

Lightning Talks

Academic Track

SotM 2019





HOW KNOWING THE PURPOSE OF MAPPING IMPACTS THE MAP AND MAPPERS THEMSELVES



Patricia Solís, PhD

Director and Co-Founder, YouthMappers®

Research Associate Professor, School of Geographical Sciences & Urban Planning
Executive Director, Knowledge Exchange for Resilience, Arizona State University



we don't just build maps.
we build mappers.

what is the effect of sharing authentic contextual information about the purpose of humanitarian mapping tasks on new mappers' performance, motivation, and empathy?

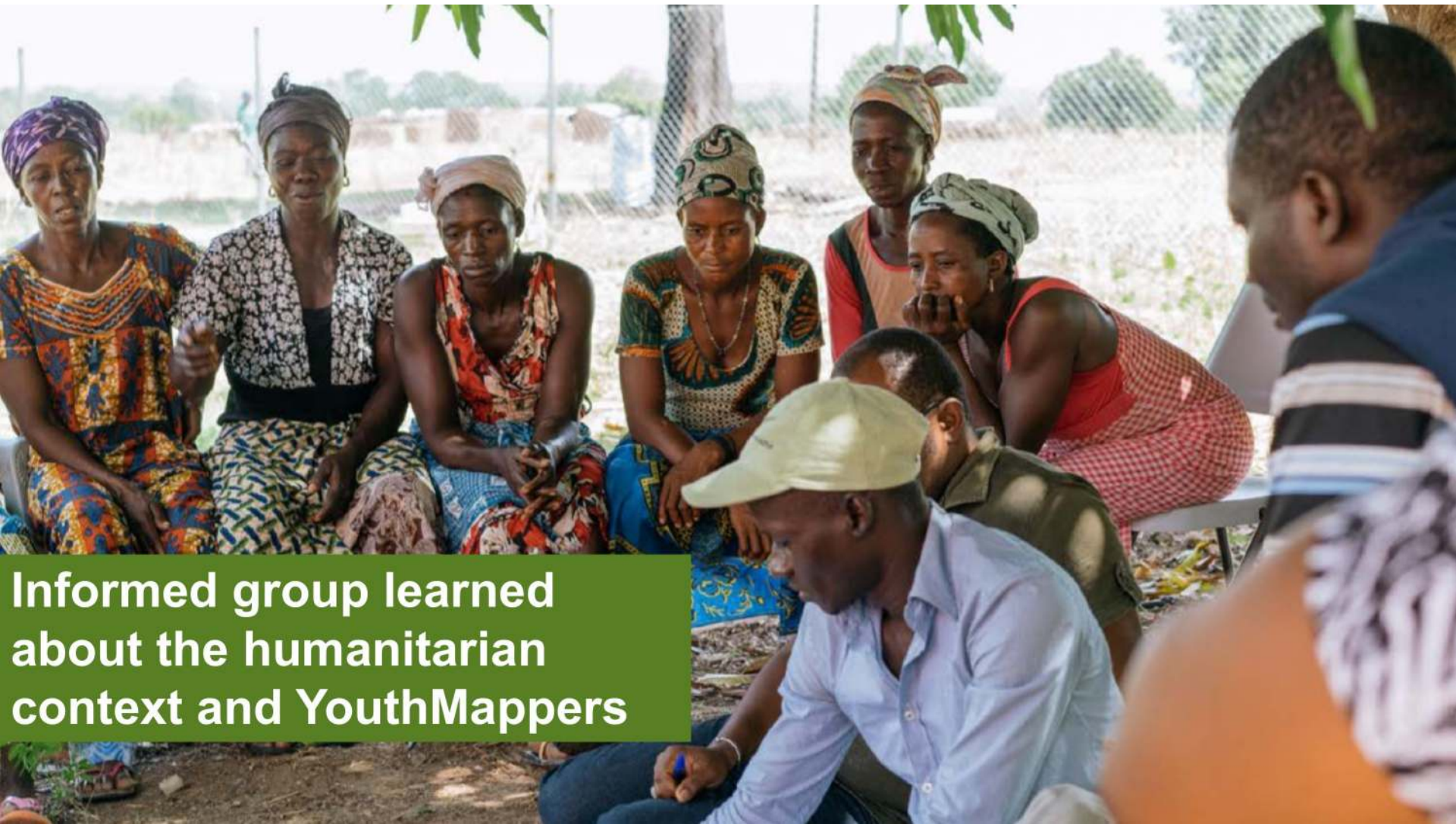
Methodology



Control group learned only how to map

Beginner mappers, **42 students** with no prior experience, were given the same location to map on OSM, organized into **2 groups** where only one group was provided information about the location and humanitarian purpose of the task

Methodology



**Informed group learned
about the humanitarian
context and YouthMappers**

Performance metrics observed on OSM tasks assessed changes to the **map**

Productivity, Quality of Edits, Error Rates and Types

Pre and post Likert surveys measured change in **mappers**

Awareness of Geospatial Careers, Interest, Satisfaction, Motivation, Confidence, Empathetic Affective Response

