas of the world, particularly the most vulnerable to disaster, lack available data at all. A disaster can significantly alter the landscape, so it must be easy to make and distribute updates to the map. OSM was a natural fit in some ways for this need, though a very odd fit organizationally. Disaster response agencies must operate with regimented structure, yet in OSM essentially no one is in charge. HOT began as a community of interest within OSM, and quickly took on the challenge to build partnerships and respectfully negotiate with very different kinds of entities. The 2010 earthquake in Haiti was the first event when the approach of HOT was tested, and the ready availability and quality of OSM made it the base map for the response among humanitarian entities. The Haiti earthquake remains one of the most well-known uses of OSM for real-world collective impact.

## 2.3   A Stage Set for the Emergence of YouthMappers

The devastation in Haiti and the key role of open data caught the attention of even more unusual partners. In Washington DC, the State Department identified an opportunity to support humanitarian response by making satellite imagery available post-disasters to HOT and others through its program, MapGive. The World Bank began work to improve OSM in preparation for future disasters, most notably in Nepal under the OpenCities program where data preparation works greatly helped the response years later after the 2015 earthquake there. The entity that would become the main sponsor of YouthMappers, USAID GeoCenter, had also been working with the OSM community in Haiti as part of recovery efforts there. The people in these institutions involved in these efforts were to some extent already connected in professional settings, but they set out to purposefully connect with each other, as the OSM community was expanding, and began to form a community of their own. At George Washington University, a forward-thinking geography department incorporated OSM mapping for HOT tasks directly into the curriculum. Researchers at West Virginia University were transforming open and acquired geospatial data into decision-ready support for USAID Missions. And since 2003, the scholars who at that time were in residence at Texas Tech had been designing innovative programming to directly engage students in spatial data efforts for sustainable development research at universities with USAID in scores of countries. Together, this group of academics – with varying degrees of engagement to OSM – began to coalesce their ideas formally, directly connecting the learning experience to a real contribution to the world. This fertile ground of open collaboration that had emerged from OSM user-creators contributed to what would become the core design of YouthMappers.

## 3   Present Innovative Patterns of Collaboration

In many ways, YouthMappers as a distributed and youth-led program is a natural fit for the unusual partnership and community model of OpenStreetMap. With "no permission neces-

sary,"YouthMappers aligns with OpenStreetMap's inclusivity, to allow anyone to get involved in their community and their world via a map. Students don't need to ask faculty. Traditionally marginalized communities don't need to ask those who are marginalizing them. Likewise, the experience of the traditional OSM community expanding and encountering new ways "to do OSM" has potential for the OSM movement to more explicitly identify ways to nurture the necessary growth of the mapping community.

In other ways, it is a challenging collaboration to engage relatively inexperienced newcomers within an established community with many implicit cultural practices. Here conflicts can and did arise. Sometimes newcomers experience gatekeeping attitudes, especially toward "remote" volunteers, who sometimes have trouble interpreting satellite imagery of far way terrains. Within OSM there have been naysayers doubting the need for "another" program, because of the historical presence of students within OSM from the very beginning. But this posture lacks understanding of the implicit gap to joining OSM that YouthMappers helps to bridge.

## 3.1 The Innovative Model from Individuals to Groups

While it originally may have been envisioned as a space for individuals to contribute, OSM has emerged as a "community of communities," which align on both local geography and applications of interest (Solís 2017; Brovelli et al. 2020). In addition to purpose, these also can align with personal or social identities, such as in the case of students (Brovelli et al. 2020:600). Universities have an inherent spatial distribution, and students are practiced in forming clubs and interest groups within their schools. While starting a YouthMappers chapter is more formal than starting up a local meetup in OSM, the requirements to form a chapter are minimal: a faculty sponsor and agreement to the terms of participation in the program. The first recom-

mended activity for a chapter is to map their local place on OSM – their campus. Then groups are encouraged to organize around HOT mapping activities on the tasking manager and other YouthMappers organized campaigns.

