

State of the Map 2022 in Florence Italy

# YouthMappers: A Hybrid Movement Design for the OpenStreetMap Community of Communities

**Patricia Solís, PhD**

Director and CoFounder, YouthMappers

Executive Director, Knowledge Exchange for Resilience

Associate Research Professor, School of Geographical Sciences and Urban Planning

Senior Global Futures Scholar, Global Futures Laboratory, Arizona State University





# Premises

- More study needed on cultural and organizational aspects of spatial data production and use in OSM
- OpenStreetMap is a community of communities (Solís 2016; Brovelli et al. 2019)
- YouthMappers lends itself as an interesting design framework (hybrid) and set of experiences (movement-like) to provide insights on some cultural and organizational aspects of open mapping



# Knowledge & Implications

Who are YouthMappers? What do they do? How do they map? How do YouthMappers navigate different aims within different spaces of action?

- Brief design case (hybrid)
- Overall performance (movement)
- **Consider 3 hypotheses** (myths?)

- What do these characteristics mean for OSM broadly?
- What lessons does this provide for higher education globally?
- What insight does this offer for other communities within the OSM ecosystem?



# Knowledge

Who are YouthMappers? What do they do? How do they map? How do YouthMappers navigate different aims within different spaces of action?

- Brief design case (hybrid)
- Overall performance (movement)
- **Consider 3 hypotheses** (myths?)





# OpenStreetMap Community

“community of communities”



concept  
**2014**

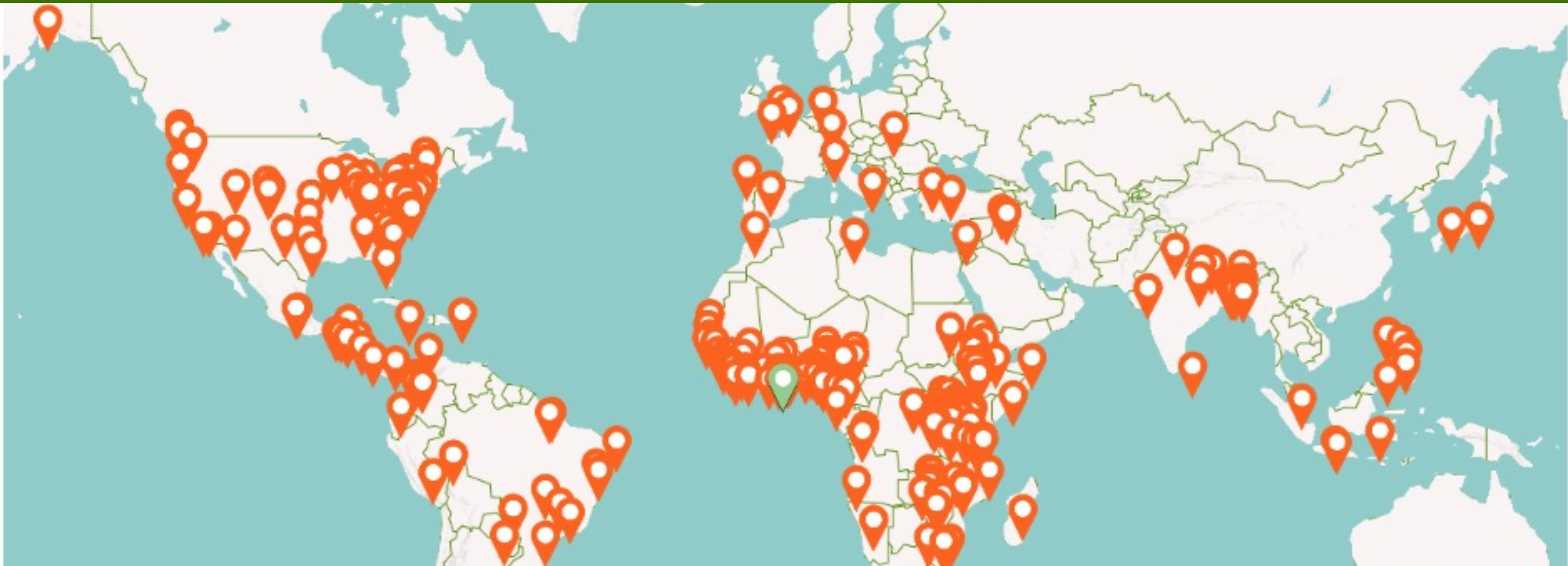
launched  
**2015**





Global consortium of student-led  
faculty-mentored campus-based  
chapters creating and using open  
maps for humanitarian and  
development action