Building i

▼ All fields

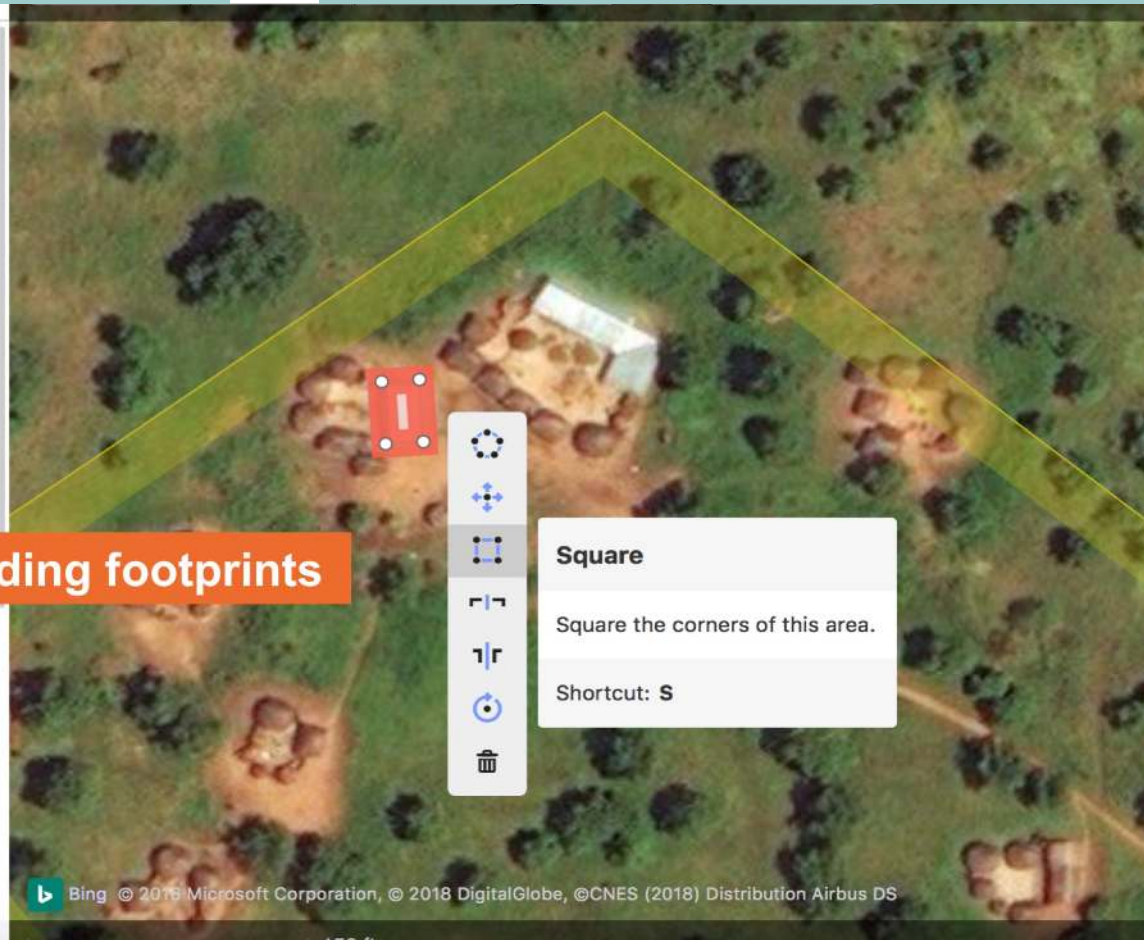
Name i
Common name (if any) +

Building i
yes

Address i
123 Street
City Postcode

Add field: Description, Elevation, Email...

Thirty minutes of tracing building footprints



Results

Performance measures and perceptions by group

Measure	Control group		Informed group		t Score ^a
	M	SD	M	SD	
Productivity					
Change sets	6.89	2.85	5.96	2.58	1.091
Map changes	772	429	680	254	0.807
Buildings traced	73	33	70	24	0.284
Quality					
Total errors	41	26	31	22	1.039
Error types	5.44	2.77	7.21	3.08	1.947* $p=0.0293$
Edit error rate	0.056	0.036	0.054	0.038	0.151
Feature error rate	0.610	0.486	0.520	0.359	0.657
Self-assessment					
Satisfaction ^b	3.5	1.3	4.7	0.6	3.570** $p=0.00048$
Productivity ^c	3.2	0.9	3.8	0.4	2.884** $p=0.00315$
Quality ^d	2.9	0.7	3.3	0.5	1.826* $p=0.0378$

^a $df=40$.

^bOverall, how satisfied are you with your mapping experience today? 5 = *very satisfied*, 4 = *somewhat satisfied*, 3 = *indifferent*, 2 = *somewhat dissatisfied*, 1 = *very dissatisfied*.

^cHow would you characterize your mapping productivity today? 4 = *very productive*, 3 = *somewhat productive*, 2 = *somewhat unproductive*, 1 = *not productive at all*.

^dHow would you characterize the quality of your mapping contributions today? 4 = *a very good job*, 3 = *a pretty good job*, 2 = *not do very well*, 1 = *poorly*.

*Significant at $p < 0.05$.

**Significant at $p < 0.01$.

Informed mappers made a similar number but **more types of error**, reported **greater satisfaction**, believed they mapped **more edits**, and thought their work was **done better** (but it was not)

Beware of The Do-Good Effect:

**beginner
humanitarian
mappers might
believe they are
doing well just
because they are
doing good**

Results

Changes in Likert-scaled responses to mapping technologies within and across groups

Statement	Control group ^a		Informed group ^b	
	Mean difference	Within-group <i>t</i> test (pre to post)	Mean difference	Within-group <i>t</i> test (pre to post)
I am confident in my ability to use technology	-0.056	0.37	0.208	-1.31
Technology on the whole is a benefit to society	-0.278	1.43	0.250	-2.01*
Technology on the whole is a detriment to society	-0.167	0.77	0.154	<i>p</i> = 0.028 -0.17
I know how to explain the benefit of technology to society	-0.056	0.37	0.208	-1.10
I am interested in learning more about using technology in general for my career aspirations	-0.167	1.00	0.167	-1.07
Understanding technology will make me a stronger candidate for employment	-0.111	0.70	0.147	0.20
I have a good understanding of how to use mapping technologies	0.824	-2.2* <i>p</i> = 0.021	1.292	-6.07** <i>p</i> < 0.0001
I understand what is meant by geospatial data	0.222	-1.17	1.208	-4.28** <i>p</i> = 0.0001
I know how mapping could impact real communities	0.222	-1.29	1.167	-5.45** <i>p</i> < 0.0001
I am interested in learning more about using mapping technologies specifically for my career aspirations	0.118	0.16	0.826	-2.71** <i>p</i> = 0.0006

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

^a*df* = 17. ^b*df* = 23. **p* < 0.05. ***p* < 0.01.