Collaboration follows this design. YouthMappers is a global network, and groups in very different places will face common challenges as they map their schools, organize events, and engage in global mapping activities. OSM has spread and grown through individual enthusiasm, cooperation, and willingness to help others. OSM is incredibly generous by definition, in that mappers are sharing their time and knowledge to build the map, and by and large that extends working with others around the world. Local OSM communities will share what they have tried, failed, and succeeded at in welcoming new members, growing their community, and figuring out tricky mapping challenges. The fact that a YouthMappers chapter in South Asia can reach out and directly learn both from local mappers outside of their university or from colleagues in South America is a reflection of the core of OpenStreetMap's potential to serve as a learning network spanning the globe.

## 3.2 Disruption as a Component of Innovation

Nevertheless, with a variety of backgrounds and disciplines, time zones, languages, and cultures, opportunities for misunderstanding abound. The communication styles of, say, American and German software developers have so many subtleties of meaning that miscommunication is inevitable. Like many global efforts, English is the primary language of the global OSM community, and those with English as a second or even third language are not able to participate as quickly and fully. Text-based communication lacks the nuance of in-person communication, where a joke can easily be interpreted as an insult. This is the backdrop of so much of the strife on the internet as a whole, and global OSM commu-

nication channels are not immune either. For YouthMappers, the tendency has been to not engage, with the result that the story of YouthMappers within the OSM community is often told by others.

Some of the criticism is fair, even if unfairly delivered. HOT tasks are designed to be completed quickly, by large numbers of people, and not always involving people mapping locally in those places (if there are any at all). This can result in lower quality data that is not consistently reviewed by others with more experience. OSM is a wiki, and a learning journey for all, so it is expected that newcomers may need more help. However, the potential scale of contributes within YouthMappers engagements means that the existing communities' ability to give feedback and help mappers develop skills can be overwhelmed. YouthMappers has worked to address this through training and dedicated validation teams.

Also working against groups like HOT and YouthMappers is the common tendency within OSM to focus on editing problem areas, even when the majority of efforts might be high quality. A similar dynamic with companies employing large teams of editors in OSM led to the adoption of the Organized Editing Guidelines by the OpenStreetMap Foundation, which provide specific instruction on how to make organized efforts visible to, and part of a dialogue with, other mappers (OpenStreetMap Foundation 2018). Ensuring these guidelines are helpful to build healthy relationships between organized efforts and the broader community is a work in progress. There is a need for more genuine investment in the process by companies and HOT, as well as many others in local OSM communities. Guiding rules of partnership are not meant to be an enforcement mechanism, but a means to work together toward a shared goal. In this way, it can be concluded that the emergence of these communities has led to the kinds of innovation for editing that OSM needs as it grows and evolves.

## 3.3   Efforts Off the Map

Organized efforts in OSM have sometimes overwhelmed community efforts away from making the map. For many years, the State of the Map conference has held a scholarship to cover the costs of traveling to and attending. This has opened up participation in the global community to people in parts of the world that would have otherwise struggled to access the conference and enriched the global community through sharing of new perspectives on the craft. Scholars are one of the best parts of the conference, and many excellent YouthMappers have been scholars at the conference. What has been overwhelming is the application process.

Understandably SOTM events are attractive opportunities for many YouthMappers, but in recent years, more than half of the applications have come from students in YouthMappers chapters, and unfortunately, the typical quality of applications is low. That is not necessarily a reflection on the applicants themselves. The process requires writing about their contributions to OSM, and how the conference attendance will benefit their community back home. Without experience and skill in writing for an international audience, an understanding of what the scholarship program is looking for, and a means to self-assess their own likelihood of selection, the result is a large number of applications which recapitulate the texts of the YouthMappers program itself. For the application review team, the work of selecting applicants is that much more arduous.

In response, YouthMappers organizers have since put into place a screening and recommendation process to help reviewers and now offer writing workshops to improve the professional development of students seeking to apply. In this way, the experience of OSM, in turn, is also helping YouthMappers innovate and improve how to support and build the capacity of students off the map, too.