**~5,000** students on **324** university campuses in **67** countries







**79%**  
majoritarian  
nations

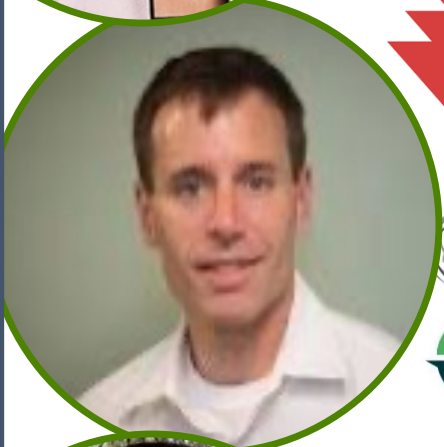
**45%**  
women



# Regional Ambassadors: leaders helping the community grow and thrive

**40**  
ambassadors





**USAID**  
FROM THE AMERICAN PEOPLE

**ASU** Arizona State University



TEXAS TECH UNIVERSITY

THE GEORGE WASHINGTON UNIVERSITY  
WASHINGTON, DC

**WV** West Virginia University



**Mapillary**



**MISSING  
MAPS**

**MAXAR**  
TECHNOLOGIES



MEDECINS  
SANS FRONTIERES



**GFDRR**  
Global Facility for Disaster Reduction and Recovery



**OSGeo**



**mapbox**

Teach**OSM**  
a program of OpenStreetMap US



**esri**



**NSF**



CRUZ VERMELHA DE MOÇAMBIQUE  
CVM



**CROWD2MAP  
TANZANIA**  
Putting rural  
Tanzania on the map  
crowd2map.org



GIS Certification Institute  
**GISP**



**MAP GIVE**



**Radiant Earth  
Foundation**  
EARTH IMAGERY FOR IMPACT



**German  
Red  
Cross**



University  
Consortium for  
**GEOGRAPHIC  
INFORMATION SCIENCE**



**The  
National  
Map**

Your Source for Topographic Information



**MapSwipe**



**Microsoft**



**HEXAGON**



**CRITIGEN**



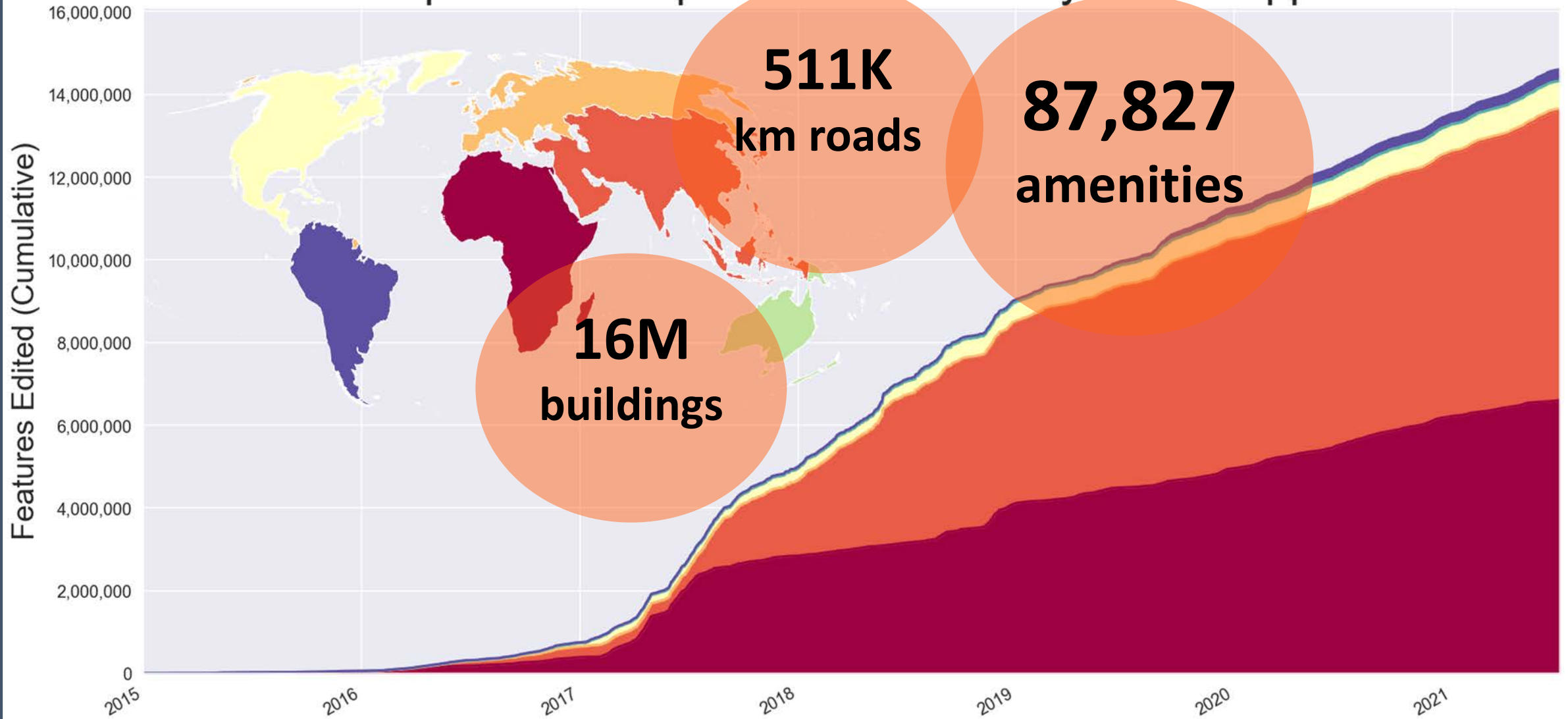
**American  
Red Cross**







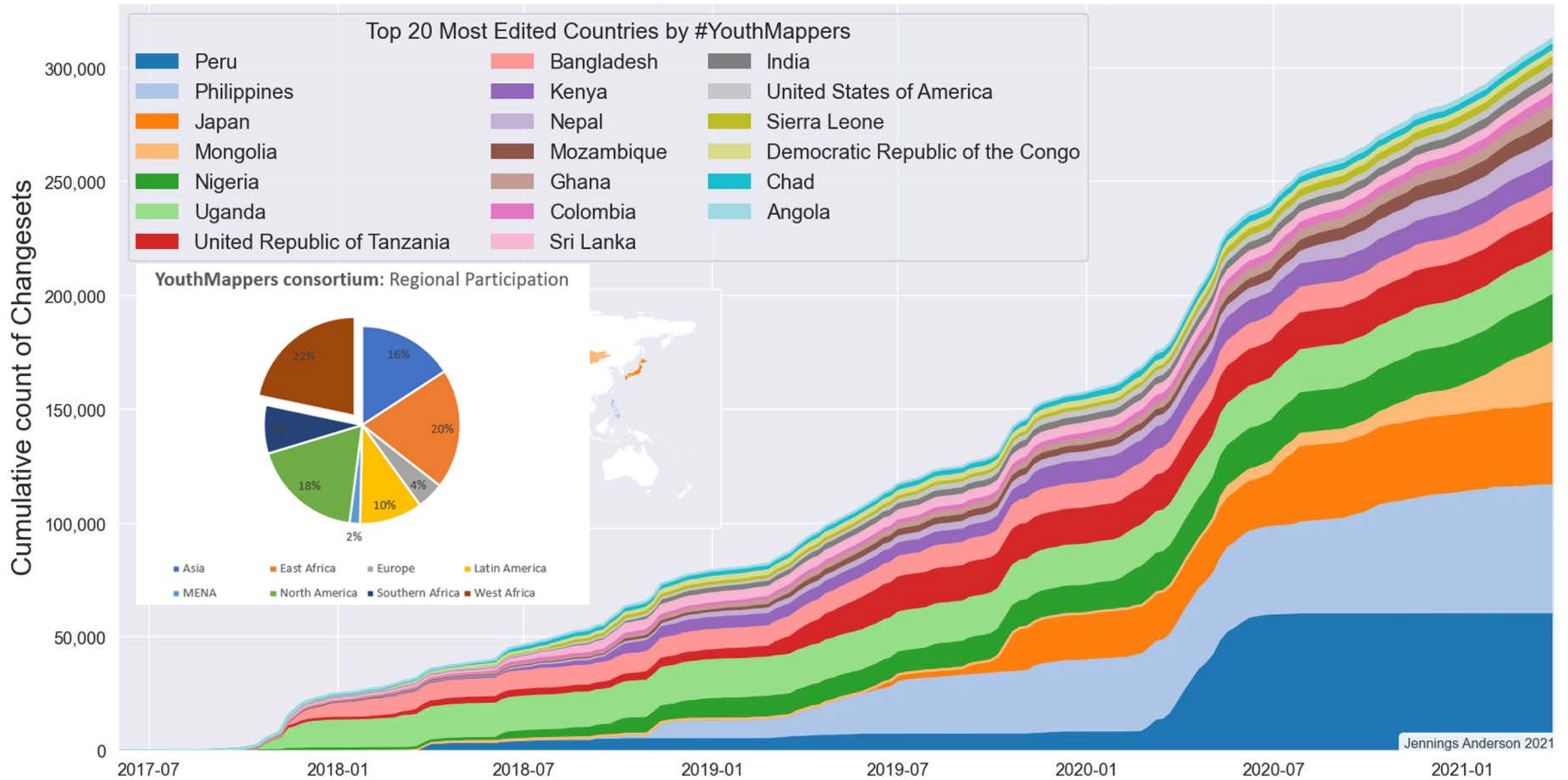
## All OpenStreetMap Features Edited by YouthMappers