Uninformed
mappers
grew less
positive
about
technology in
general but
more positive
about
mapping

Informed
mappers are
significantly
more likely to
say technology
as a whole
benefits
society after
the mapping
exercise

**Humanitarian mapping
might be a creative way
to successfully introduce
general science and
technology material to
new students**

Results

McGraw-Hill Workforce Readiness Survey Toronto Empathy Index

Changes in responses to empathy questions by group

Response statement	Control group ratio (post/pre)	Informed group ratio (post/pre)	Difference between group ratios	t Score
Positive empathetic response				
I find that I am "in tune" with other people's moods	0.994	1.083	-0.090	1.521
When I see someone being taken advantage of, I feel kind of protective toward him/her	0.993	1.041	-0.048	0.780
I have tender, concerned feelings for people less fortunate than me	1.038	1.015	0.022	0.377
I enjoy making other people feel better	1.003	0.976	0.026	0.446
When someone else is feeling excited, I tend to get excited, too	1.005	1.017	-0.013	0.331
I can tell when others are sad even when they do not say anything	1.019	1.040	-0.022	0.360
It upsets me to see someone being treated disrespectfully	0.996	0.983	0.013	0.302
I get a strong urge to help when I see someone who is upset	1.052	1.036	0.016	0.248
Lack of empathy response				
I am not really interested in how other people feel*	0.919	1.087	-0.168	2.291*
I become irritated when someone cries	1.165	1.021	0.144	1.351
I remain unaffected when someone close to me is happy	1.059	0.993	0.066	1.216
I do not feel sympathy for people who cause their own serious illnesses	0.944	1.033	-0.088	1.053
When a friend starts to talk about his/her problems, I try to steer the conversation towards something else	1.042	1.003	0.038	0.778
When I see someone being treated unfairly, I do not feel very much pity for them	0.933	0.967	-0.033	0.492
Other people's misfortunes do not disturb me a great deal	1.079	1.094	-0.015	0.120
I find it silly for people to cry out of happiness	1.028	1.035	-0.007	0.078
Index of all answers	15.935	16.340	-0.404	1.376

Notes: Responses are *always, sometimes, often, rarely, never*. Statements were used from the Toronto Empathy Questionnaire (Spreng et al. 2009).

* $p = 0.014$, $df = 38$.

Changes in Likert-scaled responses to self-reflection statements within and across groups

Response	Control group ^a		Informed group ^b	
	Mean difference	Within-group t test (pre to post)	Mean difference	Within-group t test (pre to post)
Being a good citizen	-0.056	0.37	0.292	-2.60** $p = 0.008$
Social responsibility; giving back	0	0.00	0.208	-1.74* $p = 0.048$
Finding a well-paying job	-0.111	1.00	0.083	-0.81
Finding a rewarding job	0.028	1.28	0.069	0.57
Living a well-rounded, happy life	-0.072	1.10	0.042	-0.57

Notes: Responses are 4 = *extremely important*, 3 = *very important*, 2 = *somewhat important*, 1 = *not important*. Statements selected for use from the McGraw-Hill (2016) Workforce Readiness Survey.

^a $df = 17$. ^b $df = 23$. * $p < 0.05$. ** $p < 0.01$.

Informed mappers significantly changed their ideas about the importance of being a **global citizen** and **giving back** after building the map

Informed mappers became less negative about their interest in **how do other people feel**

Could humanitarian
mapping become
a place to start
to **teach empathy?**

www.youthmappers.org



STATE OF THE MAP



Bridging the Map
Heidelberg 2019

Heidelberg, Germany

EUROPE

Atlantic
Ocean

AFRICA

SOUTH
AMERICA

Curitiba,
Brazil

Contextualizing OpenStreetMap in Mapping Favelas in Brazil

Everton Bortolini and
Silvana Camboim

Federal University of Paraná

Introduction

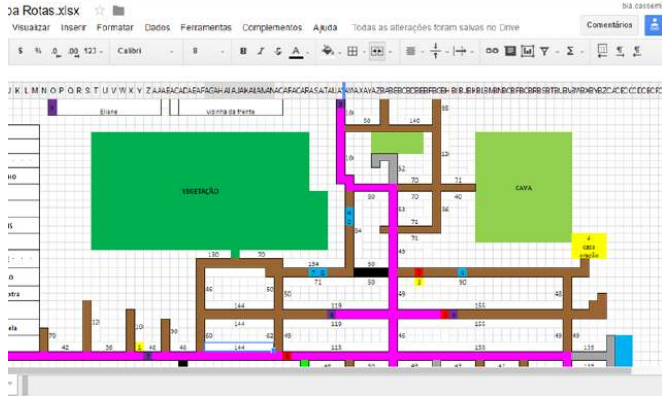


6%
Brazilian population

FAVELAS

Informality
Precariousness
Social
vulnerability

Outdated/Lack
of Geographical
Information
X
High demand
of Geographical
Information



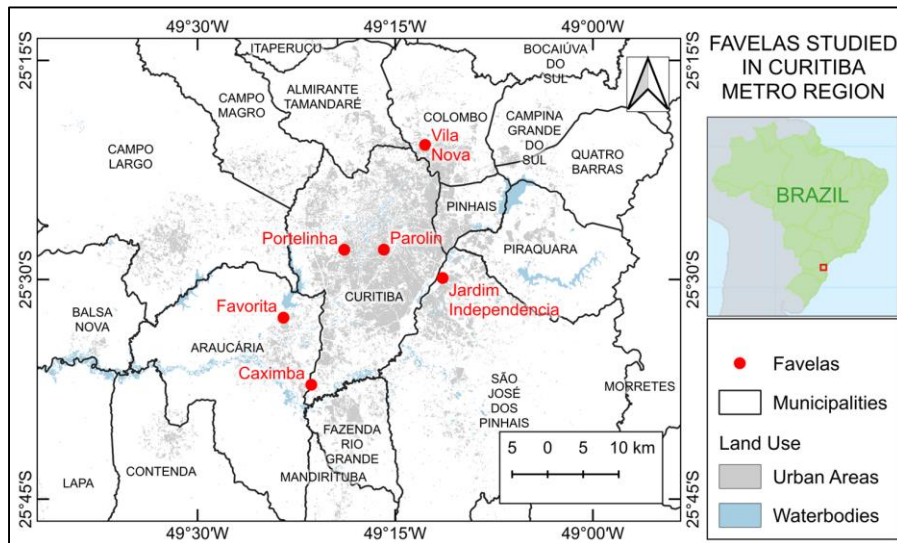
Methodology

Case study -> Mapping activities in favelas upgrading by NGO TETO Brasil;