## 3.4   Communication Channels for a Multicultural Movement

The relative lack of explicit partnership guidelines within OSM is a strength and a weakness. There are many expectations embedded in the cultural practice of OSM that are only understood after effort, and a few bruises. While some initiatives like the Organized Editing Guidelines have tried to make more explicit how to engage, the general message of this open community is to jump in, get involved, and do it. Direction given to newcomers may be as little as to "just" post on the mailing list, or edit the wiki.

The YouthMappers chapters have perhaps been confused by this messaging, and some have felt reluctant to get directly involved in the community and communication dynamics chapters sometimes find themselves in. Social participation and partnership are not as straightforward as editing the map. The opportunity to work in the same space as professions is one reason why the YouthMappers network has gone viral, however students often feel intimidated by more experienced people. But it is more than newcomers feeling shy. This hesitation also stems from the fact that there are so many unspoken assumptions implicit in a fast-growing, global, complex community of individuals and groups from countries around the world and different sectors. They may not even realize they are not following convention.

Another concern is that because YouthMappers are far more inclusive in terms of gender, people of color, and people from majoritarian nations than OSM at large represents, the existing community may also not realize the barriers to inclusion. The dynamic makes for a culture of "fear of mailing lists" and "fear of engagement" due to some deep systematic issues, which are not entirely of OSM's doing given the nature of technology communities. There are now working groups within OSM established for grappling with digital, cultural, and diversity and inclusion divides. The OSM culture shifts to tackle safe and healthy communities is ongoing. This groundwork should precipitate a shift to also engage more deeply across the project rather than on separate tracks.

Intentional institutional support is necessary to retain the power of the loose partnership model of OSM, yet bridge the strengths of traditional institutions. This was the early approach of HOT, where members of HOT spent extensive time and energy to build networks and understand the dynamics and structures of the disaster response field, while likewise helping to educate them about how to work with OSM. YouthMappers members have a lot to understand about the history of OSM, how the OSM Foundation functions, what channels various communities use, and what topics are part of age-old debates. Focused training on how to collaborate and partner within OSM, like through the YouthMappers Academy, has been put in place to better prepare YouthMappers to succeed as OSM mappers.

The benefit to OSM from the YouthMappers movement is potentially huge. A framework to understand how to work with the OSM community will be very useful to YouthMappers but also to other newcomers as well. Similarly, making sure the OSM community understands how to engage with one specific community among the many in OSM would help to ensure its continued growth and impact. Perhaps the OSM community is sometimes simply not self-aware of its own dynamics. We understand the OSM community not as a separate thing, but made up of everyone who participates – whether they come as individuals or groups of individuals. A different viewpoint like the one students bring can help this culture develop and grow. And OSM must develop and grow. Indeed, the mission is to map the entire world, and the world is massive and ever-changing. The energy of global youth today, and their investment in OSM as they go into their careers, are clearly essential for OSM to grow in the decades ahead.

## 4    Recommendations for New Innovations Within the OSM + YouthMappers Communities

Considering these ideas, we see a significant opportunity for YouthMappers to shine. Be it civic engagement or global movements - the need for a skilled and impact-driven network remains a challenge, but a necessity. YouthMappers' design as a chapter network represents the epitome of the intersection of "partnerships" and "distributed network" approaches. In the urban civic space, as well as development and humanitarian spaces, the need for more quality data and youth engagement proves to have an impact on achieving the Sustainable Development Goals (SDGs) for nations – but also for organizational goals for the institutions that may be participating in seeking the SDGs. There are a plethora of existing examples of YouthMappers engaging across their civic institutions (city, local and national governments), NGOs/INGOS (HOT, World Bank, UN, etc.), and universities. We hope to continue to see that grow.

Reflecting on all of this trajectory, we emphasize that SDG 17 indicates that partnerships are key to the success of SDGs. It is a marriage of purpose and skill. Having a rich and thoughtful partnership strategy can lay a strong platform and pipeline for YouthMappers to have an impact in their own lives and in their communities. Add to this the benefit of mentorship and future employment to build on the important lessons of civic engagement that OSM brings and that YouthMappers as a peer network tailors to that experience. YouthMappers gain valuable experience in social impact, negotiation, and project management while the suite of OSM partners receive an influx of experienced youth to inspire and support the necessary digital transformation and information management needs of multiple sectors. This in turn sows the seeds for true innovation, which is something that also advances SDG 9.