Credit: Jennings Anderson for YouthMappers © 2021



## Total Changesets over time with #YouthMappers



Credit: Jennings Anderson for YouthMappers © 2021

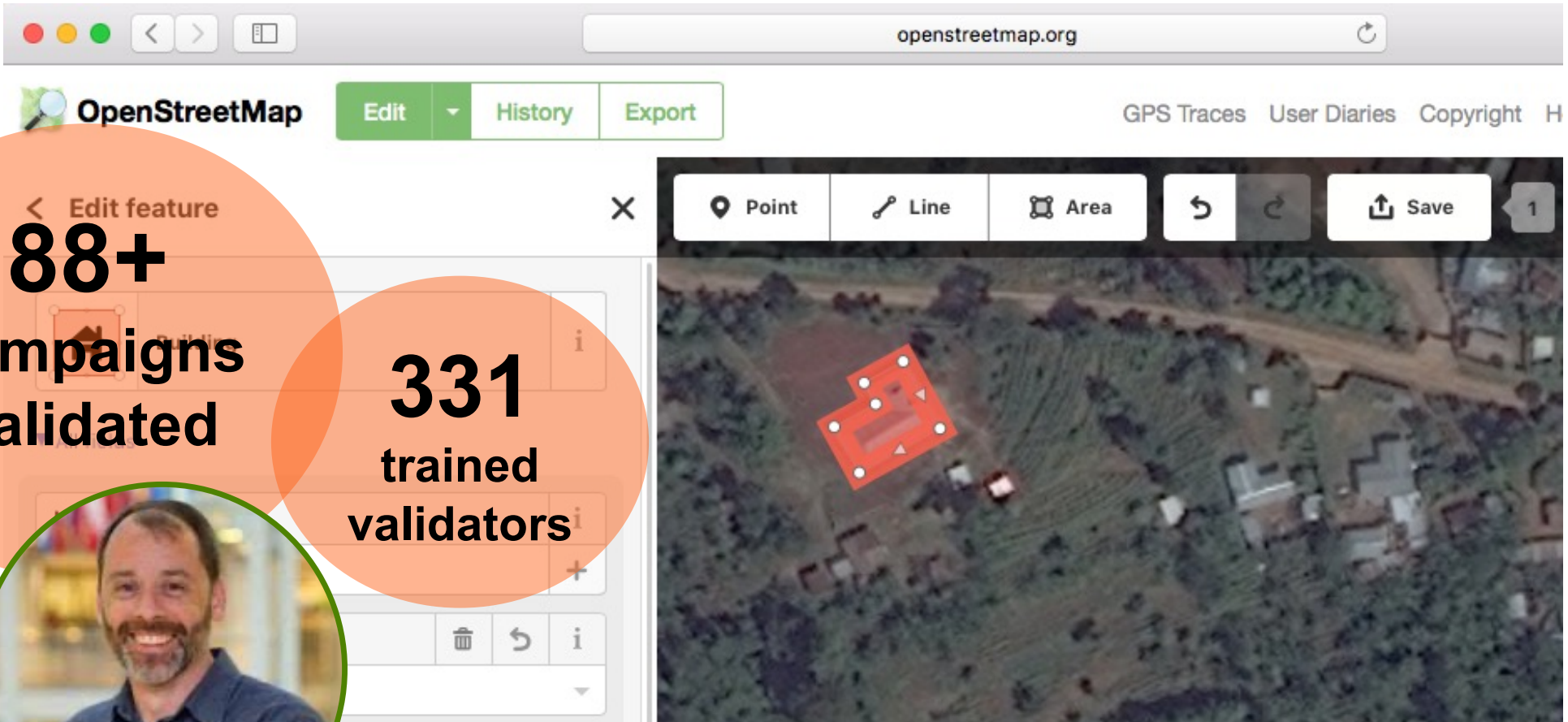








# Digitizing Features like buildings and roads, adding **Attributes** like labels and addresses, coordinating **Validation**



**88+**  
campaigns  
validated

**331**  
trained  
validators





# YouthMappers Academy



**399**  
badges  
awarded

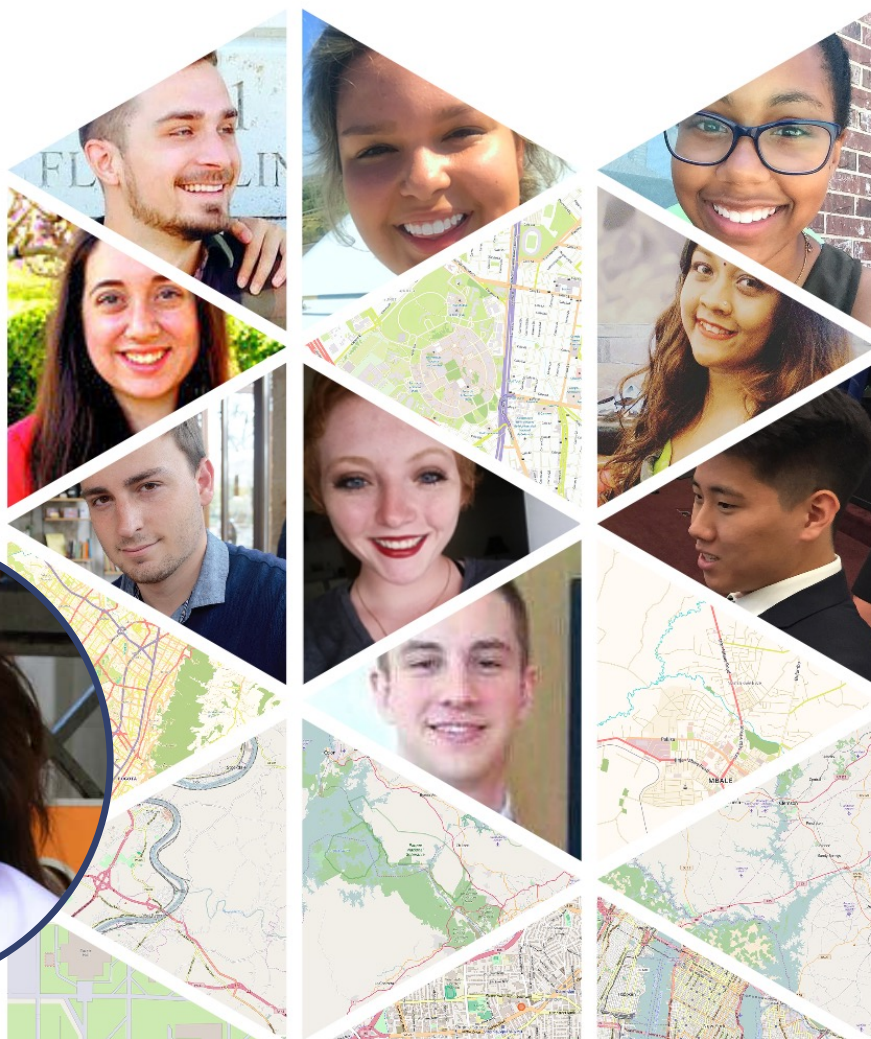
**20**  
geospatial  
competencies

**12**  
courses  
offered





# Communications & Recognition



365  
blogs

57  
webinars

7,314  
followers



## Not taking data for granted

September 16, 2016 | Taylor Zevanove, Douglas Ssebagala, and Paul Uthol



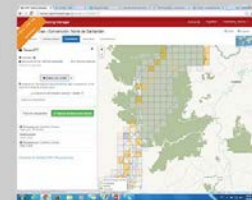
On July 25th Uganda's Humanitarian OpenStreetMap team and YouthMappers in Uganda completed a week-long pre-assessment trip in Karamoja. The effort mobilized local youth to gather much needed data on the under-mapped region of Karamoja. Despite a high concentration of...

[Read More](#)

## In Colombia, students win and the country wins

September 2, 2016 | Patricia Solis and Humberto Yances

Three dozen students across five universities in Colombia joined forces to map tertiary roads in their country. It was a friendly competition, where winning teams received mapping tools and the top two mappers earned a trip to a project site for more training in...



[Read More](#)

## Far beyond the textbooks

September 1, 2016 | Halle Miller



The world is not as big as I once thought it was. What is officially known as the distance decay effect, has made Africa right around the corner from my High School in Plano Texas. This phenomenon can be credited to the widespread innovation of open GIS software, and t...

