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Mapping Pedagogies: Applying Cartographic Practice to the Public Sphere

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Abstract

This article conceptualizes how democratized modes of participation in spatial knowledge production via open source mapping platforms translate into educational praxis, detailing educational projects in the Global South using them. To do so, the article gathers findings from a critical discourse analysis of forum articles which discuss grassroots mapping and from digital participant observation work within Humanitarian OpenStreetMap (HOT). The former show how feminist and community-oriented approaches to mapping, which endorse an ethics of craft, care and cultivation over the corporate or outsider research paradigms, are at the forefront of the tactics and practices such articles describe. The latter show how projects such as Crowd2Map Tanzania, The GAL (Global Active Learning) School of Cusco, Peru, Map Lesotho, OpenStreetMap (OSM) Liberia, OSM Nigeria, Public Lab and its Grassroots Mapping Curriculum, and YouthMappers. It details such initiatives to document the mentorship of female students in digital mapping within educational contexts. This mentorship allows for the applications of such skills to gender-based issues across the globe, from mapping safe routes on college campuses to sexist advertising in Lima, Peru and female genital mutilation in rural Tanzania.

To foreground these discussions, the article combines prescient work on education and technology from figures like John Dewey and Neil Postman with feminist perspectives on science, technology, publics, and the global from scholars like Donna Haraway, Anna Tsing, and Laura Forlano and Megan Halpern. Such work help conceptualize the use of technology for advancing the interests of the public sphere. In relating its findings to the broader context of the techniques and platforms at hand in this research, the article also presents historical

considerations from feminist pedagogies and illuminates the gender inequities and power relations at hand in crowdsourced mapping more broadly.

Keywords: Critical Discourse Analysis; feminist STS; globalization; pedagogy; the public sphere

Introduction

Background

Several years ago, I began contributing to the Humanitarian OpenStreetMap Team (HOT), a branch of the crowdsourced platform OpenStreetMap (OSM) geared toward disaster response and humanitarian campaigns. My most pronounced work was interning on its Eliminate Malaria mapping campaign, helping first responders gauge population density within countries impacted by malaria and informing eradication efforts (Prutzer, 2019). When I started mapping several months prior, an initial site I visited for training was MapGive, one of many offering tutorials on contributing to HOT campaigns. The right side of the page pictured and quoted a young Kenyan man attesting, ‘If the whole world is mapped, we can manage our resources better than if it’s not.’ The quote echoes the simplistic view that the ‘complete’ map is possible with what digital mapping platforms afford. But the pursuit of that impossible ideal (geared toward managing both the human and the nonhuman) mandates critical inquiry for their impact on communities. Mapping has obvious benefits for the state, but can equally serve community initiatives.

Though it rose in prominence with colonial conquest and military campaigns, mapping has helped chart the detrimental effects of human industrial activity on the environment, patriarchy, and the like. Participation in crowdsourced mapping can thus be a tool for intervention. At the same time, it can provide technological expertise deemed valuable from a vocational standpoint.

As students in the Global South face mounting pressures to seek training experiences that prepare them for the increasing importance of data work, mapping initiatives provide support in community development and in students’ educational goals. Given the contestations within the

term ‘Global South,’ I will clarify that my intent is to broaden understandings of where innovation occurs and how platforms considered here animate pedagogy beyond their Western contexts. Views of innovation that presume a Western dominance, by contrast, can mirror how, as Doreen Massey (1999) explicates, discourses of globalization are aspatial, wrongfully assuming spaces that have not felt the same effects of globalization will inevitably and necessarily feel them soon enough.

When one sees communities as producers of data and in dialogue with data, one activates publics in ways that seeing data production within corporate and government action alone disregards. This article considers how alternate perspectives can foreground pedagogy in ways extending beyond technological instruction to use of contemporary tools for community impact. It first provides a brief description of the platforms, methods, and intersections with community-based activism and learning at hand.

Communities of Focus

I discuss two different communities in this article (Public Lab and HOT) for their pronounced connections between mapping and pedagogy. Public Lab champions low-cost methods toward community technoscience, including community-produced maps. Its website situates tools and mapping kits sold online (including balloon and kite mapping kits) as part of its Grassroots Mapping Curriculum, ongoing since 2011. Jeff Warren’s (2010) Master’s thesis on grassroots mapping, documenting many of the community’s initial mapping experiments, examines tools and approaches he helped pilot within the Global South. These tactics have spread globally, perhaps most notably in cataloging the need for Gulf Coast relief following the 2010 BP Oil Spill.

Public Lab's approach has been grounded in pedagogical intervention from the start. Warren, for instance, partnered with students and organizations in Lima, Peru to chart the effects of urbanization, the status of rural infrastructure, and the land rights claims of settlements left unrecognized by the state. In the Evaluation chapter of his thesis, Warren poses a series of questions as criteria by which to judge such interventions. In responding to his criteria of increased map quality and increased community interest in mapmaking, Warren (2010, pp. 83) proclaims that 'the answer is clearly "yes" for both the Peru and Gulf of Mexico case studies. Resolution and recency were dramatically better in the maps we produced.'