Methodology

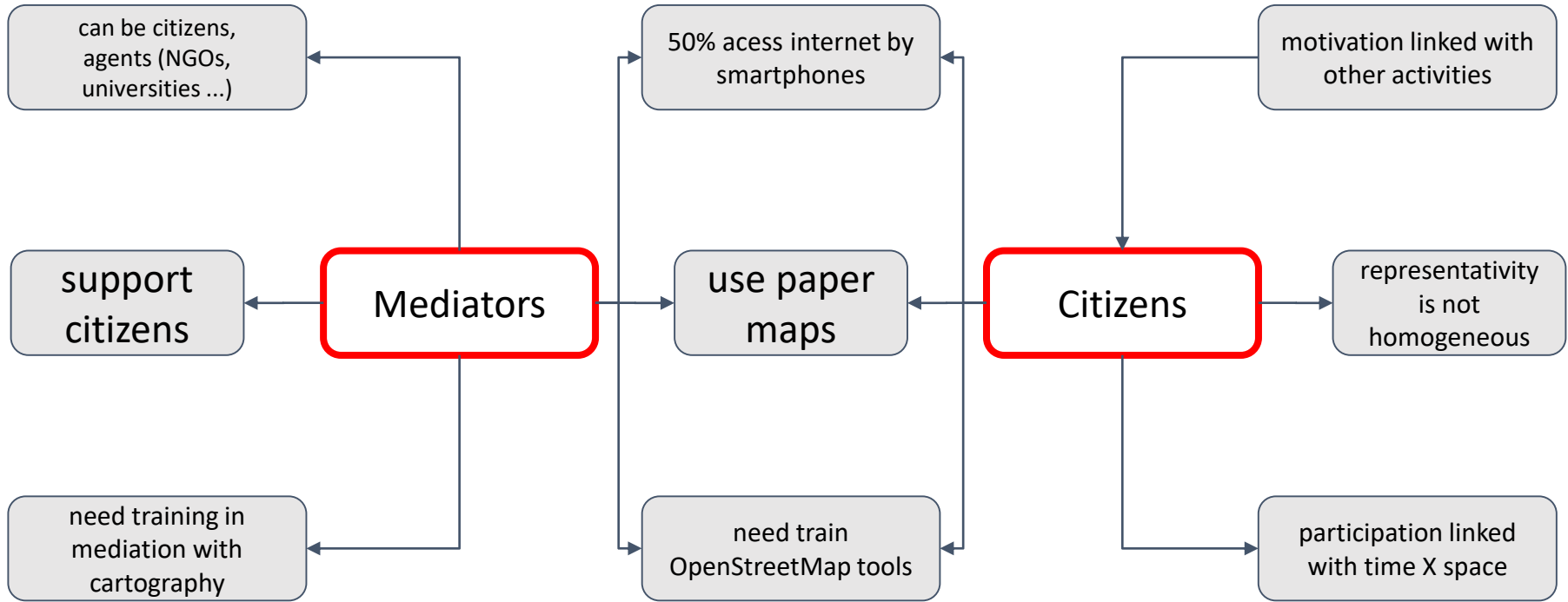
32 Questionnaires and participant observation -> 200 volunteers of NGO

TETO Brasil's census and participant observation -> 15000 residents of favelas



2017 and 2018

Results and analysis



Results and analysis

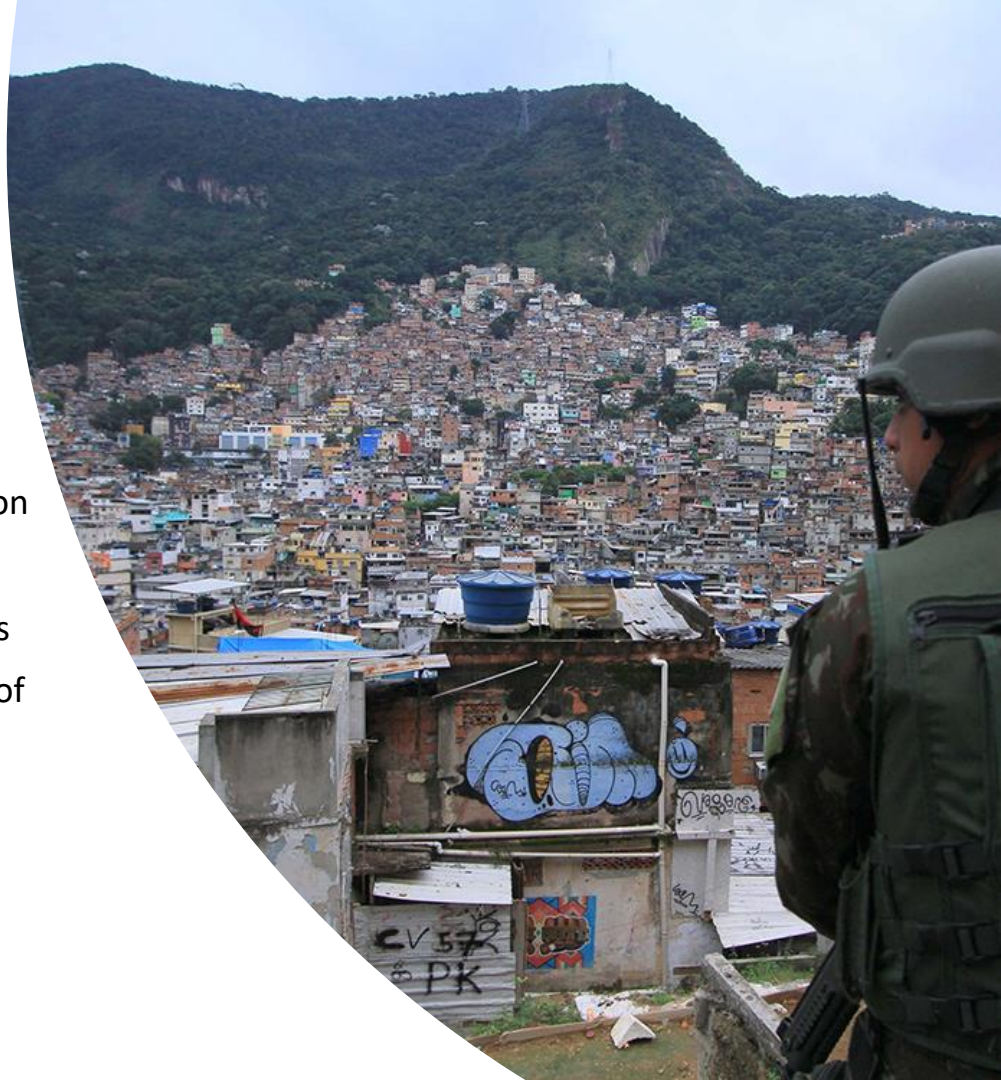
GI Privacy in favelas:

- -> needs to use abstract and personal references
- No formal address and POIs.
- -> are OSM tags appropriate?



