

The Ecosystem Where YouthMappers Live and Thrive

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Abstract

YouthMappers live and thrive in an ecosystem of university chapters, organizers, sponsors, ambassadors, and partners. This system places youth at the center and is designed as an empowering network, which ultimately advances partnerships for the goals, in line with SDG 17. But because we don't just build maps, we build mappers- the result of this ecosystem also expands the capacity for students to advance to decent work and contribute to the economic growth in their careers and of their countries. We present here some of the voices of students, alumni, staff, and partners to describe this enabling ecosystem from their own perspectives.

Keywords

Work and Internships · Partnerships · OSM ecosystem · Youth Economic Development · SDGs



1 The Structure of a Partnership Ecosystem

Partnerships and collaborations are not always the solution to enhance an organization. Sometimes they can be inefficient, logistically complex, and cause more of a burden (Harold 2017; Ostrower 2005). This could especially be the case for a small staff team like YouthMappers. However, when organization leaders focus on the mission and put in place strategic pillars to guide an organization, partnerships can instead lead to impactful rewards. The YouthMappers network does this and has since its ideation design phase in 2014 and its formal creation in 2015, because of our intentional efforts to be student-led and community-based.

1.1 University Chapter Network and Regional Ambassador System

Currently, YouthMappers is not a non-profit organization, a corporation, or a governmental orga-

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nization. Instead, YouthMappers is an international university network. In essence, this means that the individual chapters established on campuses form non-binding ties under a banner of a shared vision, by-laws, and ethics statement (Cowan et al. 2017). The name YouthMappers® is trademarked (USPTO 2017), and digital assets like URLs are secured using this unique handle, which serves as a focus for the identity of our consortium of members, chapters, organizers, sponsors, and partners. YouthMappers has been clearly defined as a community within the “community of communities” that make up OpenStreetMap (Brovelli et al. 2020; Solís 2017). However, the network does not fit neatly only within those boundaries, promoting youth capacity in ways that go beyond the orbit of OSM. We assert that YouthMappers has transformed into a youth movement due to the passion and drive of students (Solís et al. 2020).

Four founding partners have led the network and promoted its growth, and resources to support it since 2015 through a steering committee format. The three founding universities are Texas Tech University, the George Washington University, and West Virginia University. The United States Agency for International Development generously supports this program through a grant from the USAID GeoCenter. Today, a fifth organizing partner is the lead fiscal administrative organization, Arizona State University (Fig. 29.1). Fifteen other official orga-

nizational partners support YouthMappers in various ways that are formalized through memorandums of understanding (MOUs) (Fig. 29.2).

The network has been able to thrive in a grassroots capacity, thanks in no small part to a regional ambassador structure introduced in 2019. There are two types of regional ambassadors: outreach ambassadors and Everywhere She Maps (ESM) ambassadors. The outreach ambassadors provide local support to chapters and recruit new chapters, while the ESM ambassadors focus on building local capacity by and for women mappers. A key component of both types is to support students to be embedded and connected to the local OSM community. While YouthMappers has many formal partnerships, the regional ambassadors cultivate and manage multiple partnerships and connections that offer students opportunities beyond the consortium. Being open and encouraging informal collaborations – with guidance from highly motivated and qualified regional ambassadors – allows the network members to achieve goals that are locally sustainable and more effective than through some traditional means (Wei-Skillern and Marciano 2011).



Fig. 29.1 Co-founding institutions of YouthMappers organize network-wide activities to link YouthMappers chapters around the world



Fig. 29.2 Partners of YouthMappers provide specific support to YouthMappers in alignment with their capacities and missions

1.2 Student, Alumni, and Staff Perspectives

Many YouthMappers students will describe being a part of the network as having friends in 67+ countries (and growing) around the world. Erneste Ntakobangize of Rwanda (2021) shared this sentiment in his blog:

I have seen that when you are connected to YouthMappers, you have the world in your hands. Living in foreign countries is not easy; most of the time, you feel lonely as it takes time to be familiar with the new conditions. Since I joined YouthMappers, I got the opportunity to be connected to many people from different countries ... Nothing is better than having a network of people for whom you have the same feelings and commitments. Currently, I have at least friends in more than 60 countries all over the world. This is a privilege that I couldn't have if I had never joined YouthMappers.

The students, faculty, staff, and professionals who are connected to this movement feel a similarly strong connection across the globe because of their common cause. Innovation and collaboration have flourished for YouthMappers because there is a social and technical infrastructure for an innovative partnership model supporting and encouraging it.