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Let us know what you'd like to hear about in our next article to be a

### Recent Posts



Not taking data for granted  
September 16, 2016



TeachOSM supports student trainers in Ghana  
September 15, 2016



Mapping is Like a Box of Chocolates  
September 9, 2016



In Colombia, students win and the country wins  
September 2, 2016



Far beyond the textbooks  
September 1, 2016



5 Tips for Creating a Successful YouthMappers Team  
August 25, 2016



User Friendly Mapping and Friendly Mapping Chapters



A Map is Worth More than a Thousand Words  
August 14, 2016



What would a world without open source collaboration be like?  
August 5, 2016



Opening up to Open Source Mapping  
August 3, 2016

### Archive

September 2016 (5)

August 2016 (5)

July 2016 (4)

June 2016 (4)

May 2016 (1)



# Virtual Internships



10,080  
hours



**USAID**  
FROM THE AMERICAN PEOPLE

**GEOCENTER**





# Everywhere She Maps



**SECURITY  
IMPROVES**

[Read More](#)

**LIVES ARE  
SAVED**

[Read More](#)

**POWER IS  
GENERATED**

[Read More](#)

**PROSPERITY  
RISES**

[Read More](#)

**INNOVATION  
HAPPENS**

[Read More](#)

**15  
Interns  
hired**

**44**  
**chapters  
majority  
female**





# Research & Fieldwork Grants



**13**  
fieldwork  
grants



**16**  
students

**15**  
mentors

**Disaster Preparedness, Food Security, Refugee Settlements,  
Illegal Mining, Flooding Mitigation, Disease Prevention**





# Leadership Fellowships



118  
fellows

**SPRINGER NATURE**



**youth mappers**

Open Mapping towards SDGs:  
Voices of YouthMappers on  
Community Engaged Scholarship



Edited by Patricia Solis and Marcela Zeballos

**68**

**co-authors**

**25**

**countries**





# Mapping with our communities







# Mapping with our communities





we don't  
just build  
maps.

we build  
**mappers.**

# youth mappers



**Table 18.1** Dimensions of characterizing OpenStreetMap as a community of communities

Sector-based categories	Modality of engagement	Social-based categories
Nonprofit/civil society <ul style="list-style-type: none"> <li>• Humanitarian Sector (e.g., International Federation of Red Cross/Red Crescent)</li> <li>• Local nonprofit entities</li> </ul> Education/Academic Sector <ul style="list-style-type: none"> <li>• K-12 teachers</li> <li>• University students/faculty</li> </ul> Government/Public Sector <ul style="list-style-type: none"> <li>• Local municipalities (e.g., World Bank's Open Cities)</li> <li>• State /Regional governance (e.g., Transport planning entities)</li> <li>• National agencies</li> <li>• Multinational (e.g., World Bank's Open Cities)</li> </ul> Private Industry/For-Profit or Commercial Sector <sup>a</sup> <ul style="list-style-type: none"> <li>• Information Technology and Services</li> <li>• Computer/GIS Software (e.g., MapBox,</li> <li>• Internet Companies (including Social Media)</li> <li>• Use-Driven (e.g., Restaurants, Construction, Retail, Health Care)</li> </ul>	Data contributors <ul style="list-style-type: none"> <li>• Local mapping (e.g., Craftmappers)</li> <li>• Local and remote (e.g., YouthMappers)</li> <li>• Remote mapping</li> <li>• Dataset uploading (e.g., road networks)</li> </ul> Providers of Map-based Services or Value Added to OSM <sup>b</sup> <ul style="list-style-type: none"> <li>• General (e.g., Geofabrik, OpenTopoMap)</li> <li>• Functional Providers               <ul style="list-style-type: none"> <li>– <i>Edit/Compare</i> (e.g., <i>OSMCompare</i>)</li> <li>– <i>Live/real-time edits</i> (e.g., <i>Show me the way</i>)</li> <li>– <i>Quality Assurance</i> (e.g., <i>Keep Right, Osmose</i>)</li> <li>– <i>Export</i> (e.g., <i>Walking Papers, Field Papers</i>)</li> <li>– <i>3D Rendering</i> (e.g., <i>OSM Buildings</i>)</li> <li>– <i>Routing</i> (e.g., <i>OpenTripPlanner</i>)</li> <li>– <i>Interaction</i> (e.g., <i>Wikipedia overlay</i>)</li> <li>– <i>Services</i> (e.g., <i>OSMNames, OSM Landuse, OpenFireMap</i>)</li> </ul> </li> <li>• Thematic Providers               <ul style="list-style-type: none"> <li>– <i>Biking, geocaching, hiking, sport</i></li> <li>– <i>Art, history, archaeology, monuments</i></li> <li>– <i>Public Transport</i></li> <li>– <i>Other</i></li> </ul> </li> <li>• Educational (e.g., TeachOSM, LearnOSM)</li> </ul> Consumers <sup>c</sup> <ul style="list-style-type: none"> <li>• As Base Maps (e.g., Facebook, Wikipedia, Weather.com, Snapchat)</li> <li>• As Data (e.g., Pokémon Go)</li> <li>• As Media (e.g., films and TV) <sup>d</sup></li> </ul>	<b>Purpose-driven</b> (e.g., Humanitarian OpenStreetMap Team) <b>Identity-focused</b> (e.g., GeoChicas) <b>Place-based</b> (e.g., Tanzania Development Trust)