Conclusion/ Current Work

- Using OpenStreetMap to create spatial information in favelas in conjunction with locals requires a lot of care, but this project has shown that its application is possible and can reduce the cartographic invisibility of vulnerable populations.
- And the Ethics of Geographic Information in vulnerable communities?



Would you like
to exchange
some
experiences and
ideas with our
group?

Obrigada !
Thank you !
Danke !



E-mail silvanacamboim@gmail.com
evertontbertanbortolini@gmail.com



Site: www.labgeolivres.ufpr.br

GeoforAll : <https://www.osgeo.org/initiatives/geo-for-all/>

International Cartography Association

<https://opensourcegeospatial.icaci.org/>



Twitter: @silcamboim @eTonBortolini

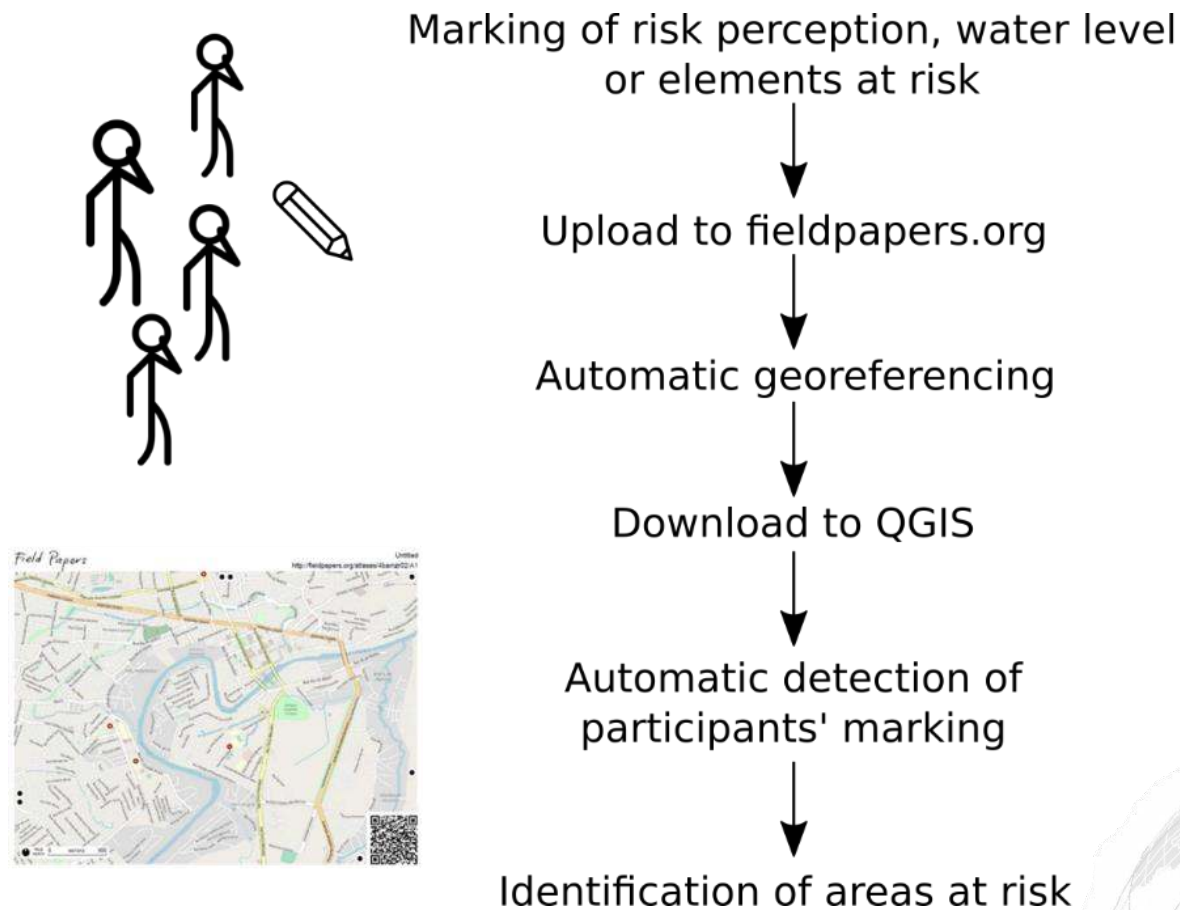


UNIVERSITÄT
HEIDELBERG
ZUKUNFT
SEIT 1386

“Ohsome” OpenStreetMap Data Evaluation: Fitness of Field Papers for Participatory Mapping