From the perspective of a staff member, Dara Carney-Nedelman, who serves as communications coordinator, one of only three paid core staff:

I'm constantly amazed by the numerous conversations I have with individuals who have informal and formal partnerships with YouthMappers. Some organizations may be concerned about competitors, which limits their network and reach. However, YouthMappers embraces these kinds of collaborations. I recall a virtual meeting with an organization doing similar work in a part of the world YouthMappers is not very

active. Instead of shying away from partnering with this organization, I remember my YouthMappers network colleague focusing on how we could collaborate, seeing this as an opportunity for YouthMappers students. I've seen this mentality of inclusiveness and openness time and again and know that an organization like ours that focuses on achieving its goals in a similar manner will succeed. YouthMappers has given me an opportunity I never expected I would have in an entry-level position, much less reach by 22 years of age. Youth's voices matter here! My ideas and perspective are always respected, which leads to successful teamwork and alliances internally and externally.

The core staff also appreciate the global diversity represented by those who join virtual meetings. We regularly speak with groups where all the representatives are based in different countries and regions of the world. Our favorite virtual calls are always those with the regional ambassadors because there are so many various perspectives and lived experiences that contribute to our conversations.

YouthMappers alumni Candan Eylül Kilsedar (2021) of Turkey and Italy shares this similar sentiment, as one can read from her blog where she wrote,

YouthMappers strives to address these [environmental, social, or economical] challenges through establishing collaborations for the use of and generation of open geospatial data. The collaborations I had helped me understand the peoples of the world and the challenges faced, whether locally or globally, better, thus enabling me to have a more solid ground and understanding in the projects I am involved with ... YouthMappers network has been a facilitator for me in this sense, as it reminds its members that young people have the capacity to make a positive change in the world; they already have what it takes to follow their vision.

Eylül explains well here that YouthMappers' collaborations led to her building skills for her future. There are many more examples from hundreds of blogs written by YouthMappers (Hite et al. 2018). These amount to a strong case of how YouthMappers as a partnership network clearly advances SDG 17. Because of engaging youth in administrative compensated roles of ambassadors and staff, YouthMappers is also building career networks, workforce talent, and capacity that contribute to work and economic development (SDG 8).

1.3 Connective Tissue for YouthMappers

The infrastructure of the network is bolstered by the health of our partnerships, both formal and informal. The network benefits from being largely decentralized, meaning the steering committee and staff members provide structure, leadership, and day-to-day support, but the students ultimately take ownership of the network and drive it forward, being supported regionally by the ambassadors, and locally by their own chapter mentors (See also Chap. 28). The network can have the impact it does because it has been purposely designed to enable students to have the power to shape and lead their chapters beyond anything a centralized organization could accomplish.

The student movement is phenomenal at developing flexible and timely partnerships with a vast array of local, national, and international organizations and government actors. Challenges do occur due to some disadvantages of decentralization. Some of these challenges include difficulties in capturing and recognizing all activities happening across the network, ensuring communications reach every student member (in a context of turnover like graduations), and unintended misunderstandings of YouthMappers' purpose or goals among new participants or supporters. However, the benefits of this enabling design far outweigh these challenges when it comes to the impact of the movement and students' ability to implement their own visions.

2 Components of the Ecosystem: Sponsors and Partners

As noted, YouthMappers organizers also engage with formal partnerships to support the network through MOUs to provide opportunities and resources. It is crucial to highlight that since the partnerships are dynamic, involvement fluctuates over the years. All partners that have collaborated with YouthMappers are not recognized in this book. However, the YouthMappers network is grateful for all partnerships, past and present- and recognizes that without the support of partner organizations accomplishing our motto of “building mappers” would be much more difficult if not impossible.

At the present time, twenty organizations are considered sponsors, organizers, or partners within the YouthMappers network, as follows: Texas Tech University, George Washington University, West Virginia University, The United States Agency for International Development, Arizona State University, the Humanitarian OpenStreetMap Team (HOT), the University Consortium for Geographic Information Science, The American Geographical Society (AGS), Mapillary, TeachOSM, Maxar, Missing Maps, GIS Certification Institute, OSGeo, Radiant Earth Foundation, Esri, MapBox, Hexagon Geospatial, Locana, and Crowd2Map. A few representatives of these organizations shared below their perspectives on partnerships and what that means for advancing the capacity of building mappers, which have the added benefit of growing the capacity of local mapping talent.