Huadong Guo  
Michael F. Goodchild  
Alessandro Annoni *Editors*

# Manual of Digital Earth

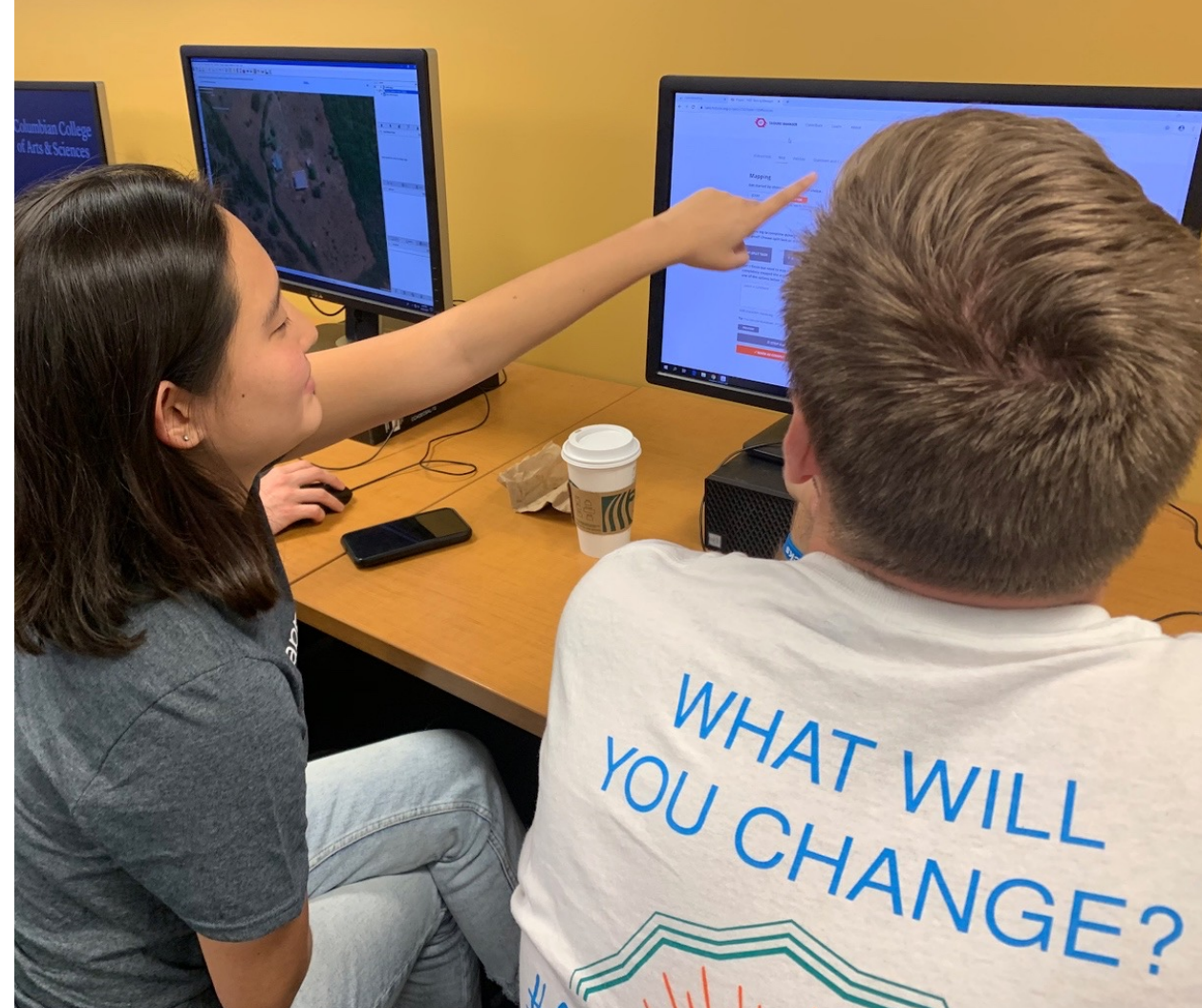
Brovelli, Maria Antonia, Marisa Ponte, Sven Shade, and Patricia Solís. 2019. Citizen Science in Support of Digital Earth. In *Manual of Digital Earth*, International Society for Digital Earth. Springer, Singapore, pp. 593-622.



# Within a Context of Higher Education

Academia has spent 21<sup>st</sup> Century re-evaluating itself as place for learning within global economic realities

- Embrace redefinition (AACU, 2007; Care et al. 2018; Trilling & Fadel, 2012; NAS, 2006)
- Skepticism of meeting contradictory aims (UNESCO, 2015)
- Rejection of underlying ideology (Baltodano, 2012)





# Changes within Higher Education

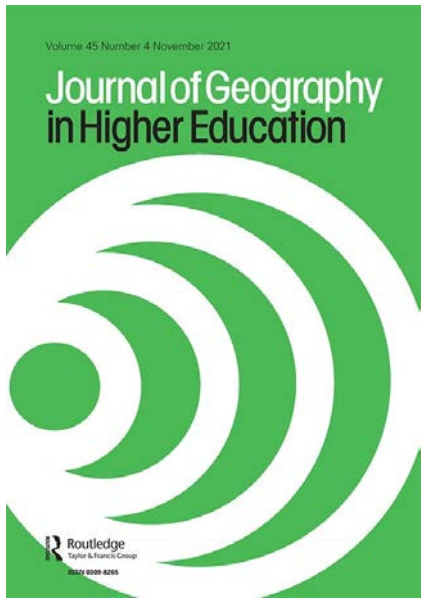
## Relevant institutional transformations (Solís et al., 2021)

- Rethink objectives, pedagogy, assessment (Dede 2007) to promote neither a “process-free content nor a content-devoid process,” frameworks to authentically generate knowledge-based “understandings” where skills are learned through “performance”
- Heaney and Rojas (2014) note emergence of multiscalar, hybrid organizations that span intersectional identities at individual and collective scales
- Soja (1996) defines “third space” as a “way of understanding and acting to change the spatiality of human life” to encompass dualisms
- Soja (1996) also synthesizes contributions from post-colonial majoritarian scholars like Said and Bhabha to eschew “digital colonialism” (McCusker 2022)
- ... resonates with motto to “**define our world by mapping it**”



# Digital humanitarians for the Sustainable Development Goals: YouthMappers as a hybrid movement

Patricia Solís , Sushil Rajagopalan , Lily Villa , Maliha Binte Mohiuddin , Ebenezer Boateng , Stellamaris Wavamunno Nakacwa & María Fernanda Peña Valencia