Carolin Klonner, Maximilian Hartmann, Lily Djami, and Alexander Zipf

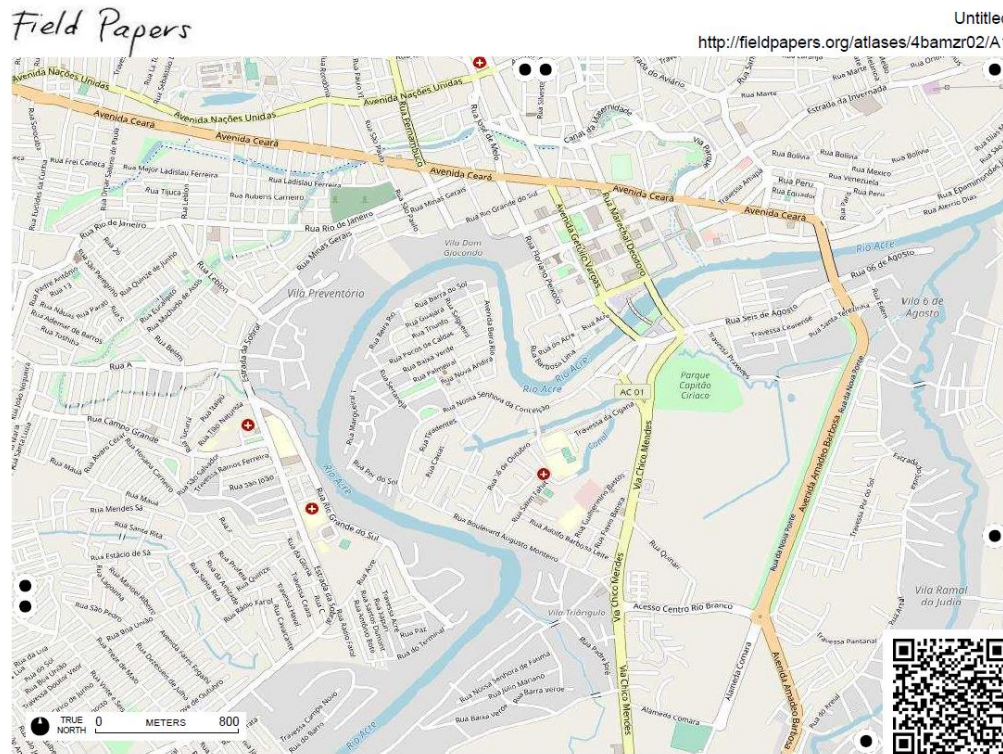
Status quo: Field Papers are used for participatory mapping



Klonner et al. (2018), Klonner and Blessing (2019), <https://www.iconfinder.com/>

Gap: Fitness of the OpenStreetMap data for the application as Field Papers

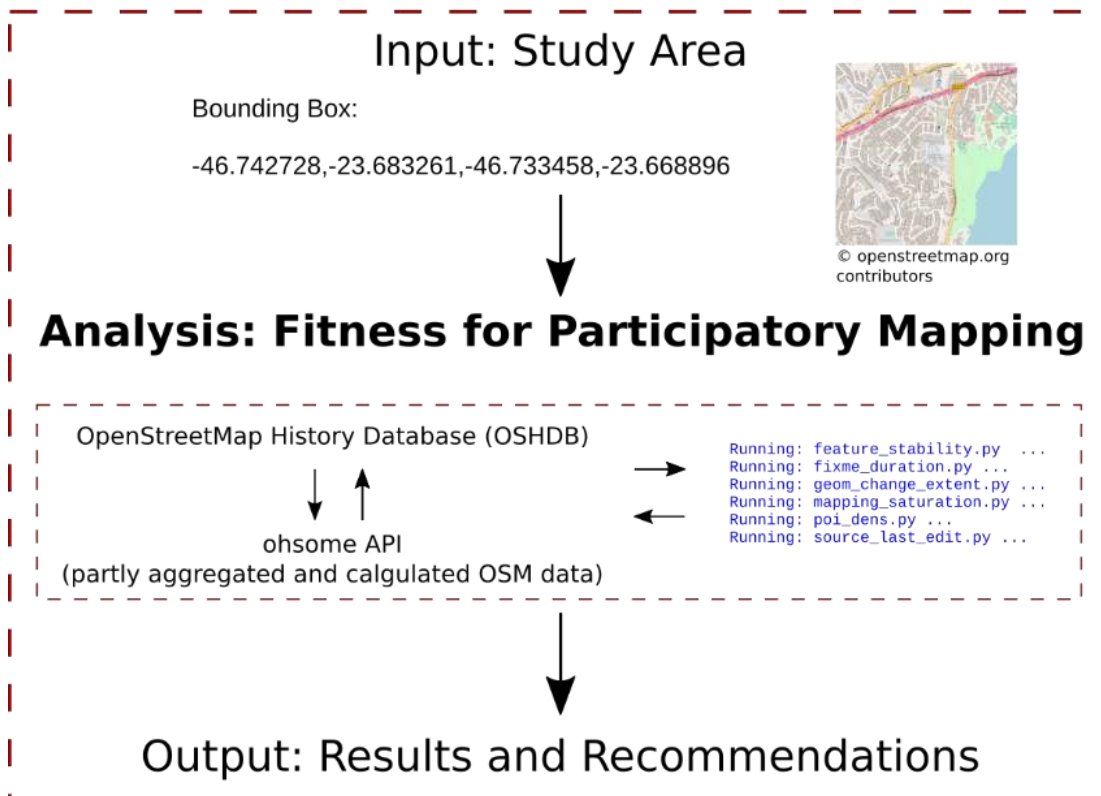
Sketch maps based on OpenStreetMap Field Papers: Rio Branco, Brazil



<https://fieldpapers.org/>

Method: Analysis via OpenStreetMap History Database and ohsome API

Workflow

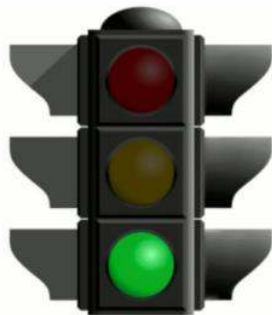
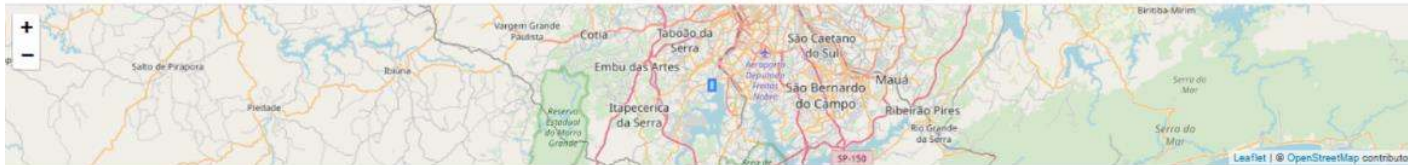


Focus on:

- Positional accuracy
- Community activity
- Up-to-dateness
- Orientation
- Hints for manual inspection
- Completeness

Result: Information about OSM data and recommendations for the use of the Field Papers

OpenStreetMap Evaluation for Requested Area:



Very Important

-The average amount of geometrical changes per highway feature is high (492.18m² not overlapping area between two adjacent versions of the same feature, every feature was moved 5.24m on average). Their mapping accuracy in this area might be problematic

[more >>](#)

Important

-The average number of coordinate changes on waterway features (including rivers) in the last year is increased (0.2). There might be inaccurately mapped features

[more >>](#)

Very Important

-The average amount of geometrical changes per amenity feature is low (18.51m² per feature, every feature was moved 0.42m on average)

[more >>](#)

Recommendations:

- Be aware that in average the streets and ways were subject to heavy geometrical changes, which might indicate accuracy problems in this area
- Be aware that the mapping of amenity features seems to be not saturated and therefore possibly not complete yet.
- Be aware that some streets and ways might be mapped inaccurately
- Be aware that the community doesn't respond quickly to known problems and mapping-errors in this area, therefore some data might be outdated or inaccurate
- You might want to check the following sources, which account for a substantial share of all features: 'pmsp' (90.97%).