In other chapters, we consider the perspective of organizers and funding sponsors. This section focuses on some of the perspectives of other partners from private and nonprofit sectors that inform the mutually beneficial ecosystem that supports YouthMappers to thrive, while building mapping talent that ultimately will also in turn benefit these partners now and in the future (Fig. 29.2).

2.1 The American Geographical Society

Chief Executive Officer John Konarski and Manager of Special Projects Courtney Clark

The American Geographical Society (AGS) is deeply supportive of YouthMappers’ mission. We recognize that the success of YouthMappers and the Everywhere She Maps program is critical to our vision of a world where geographic science and technology are used to address society’s challenges and opportunities. Both YouthMappers and the AGS have a fundamental interest in promoting and supporting geographic thinking, education, and careers, particularly among youth. Like YouthMappers, we invest significantly to enable experiential geographic education among young people. Our approach complements that of YouthMappers – we focus on supporting geography teachers and students at the secondary level, while YouthMappers concentrates on postsecondary education. It is our intention to encourage high school students to consider participating in YouthMappers when they go to college.

Since YouthMappers’ founding, the AGS has been proud to include members of the network in our annual Geography 2050 symposia and other special events we host to advance geographic and geospatial thinking. During our 2021 symposium, “Geography 2050: Towards a More Equitable Future,” we were especially honored to feature YouthMappers’ Everywhere She Maps Regional Ambassadors. These eight rising stars of geography from around the world shared their experiences of using geography to address the Sustainable Development Goals (SDGs), particularly SDG 5: Gender Equality, with our community and helped us more deeply understand barriers to gender equality within our field. YouthMappers helps us remain committed to a more equal discipline and world.

The AGS significantly expanded our partnership with YouthMappers through the addition of a shared staff resource to both our teams in 2021. We joined forces to form a creative resource-

sharing model that enabled YouthMappers to hire a director for its Everywhere She Maps program and us to bring on board a manager for our Geography Educator Initiative.

2.2 Mapillary

Program Manager Edorado Neerhut and Data Analyst Christopher Beddow

Mapillary has had a long history of association with YouthMappers since its early days. During this time, we've been able to collaborate with YouthMappers chapters across the world in places like Bangladesh, Italy, Sierra Leone, Turkey, and Uganda. Much of this work has centered around the role street-level imagery can play as a tool to collect map data. Students have learned how to collect street-level imagery, how computer vision can be applied to derive map data automatically from images, and how to use derived data with OpenStreetMap editing tools and QGIS. Working with YouthMappers has given us the opportunity to connect with future leaders in the geospatial community. YouthMappers have regularly shown us new applications of street-level imagery that opened our eyes to the value it can provide in different contexts.

Mapillary is a critical tool for collecting and analyzing geospatial data using photos. It produces openly licensed data and is integrated with OpenStreetMap, which is the most critical infrastructure for YouthMappers. Having a direct relationship with YouthMappers allows us to think of our product in terms of how it serves the goals of YouthMappers, and helps YouthMappers to have open communications with us about their needs and activities. In the long term, it means we can build excellent tools together that enable the mission of YouthMappers in improving maps and map data around the world.

In terms of successes, we have learned about new applications for street-level imagery such as mapping waste disposal sites, mapping electrical infrastructure, and mapping slums. Also, imagery is now available for the OpenStreetMap

community in new areas that would often get ignored by organizations mapping with strictly commercial incentives. In addition, many of the students we've worked with have developed into prominent leaders in their fields. It has been incredibly satisfying to see some of them undertaking postgraduate studies in places like the United States and Germany, joining local organizations as advocates for open map data, or international organizations such as HOT where they provide important local context to HOT's work. A YouthMappers alumni from Italy and Turkey is now working at Facebook as a critical part of Mapillary's community team. Finally, through our Map2020 project, YouthMappers were able to connect with the global geospatial community at State of the Map 2019 in Heidelberg, Germany.

With respect to some challenges, we see that access to high-speed internet can vary greatly between YouthMappers chapters and even students within the same chapter. As a high bandwidth application, students sometimes had to wait days for their street-level imagery to upload. Their persistence through these challenges was admirable and many worked with local organizations or their university to find ways to upload the imagery as quickly as possible. Similarly, socioeconomic conditions also vary between students. Data collection can involve long journeys and not all students were able to access vehicles easily or afford the fuel required for these trips (See also Chap. 11). Training participants to use Mapillary effectively can take time, since hands-on collaboration and open learning sessions are more effective than just reading instructions in order to ensure the best data quality and understanding of the tools available.