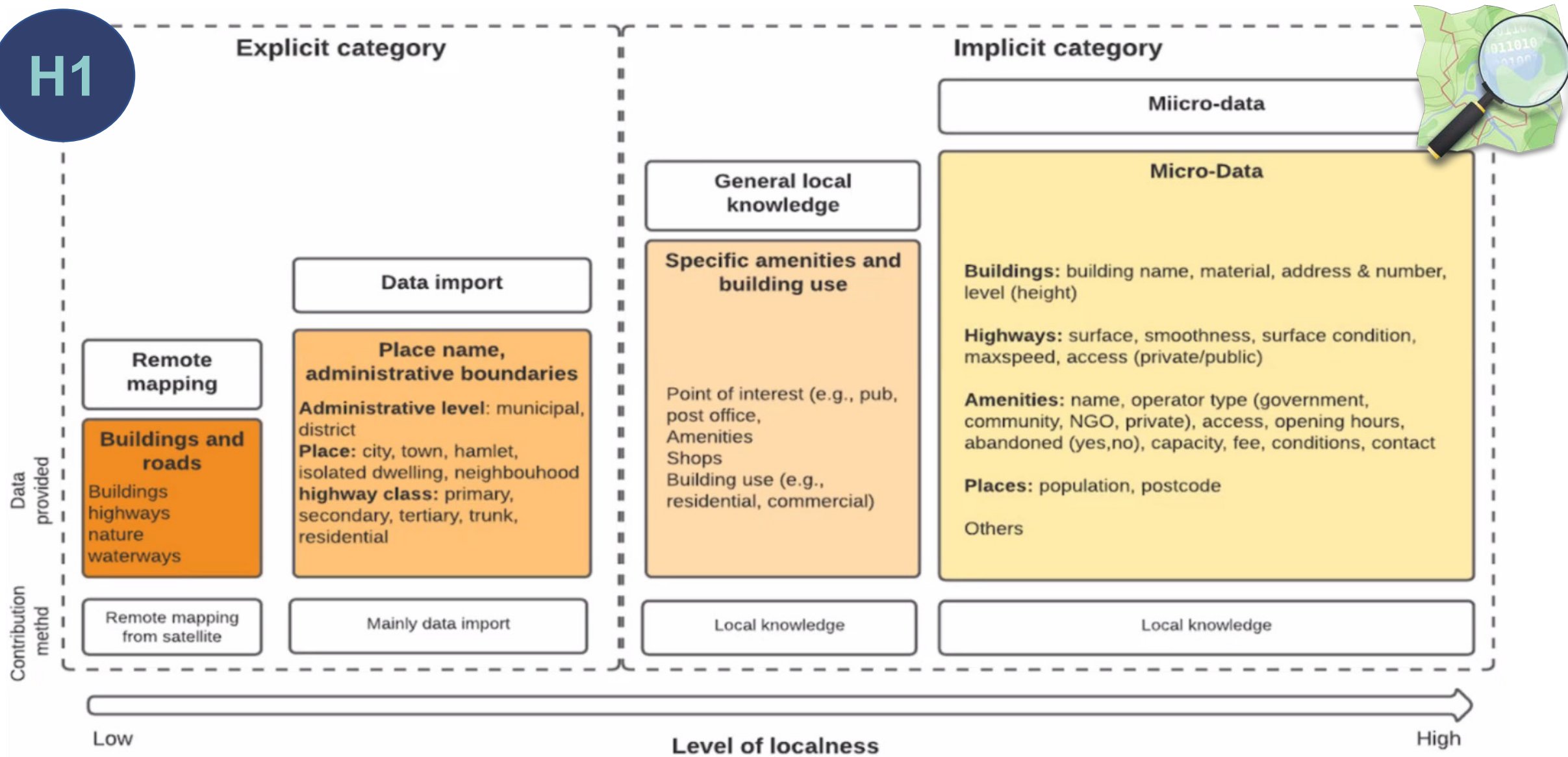




# Hypotheses testing (mythbusting?)

- **H1: (Action-of-Performance)** Participating youth either map only locally or remotely, but not both
- **H2: (Hybrid-Roles)** Participating youth cannot simultaneously pursue personal aims to prepare themselves for the workforce and to express their identities as global citizens
- **H3: (Movement-Minded)** Participating youth cannot articulate the impacts/benefits of actions undertaken for broader communities or society through their work with OSM, nor identify the roles/contributions of youth action in this work for the common good.





Source: Owusu, Herfort, & Lautenbach, 2021

H1

# Remote (explicit) and Local (implicit) mapping



H1

**(Action-of-Performance) Participating youth either map only locally or remotely, but not both**

**Percentage of In Country to All Edits**

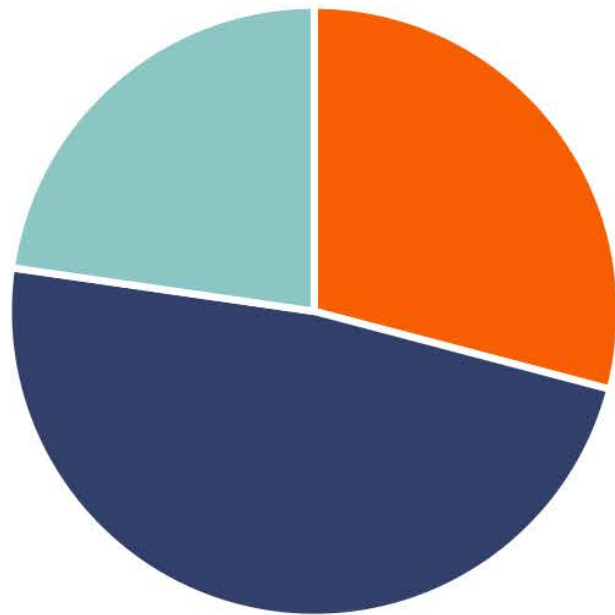


*n* = 1,866



# (Action-of-Performance) Participating youth either map only locally or remotely, but not both

Number of Mappers by Tendency to Edit



■ All Local ■ Mix ■ All Remote

Edit Output of Mappers by Tendency

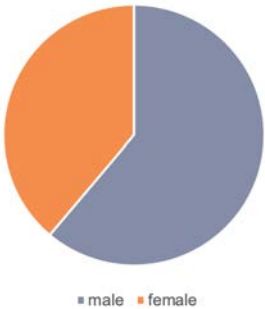




H1

(Action-of-Performance) Participating youth either map only locally or remotely, but not both

Estimated Participation, by Gender



Percent of Edits that are In-Country relative to total Edits, by gender category, by feature

				All Gender Known	Difference (M-F)	Total YouthMappers OSM Username Dataset
N	Female n=200	Male n=297	Outliers* n=8	n=505		n=766
Buildings	65.64%	52.55%	67.18%	55.13%	-13.09%	60.40%
Highways	44.90%	58.05%	61.26%	54.76%	13.15%	56.60%
Amenities	92.00%	91.06%	92.64%	91.23%	-0.94%	94.90%
All Features	69.62%	54.03%	67.95%	57.56%	-15.59%	61.90%

\* z-score above 3.0, effectively edits >250K

## H2

# (Hybrid-Roles) Participating youth cannot simultaneously prepare themselves for the workforce and express their identities as global citizens

**Table 8.** Frequency of Affective Utterances by Individual and Group in YouthMappers Blogs by Gender.

Locus of Positive Affect	All Blogs (N = 82)		
	Females	Males	Did not Provide
	(N = 137)	(N = 133)	(N = 32)
Individual	40 (29%)	37 (28%)	3 (9%)
Group	97 (71%)	96 (72%)	29 (91%)



**Table 9.** Frequency of Affective Utterances by Individual and Group in YouthMappers Blogs by Region.

Locus of Positive Affect	United States <sup>a</sup> (N = 26)	International (N = 56)		
		African	Asian	South American
	(N = 80)	(N = 139)	(N = 57)	(N = 20)
Individual	22 (27.5%)	32 (23%)	19 (33%)	7 (35%)
Group	58 (72.5%)	107 (77%)	38 (67%)	13 (65%)

<sup>a</sup> The one European student was added to the United States data set.

## H2

# (Hybrid-Roles) Participating youth cannot simultaneously prepare themselves for the workforce and express their identities as global citizens

**Table 1.** Likert-scaled responses to self-reflection statements, all and by gender.

Statement	All respondents (N = 205)	Female (n = 64)	Male (n = 141)	Difference of Means by Gender	t-test
Being a good citizen	3.68 (.58) 96.09%	3.71 (.49) 98.42%	3.66 (.62) 94.78%	.05	.59
Social responsibility; giving back	3.71 (.53) 97.55%	3.79 (.45) 98.41%	3.67 (.56) 97.16%	.12	1.73
Finding a well-paying job	3.25 (.74) 84.65%	3.24 (.82) 82.26%	3.25 (.73) 85.71%	-.01	-.07
Finding a rewarding job	3.42 (.71) 90.10%	3.44 (.67) 90.17%	3.01 (.73) 90.07%	.33	.35
Living a well-rounded, happy life	3.65 (.58) 95.57%	3.63 (.52) 98.39%	3.65 (.61) 94.33%	-.02	-.26

**Mean Score** (standard deviation); *Percentage of respondents rating extremely or very important*

Responses are 4 = extremely important, 3 = very important, 2 = somewhat important, 1 = not important.

\* $p < 0.05$

\*\* $p < 0.01$



## H2

# (Hybrid-Roles) Participating youth cannot simultaneously prepare themselves for the workforce and express their identities as global citizens

**Table 2.** Likert-scaled responses to self-reflection statements, by region.

Statement	Global South (n = 185)	Global North (n = 20)	Mean difference	t-test
Being a good citizen	3.72 (.51)	3.29 (.96)	.43	2.04
Social responsibility; giving back	3.72 (.48)	3.52 (.56)	.20	1.10
Finding a well-paying job	3.23 (.75)	3.29 (.85)	-.05	-.27
<b>Finding a rewarding job</b>	3.38 (.71)	3.71 (.64)	-.33	-2.07*
Living a well-rounded, happy life	3.63 (.59)	3.71 (.56)	-.08	-.60

Responses are 4 = extremely important, 3 = very important, 2 = somewhat important, 1 = not important.