This tool accesses OpenStreetMap data, which is partly aggregated, via the [ohsome API](#) by the [Heidelberg Institute for Geoinformation Technology \(HeiGIT\)](#). The data and statistics are based on data by [© OpenStreetMap contributors](#). ohsome uses a database that contains [ODbL 1.0 licensed OSM data](#) and [CC-BY-SA 2.0 licensed OSM data](#).

Summary: Research analyses the fitness of Field Papers for participatory mapping

- Web page can be easily used by local governments, for example, as expert knowledge is not required
- Investigations for individual study areas are possible
- Recommendations are given to the user

→ Decision support for the use of Field Papers for participatory mapping

References

- Klonner, C., Usón, T.J., Marx, S., Mocnik, F.-B., Höfle, B. (2018): Capturing Flood Risk Perception via Sketch Maps. ISPRS International Journal of Geo-Information. Volume 7, pp. 359; doi:10.3390/ijgi7090359.
- Klonner, C. & Blessing, L. (2019): Gathering Local Knowledge for Disaster Risk Reduction: The Use of Sketch Maps in Group Discussions. In: Proceedings of the ISCRAM 2019 Conference. Valencia, Spain, pp. 1397–1398.



WORKFORCE DEVELOPMENT AND YOUTHMAPPERS: UNDERSTANDING PERCEPTIONS OF STUDENTS IN HUMANITARIAN MAPPING

Patricia Solís, PhD and Sushil Rajagopalan

Director and CoFounder, YouthMappers; Executive Director, Knowledge Exchange for Resilience; Associate Research Professor of Geography, Arizona State University, Tempe, AZ, United States PhD Candidate, School of Sustainability; YouthMappers Graduate Research Assistant, Arizona State University, Tempe, AZ, United States

PURPOSE

To evaluate the impact of humanitarian mapping on workforce preparation of students engaged in YouthMappers

160
universities
42
countries

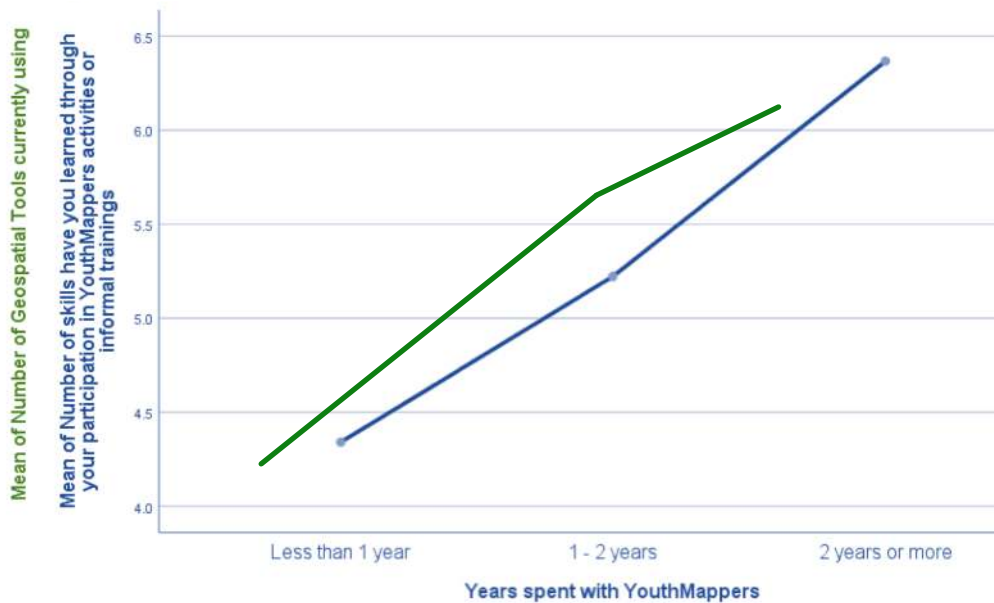


METHOD

- Online survey of students in YouthMappers chapters, January – April 2019
- Independent t-tests assess differences by Gender
- One-way ANOVA tests assess differences by Period of Participation (less than 1 year; 1-2 years; 2 years or more)
- Interpretation with YouthMappers from US, Ghana, Uganda, Bangladesh
- 239 responses were collected, 223 were validated and used in the analysis

ANALYSIS AND RESULTS

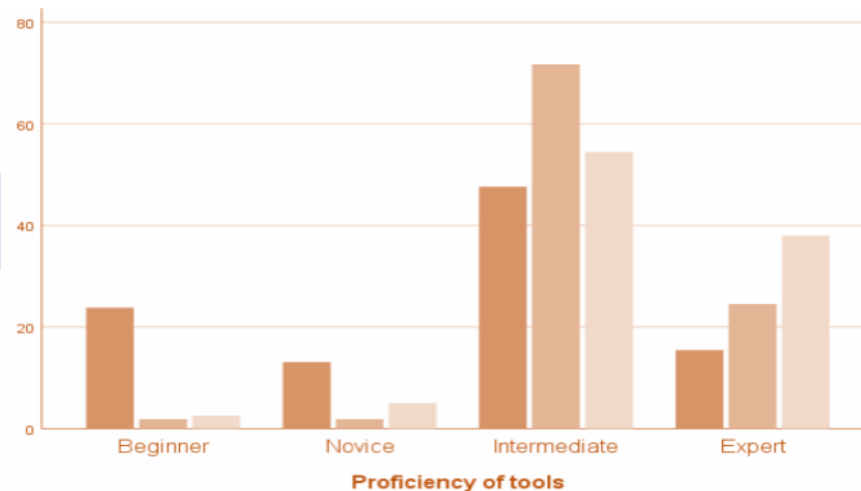
Geospatial skillsets, use of new tools, and self-reported **proficiency** all increase over **time** spent in YouthMappers