Mapillary's partnership with YouthMappers empowers organization members to use images to document and index what exists on the earth, in a given location at a specific time. This helps to map infrastructure, and allows reference to current and past geospatial data to carry out planning for sustainable future industrialization as well as innovation all based on maintaining or improving upon what exists. The photographic component of Mapillary gives a visual element to geospatial

projects in the sustainable development realm, removing the abstraction between map data and the physical world. The machine learning capabilities of Mapillary help to scale the amount of impact any one person or organization can have, creating map data across the globe from community-contributed images that give a better understanding of infrastructure on the map than any manual data collection can achieve in a limited time period.

2.3 TeachOSM

Organizer Steven Johnson

Our partnership is structurally informal but TeachOSM and YouthMappers complement each other's capabilities and services quite nicely. TeachOSM is founded on the belief that OpenStreetMap makes an excellent educational tool not only for teaching cartography and geography but as an example of applied geography in action. YouthMappers is an example of an organized group applying geography to social needs. Where our organizations have a common cause is in fostering equitable and inclusive leadership across the open mapping community. For our audience of educators, YouthMappers is an organization we can point to as an entrée into open mapping and valuable community service.

Operationally, we find our organizations partnering in and around the educational domain greater than the OpenStreetMap ecosystem. TeachOSM and AGS are active collaborators on programming for educators. TeachOSM has also had YouthMappers members co-facilitate our events, and enlisted them to present open mapping to educators and learners. YouthMappers often uses TeachOSM infrastructure (Tasking Manager) to stage mapping projects. Increasingly, YouthMappers are stepping up to help validate TeachOSM projects, sometimes providing important feedback to educators and learners.

There are three reasons our partnership is important. First, leadership development, as explained above, is enhanced through our com-

mon commitment to making the open mapping community responsive to issues of equity and inclusion. For example, TeachOSM currently has an internship opportunity co-facilitating events. Through this internship, YouthMappers support young mappers through technical support (i.e. validation), and by co-facilitating TeachOSM events (i.e. Map-Alongs).

Second, in terms of spatial citizenship, both YouthMappers and TeachOSM are citizen science projects writ large. Also, both of our organizations are developing organizational capacity and social capital. In that sense, the work of both TeachOSM and YouthMappers is implicitly promoting mapping as an act of spatial citizenship. Both of our organizations orient our contributors around an ethical framework for the use of mapping technologies, such as protecting individual privacy, while sharing public information. Both YouthMappers and TeachOSM educate our contributors how to map, and by extension, the reflexive use of geospatial technologies. Combined, our organizational activities draw a line between mapping, social benefits, and engagement as global citizens.

Third, regarding map maintenance and community management, OpenStreetMap is not only a large map but a large community and operational ecosystem. Both YouthMappers and TeachOSM are addressing the need to fill the pipeline with new mappers and new contributors. Not just to edit the map, but also to manage and administer the operating infrastructure of the project. The next generation will be responsible for maintaining the world's only publicly available open geographic data set, which is an incredibly valuable public resource.

At least two emerging successes of the TeachOSM-YouthMappers partnership are worth noting. First, validation of TeachOSM projects is important where YouthMappers are increasingly lending support to new mappers by validating TeachOSM projects. Contributors to these projects are frequently drawn from educators, and many of them find it encouraging to get a message that their work has been checked. Moreover, some YouthMappers validators provide valuable feedback to new mappers, encouraging them and helping retain mappers.

Secondly, several YouthMappers have co-facilitated a TeachOSM “Map-Along,” our weekly open mapping program for educators. Like validation, having practitioners map with them and demonstrate why mapping is important is an invaluable experience for educators. (Bear in mind, many educators have had minimal formal training in geography.) Also, the Map-Along events offer YouthMappers an opportunity to lead events and showcase their geographic talents and abilities.

Our partnership probably best addresses SDG17.7 and SDG17.9, relating to diffusion of technology and capacity-building. Both YouthMappers and TeachOSM fill a void by making mapping accessible and available. TeachOSM addresses this void through education and YouthMappers through 300+ chapters who are contributing data and developing organizational and community infrastructure. Through open-source methods we foster a broad cadre of spatially-informed citizens among teachers and their students, who connect applied learning to social issues.

2.4 Locana

Senior Consultant Chad Blevins

Partnering with YouthMappers is important as we share interest of promoting open-source geospatial data and software. We have a shared interest in creating, maintaining, and utilizing high-quality geospatial data. This partnership also exposes students to professional projects and provides a chance for them to discover potential job opportunities. For example, Locana has been supporting the OSM community for over a decade and has worked on several projects where background knowledge about OSM is essential.