\* $p < 0.05$

\*\* $p < 0.01$



Students doing these YouthMappers activities say they were able, as a direct result of their chapter participation, to:



Attend a national or international conference

Serve in an unpaid internship

Receive a paid internship

Obtain a job offer

MALE	FEMALE	ACTIVITIES ▼	Attend a national or international conference	Serve in an unpaid internship	Receive a paid internship	Obtain a job offer
83%	80%	Attended or organized a Mapathon	46%	13%	24%	5%
78%	88%	Received training	47%	17%	20%	6%
28%	27%	Initiated a local chapter-led project	47%	18%	23%	5%
70%	48%	Conducted field mapping	48%	17%	26%	6%
55%	53%	Recruited new members to their chapter or for a new chapter	50%	16%	22%	5%
59%	30%	Taught local community members how to use open mapping	48%	15%	25%	8%
18%	16%	Took college curriculum with humanitarian mapping	51%	11%	26%	9%
17%	9%	Completed a formal university course dedicated to humanitarian mapping	55%	6%	29%	13%
33%	28%	Conducted online exchange with another chapter	53%	14%	24%	10%
28%	17%	Performed outreach to local secondary, middle or primary schools	57%	11%	21%	4%
57%	55%	Served as an officer or leader of their local YouthMappers chapter	51%	14%	26%	6%
28%	23%	Participated in an in-person exchange with another chapter	63%	20%	29%	8%
14%	13%	Served as a mapping Intern	63%	29%	25%	11%
23%	31%	Received a YouthMappers Leadership or Research Fellowship	76%	16%	30%	4%



### H3

## (Movement-Minded) Participating youth cannot articulate the impacts/benefits of their actions



**Table 5.** Likert-scaled responses to impact, by region.

Statement	Global South (n = 185)	Global North (n = 20)	Mean dif- ference	t-test
<b>I know how mapping could impact my local community</b>	4.77 (.485)	4.43 (.598)	.339	2.509**
I am aware of ways that I could raise awareness about my involvement in this program in my local community	4.43 (.645)	4.05 (1.117)	.385	1.549
I know how explain benefits of science to society	4.46 (.618)	4.33 (.577)	.128	.905

Responses are 5 = strongly agree, 4 = agree, 3 = neither agree nor disagree, 2 = disagree, 1 = strongly disagree.

\* $p < 0.05$

\*\* $p < 0.01$



# (Movement-Minded) Participating youth cannot articulate the impacts/benefits of their actions



**Table 7.** Likert-scaled responses to SDG statements, total and by gender

Statement	All Respondents (N=205)	Female (n=64)	Male (n=141)	Mean difference	t-test	Global South (n=185)	Global North (n=20)	Mean difference	t-test
I am familiar with all of the 17 Sustainable Development Goals (SDGs) adopted by United Nations	4.38 (.85)	4.52 (.69)	4.32 (.91)	.19	1.50	4.47 (.76)	3.62 (1.16)	.856	4.57**
I believe SDG knowledge and awareness helps fulfill responsibilities to be a global citizen	4.63 (.60)	4.61 (.59)	4.64 (.60)	-.03	-.32	4.69 (.53)	4.10 (.83)	.59	3.21**
I believe YouthMappers has helped in enhancing my knowledge and awareness of SDGs	4.42 (.83)	4.43 (.67)	4.41 (.90)	.02	.19	4.50 (.76)	3.71 (1.05)	.79	4.26**
I understand the important role youth play in promoting and attaining SDGs	4.60 (.60)	4.63 (.58)	4.60 (.61)	.03	.43	4.68 (.55)	4.00 (.71)	.68	5.23**
I can confidently explain the contributions of youth mapping activities to attainment of SDGs	4.36 (.84)	4.28 (.72)	4.40 (.89)	-.12	-.91	4.49 (.70)	3.33 (1.15)	1.15	4.48**

Responses are 5 = strongly agree, 4= agree, 3 = neither agree nor disagree, 2 = disagree, 1 = strongly disagree.

\* $p < 0.05$

\*\* $p < 0.01$

### H3

## (Movement-Minded) Participating youth cannot articulate the impacts/benefits of their actions

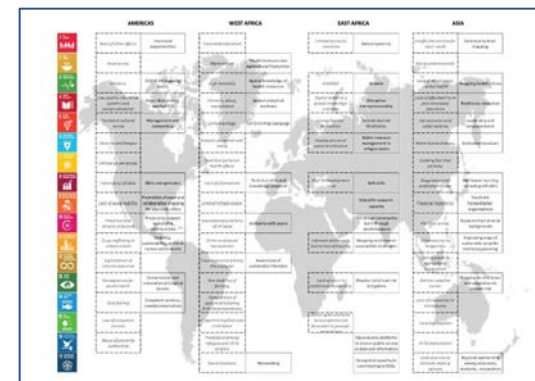
**Table 9.** Likert-scaled responses to SDG statements, by length of time participating in YouthMappers

Statement	Length of time of participation						Results of ANOVA	
	0 - 1 Year (n=76)		1 - 2 Years (n=51)		2 years or more (n=78)		F-Value	F-Prob
	Mean	(SD)	Mean	(SD)	Mean	(SD)		
I am familiar with all of the 17 Sustainable Development Goals (SDGs) adopted by United Nations	4.36	(0.972)	4.42	(0.906)	4.47	(0.683)	1.227	0.295
I believe SDG knowledge and awareness helps fulfill responsibilities to be a global citizen	4.52	(0.67)	4.70	(0.544)	4.67	(0.553)	1.693	0.187
I believe YouthMappers has helped in enhancing my knowledge and awareness of SDGs	4.35	(0.754)	4.54	(0.813)	4.51	(0.702)	1.289	0.278
<b>I understand the important role youth play in promoting and attaining SDGs</b>	4.47	(0.684)	4.70	(0.505)	4.70	(0.542)	3.612	0.029*
<b>I can confidently explain the contributions of youth mapping activities to attainment of SDGs</b>	4.10	(0.965)	4.54	(0.706)	4.54	(0.807)	7.075	0.001**

Responses are 5 = strongly agree, 4= agree, 3 = neither agree nor disagree, 2 = disagree, 1 = strongly disagree.