▲ [F(2,215)=9.821, $p < 0.01$]. Significant differences found between Group<1 year and Group 1 to 2 years ($p < 0.05$); and between Group<1 year and Group 2 years or more ($p < 0.01$)

▲ [F(2,215)=5.33, $p < 0.01$]. Difference is significant between Group<1 year and Group 2 years or more ($p < 0.01$)

▶ [F(2,213)=19.211, $p < 0.01$]. Significant differences found between Group<1 year and Group 1 to 2 years ($p < 0.01$); and between Group<1 year and Group 2 years or more ($p < 0.01$)



ANALYSIS AND RESULTS

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%

Participation in YouthMappers provides direct opportunities such as attending conferences, internships and job offers

ANALYSIS AND RESULTS

Self-reported Soft Job Skills Gained from YouthMappers Participation

Teamwork	89.8%
Global Learning	71.1%
Creative Thinking	70.3%
Critical Thinking	68.0%
Civic Engagement	53.9%

Selected Self-reported Geospatial Competencies

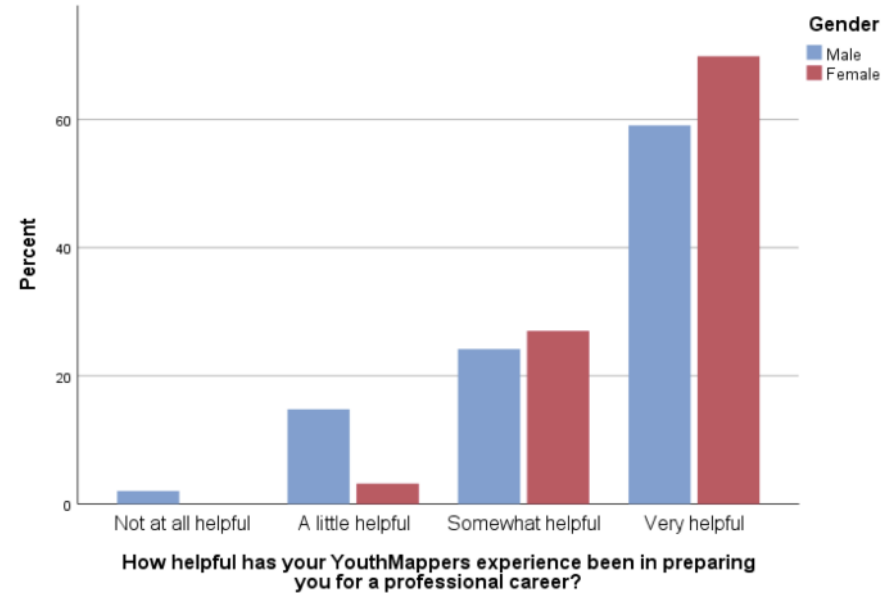
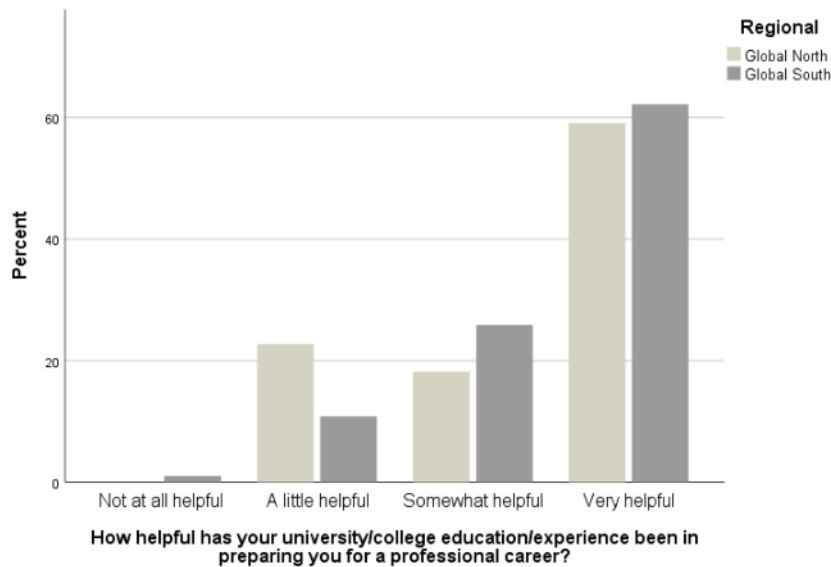
	<i>Gained from YouthMappers participation</i>	<i>Difference from Gain through College Coursework alone</i>
Recognize opportunities for mobile end-user applications	25.0%	5.1%
GIS&T and Society Ethical Issues	25.5%	-0.9%
Digitization	58.5%	-3.2%
Imagery Resolution	43.0%	-5.3%
Organizational & Institutional Aspects of Geospatial Technologies	18.5%	-6.4%
Geospatial Data Quality	34.0%	-7.8%
Data Classification or Tagging	45.5%	-8.7%

Select self-reported **learning** includes both **soft skills** and key **technical competencies**

ANALYSIS AND RESULTS

Respondents from the Global South ($M=3.52$, $SD=.74$) feel their experience with YouthMappers has been more helpful compared to respondents from the Global North ($M=3.10$, $SD=.79$) and the difference is significant at $p < 0.05$.

Females respondents ($M=3.67$, $SD=.65$) feel their experience with YouthMappers has been more helpful as compared to males ($M=3.40$, $SD=.81$) and the difference is significant at $p < 0.05$.



YouthMappers directly attribute experiences, especially students from universities in the **global south** and **female** students, to being **better prepared** for professional careers

CONCLUSIONS

- Humanitarian mapping can be effectively leveraged to improve geospatial skills of university students
- It is possible to address gender disparities in workforce preparation through participation in youth chapter based mapping programming
- Multi-year engagement of students through a YouthMappers chapter matters for perceived competencies
- YouthMappers as a network affords professional development opportunities unique to campuses in the Global South
- Integrating extracurricular activities such as YouthMappers in universities/colleges can enhance learning experiences that prepare students for a global workforce