Locana and YouthMappers signed an MOU in September 2020 which was right in the middle of the COVID-19 pandemic which inhibited many new opportunities from taking place. That said, Locana was able to partner with YouthMappers stu-

dents and alumni over the past year to create data in support of municipal waste mapping projects under our wastesites.io campaign (See also Chap. 20). We worked together with YouthMappers from Zambia, Kenya, and the USA to pilot projects and develop concepts to educate and improve waste management on a local scale.

In addition, Locana has subcontracted with YouthMappers alumni as local data experts in projects taking place in developing countries. Locana’s goal is to create and provide more opportunities for YouthMappers students and alumni throughout the world.

Locana believes youth are an invaluable resource in helping countries achieve their development objectives and we consider the UN’s Sustainable Development Goals (SDGs) in our management processes and when selecting and delivering projects. Our projects integrate environmental, social, and governance considerations as we seek to work with environmentally and socially conscious clients who share the same beliefs as us.

2.5 Mapbox

Community Team Lead Mikel Maron

Our partnership with YouthMappers has had good notes of engagement, and we look forward to strengthening our relationship for the partnership to reach its full potential. In 2016, Mapbox team members assisted with mapping in a collaboration between YouthMappers and USAID to create data on OpenStreetMap for the benefit of the President’s Malaria Initiative. We also lent our expertise by evaluating imagery and validating data for a YouthMappers project in Kenya. We were pleased to host the YouthMappers Research Fellows for a session at our DC office in 2018. During the session, we introduced the fellows to Mapbox and how our services and tools are used in disaster response and resilience projects, and we also provided hands-on training in Mapbox studio. Mapbox has also provided

YouthMappers with some support in using our products and donates the cost of hosting maps on the YouthMappers website.

We are ready to engage in a closer mentorship relationship with YouthMappers' Research Fellows and other implementers, and we would like to provide support related to the data the fellows collect and analyze. Our team members have a lot of experience developing data-driven projects that have an impact, and we would like to support a greater variety and kinds of training and experience. We highly value our partnership with YouthMappers, because it's an unparalleled opportunity in the mapping space to have the kind of engagement with young people that YouthMappers has created. It's exciting to see YouthMappers students directly involved in mapping for their local causes, community, and regions. After they graduate, many YouthMappers students will set forth in a professional career related to geography, and it's the purpose of the Community Team at Mapbox to make long-term investments in the mapping space – which includes supporting the next generation of mapping professionals.

3 Partners Ecosystem for the Implementation of SDGs 17 and 8

YouthMappers, as a student-led chapter-based university network, capitalizes on a unique position and creates meaningful partnerships to further support the role of cross-sectoral implementation. The network leverages collaborations to invest in student initiatives, which has resulted in the creation of a movement of Digital Humanitarians within this academic space (Solís et al. 2020). “Universities are uniquely placed to lead the cross-sectoral implementation of the SDGs, providing an invaluable source of expertise in research and education on all sectors of the SDGs, in addition to being widely considered as neutral and influential players,” according to El-Jardali et al. (2018).

The university center of partnerships itself thus advances SDG 17 directly. But as we have demonstrated, these connections to private and nonprofit sectors also serve to advance SDG 8 in terms of enabling the knowledge talent and capacity for economic development across all goals. A tangible instance of our student investment includes the internship programming, such as the match program through Everywhere She Maps, focused in increasing gender equity in the network and providing professional development and career opportunities to women and nonbinary YouthMappers students. The program pairs qualified YouthMappers students with partner organizations, who host the students as interns. The students gain invaluable professional experience and build their networks, while the host organizations benefit from the students' expertise, time, and energy. For example, YouthMappers' partner Crowd2Map Tanzania, which mobilizes volunteers to add key areas of Tanzania to OSM to assist with female genital mutilation (FGM) prevention and response efforts, hosted nine women YouthMappers students from across Africa as interns in 2021. The interns improved their mapping skills as they learned how to validate edits made to OpenStreetMap and implement data quality control measures, and they learned about the issue of FGM and the role of geographic data in preventing and responding to its instances. Crowd2Map Tanzania, benefited from the interns' consistent, dedicated efforts to improve the quality of its data.

The internship match program certainly faces challenges. For many of our partners, the prospect of starting an internship program or expanding an existing one is prohibitively expensive. While we aim to continue finding internship opportunities for YouthMappers students, we are also working with our partners to create additional professional development programs focused on mentorship and skill building. These activities align with SDG 8 because through them, we are focusing on workforce development, not just building maps, but also building mappers.

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