\* $p < 0.05$

\*\* $p < 0.01$







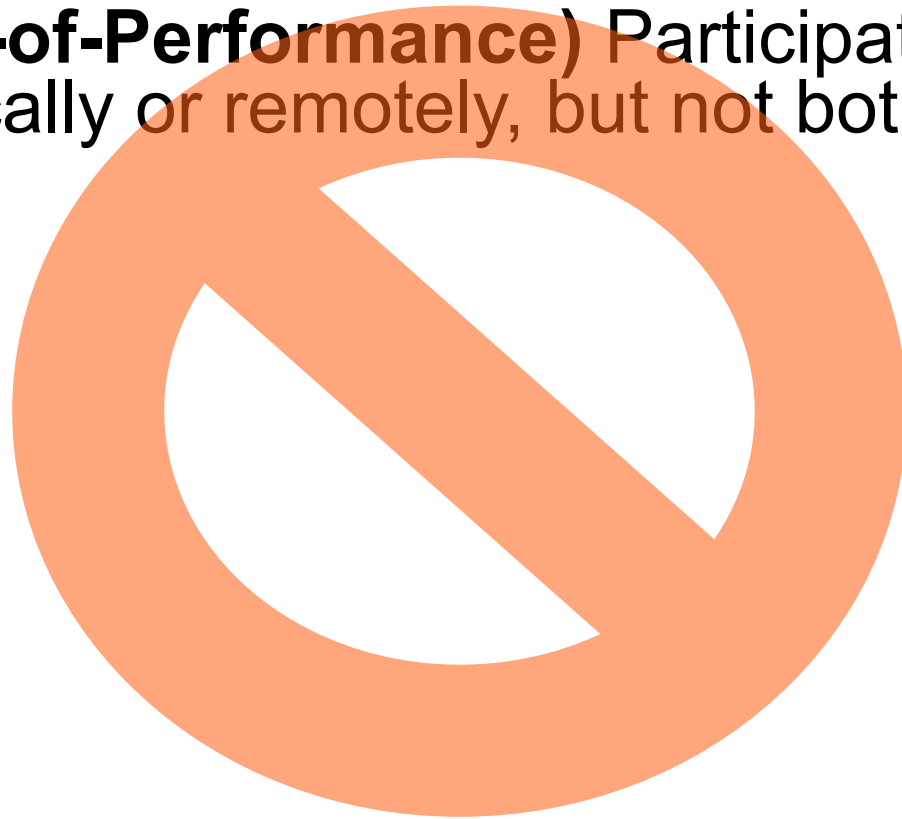
# Implications

- What do these characteristics mean for OSM broadly?
- What lessons does this provide for higher education globally?
- What insight does this offer for other communities within the OSM ecosystem?



# Hypotheses rejected (myths busted)

- **H1: (Action-of-Performance)** Participating youth either map only locally or remotely, but not both







**Life is a team sport.**

**...and so is OpenStreetMap.**

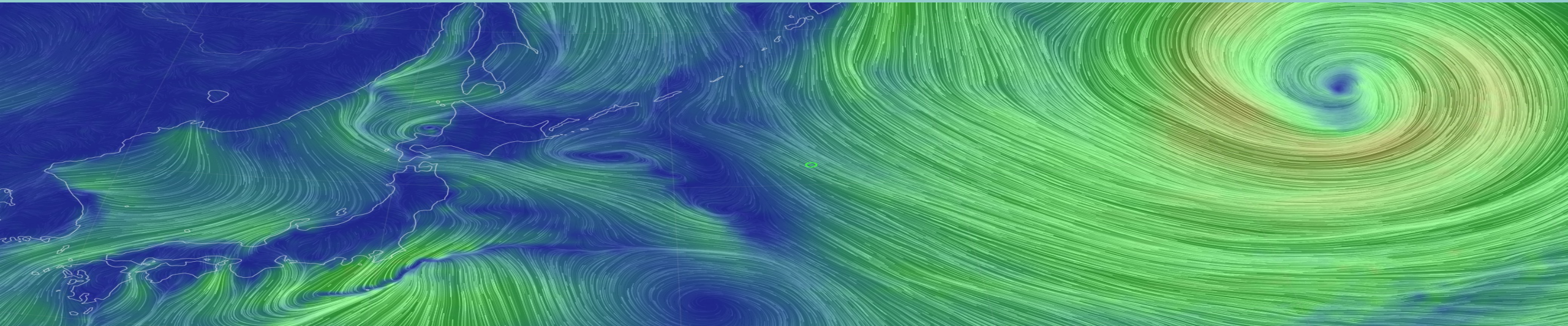


# Hypotheses rejected (myths busted)

- **H1: (Action-of-Performance)** Participating youth either map only locally or remotely, but not both
- **H2: (Hybrid-Roles)** Participating youth cannot simultaneously pursue personal aims to prepare themselves for the workforce and to express their identities as global citizens



# Create a third space.



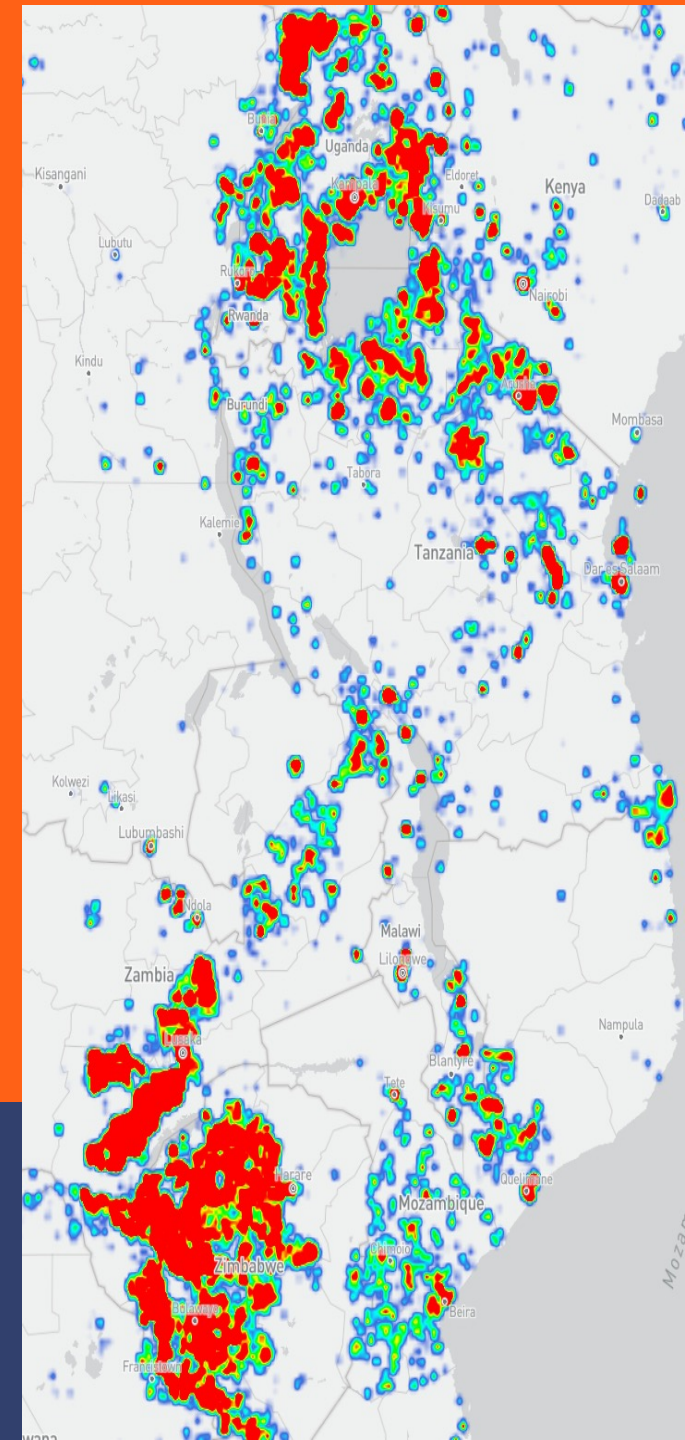


# Hypotheses rejected (myths busted)

- **H1: (Action-of-Performance)** Participating youth either map only locally or remotely, but not both
- **H2: (Hybrid-Roles)** Participating youth cannot simultaneously pursue personal aims to prepare themselves for the workforce and to express their identities as global citizens
- **H3: (Movement-Minded)** Participating youth cannot articulate the impacts/benefits of actions undertaken for broader communities or society through their work with OSM, nor identify the roles/contributions of youth action in this work for the common good.



Be a good ancestor.



# Thank You!

patricia.solis@asu.edu

@patiflafla

resilience.asu.edu

resilience@asu.edu



@AsuResilience

**ASU** Knowledge Exchange  
for Resilience  
Arizona State University



www.youthmappers.org

info@youthmappers.org

@youthmappers



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