Still, we believe that more innovation is needed to continue to evolve this unique model with impact, and to effectively address such a dynamic, fast-moving context like OSM. Fortunately, YouthMappers will not need to create a new framework to pursue this innovation, but there are some important lessons learned and recommendations from the perspective of OSM to test and apply. We consider the three most important ones here, starting with a first step that will enable all of them:

### 4.1    Stronger Connections to Civic and Open Communities

In communities around the world, there are open social entrepreneurs, innovation-driving entities, civic technology organizations, hubs, and labs. Alignment in partnership with these groups is already part of some YouthMappers chapters' local engagement. By sharing best practices from civic engagement within the YouthMappers chapter network and building alliances with these networks, especially at local and regional levels, there are endless possibilities to support the local YouthMappers' SDG journeys. A shared mission can build on the lessons from YouthMappers collaborating in universities, and enrich students and these communities in mutually beneficial ways.

### 4.2    OSM Contributions to Locally Defined Priorities of the SDGs

Certainly, YouthMappers is part of the global OSM community. With millions of contributors on every type of geospatial content, the stories and OSM data activities can align with SDGs in every possible way. How this unfolds in each community is clearly unique. While HOT has been doing this often with their work, they might not tackle some of the important non-urgent non-disaster types of community needs like accessibility of buildings, infrastructure

gaps, and climate change issues, that are more long term or even mundane. OSM's working groups, specifically the Local Communities and Chapters Working Group, already have YouthMappers engaged to contribute to this kind of action that can inform any of the SDGs that matter most in a particular local context.

YouthMappers participants and OSM contributors at large can learn much from each other. What if there were an OSM mentor from a "sister city" or their very own city, supporting the YouthMappers OSM journey in more explicit and strategic ways? What if OSM had more YouthMappers supporting working groups and supporting the project's evolution to learn from YouthMappers' lessons? Two such examples are the work of Map Kibera and OSM Philippines. These offer models that could be replicated or adapted to local circumstances, if willing and capable youth leaders could be so directed.

## 4.3    Deeper Links to Corporate Social Impact

Many businesses have expanded their focus to include corporate social responsibility, foundations, and social impact offices and programs. These organizations seek people to mentor and to have a sense of purpose in their communities. By aligning more with global and local businesses on the SDGs, the opportunities for immediate and long-term impact on their lives and the lives within their communities are large.

Recognizing that implementing this recommendation could potentially grow overly complex, and given the fact that YouthMappers students do have university priorities, we recommend a practical starting tactic: align with organizations that have open source program offices or social impact teams. This represents one way to have OSM and YouthMappers adapt together due to shared open values. Businesses are surely keen to mentor YouthMappers chapters thereby helping the network and the individuals on their learning and leadership journeys.

## 5    Looking Ahead

The next stage of partnerships across the OSM community will intersect with YouthMappers everywhere. We should keep an eye on enabling youth to have an impact by building these partnerships themselves. Overall, there are existing network challenges and ample opportunities to shift how YouthMappers might support the SDGs via partnerships. And there remains a need to better engage students within the existing, evolving OSM context while still maintaining a productive, inspiring youth-led space for them to thrive.

A final, overarching recommendation is that YouthMappers (both as a global network and as individual chapters) work to map out a partnership strategy that suits their strategic goals, keeping in mind that fundamental engagement with and through OSM and the OSM Foundation serves both the youth that are mobilized around a free open map of the world and that very free open map community itself. Doing so means that the skills to develop and sustain partnerships must be nourished.

YouthMappers of the future could rise to become a model of "citizenship" in open spaces, while also evolving to support the SDGs in the use of those open spaces. Reciprocally, we hope for members of the OSM community that are not already a part of the youth orbit to embrace this innovation – even this disruption. Work to understand, engage, welcome, and support youth in their local mapping spaces within the incredible, unique movement that is OpenStreetMap.

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