OSM and HOT have also centered various initiatives in the Global South, though largely based on remote contributions from Western mappers and not from communities of impact. HOT interventions in disaster relief began with self-organized efforts on OSM to map in support of emergency response to the 2010 Haiti earthquake. It expanded toward mapping in the aftermath the 2015 Nepal earthquake and countless other community mapping projects. The Public Lab community also emerged in the exact same year (and only a few months later than HOT) to respond to the media blackout occurring around the BP Oil Spill. The rise in public cartographic work is hence tied to disillusionment in disaster response and the imperative among citizens to assist in large-scale disasters.

The pressures of vocational training and data management in contemporary economies have led to new investments in mapping as curricular practice, including in the Global South, as a means of advocacy. These transformations see learning extending beyond the classroom, paired with technology in the community, and driven by inquiry rather than efficiency. Such changes also call for revisiting capacities of the public sphere within globalization. The rapid speed of

economic and knowledge exchange, along with technological advances and greater connectivity, carry potential in combination to produce transformative spatial representations.

Method

This article is not just about how technologies associated with globalization can be used to chart some of its effects, but also the considerations that must be taken seriously to ensure an equitable outcome. Following a section on pedagogy, mapping, feminist STS, and open source mapping collaboration, I establish what grassroots mapping signifies. I put principles of Critical Discourse Analysis (CDA) to practice in analyzing several Grassroots Mapping Forum articles. Beginning during the summer of 2011 and changing its name to the Community Science Forum in the spring of 2016, the Grassroots Mapping Forum is Public Lab's self-published journal.

To narrow the sample, I selected texts in which leading Public Lab figures communicate to a broader audience the community's ethical stances. I use CDA to analyze how the community describes itself, what discussions take place within the community's work, and how the community frames its work publicly. A study of discourse can prove seminal not only for learning about grassroots mapping in a philosophical sense or the obstacles to which it responds, but also for navigating the 'identity project' of activism, one crucial for feminist pedagogies to achieve a lasting impact. This entails how it cultivates structures of belonging, ones tied, for instance, to moments of crisis like disaster mapping or public health campaigns, narrating that history, and bringing mappers together to fuel future participation (Harré, 2007).

I then discuss how discourses and practices essential to philosophies behind grassroots mapping extend to a curriculum. In the article's penultimate section, I discuss other grassroots projects in the Global South that demonstrate the same creative and organizational capacities

toward community-led initiatives. I conclude with considerations for the ties between publics and the state these initiatives enable within learning environments.

Literature Review

Feminist Pedagogy and Mapping

Digital mapping provides various affordances when implemented within different educational contexts. It can enable critical media production in classrooms, and various case studies from the Global South attest to that. These case studies demonstrate practical application in furthering social justice and the desires of the public sphere, particularly around gender-based advocacy.

This resonates with critical perspectives on pedagogy and technology. Learning is an everyday and fully sensory engagement that, as John Dewey notably writes, necessarily extends beyond the classroom. Immersive learning opportunities are thus dependent, to Bertram Bruce (n.d.), ‘more upon our pedagogy than on our technology.’ Dewey, inspired by pragmatist philosopher Jane Addams, put forward what Bruce calls ‘a vision of education in relation to the social organism.’ This vision, in other words, sees education feeding back into the communities where learning takes place (Leffers, 1993). Here, the school becomes a social institution that can fit the community’s needs, with community interests informing the curriculum. There has thus long been a sustained discussion on the reciprocity between pedagogies and the broader communities, beyond classroom walls, in which they are enacted (Rojas, 2014).

Scholarship on critical community service learning (CSL) adds to this line of thought and proves instructive for feminist pedagogy. CSL provides real-world application of feminist precepts, promotes self-discovery, and demands communicating feminist ideas in lay terms. It

mandates students to put their instruction to use in bettering the world. This may include work with city council projects, community centers, and outreach projects on issues ranging from domestic violence to LGBT representation (Rojas, 2014).

One can see, as this article details, community production of maps to meet community-defined needs as another avenue for this work. As case studies in this article show, learning and community intervention are occurring via innovative cartographic practice at a growing rate. Where educational institutions can assist is not just in teaching about oppression or in applied technological literacies, but in sponsoring the social infrastructure needed beyond these worthy platforms (where one-off contribution – as with many crowdsourced projects – is high). Likewise, a key contention within CSL is that theory alone may not prove impactful; unless paired with practice, it may only serve to position change, falsely, as out of reach (Kajner et al, 2013). Within this article, educational institutions are using a medium fueled by colonialism, consumerism, and control over space and time, but to recognize how spaces are contested – a subversion of a Western form.

The pedagogical production of open maps equally invites consideration to how mapping serves as an act of communication. Just as the classroom environment, to Neil Postman, encourages rote memorization and recall over critical inquiry by its very structure, so too does digitized mapping typically encourage thinking in terms of routing and efficiency, not activation or critical inquiry (Postman & Weingartner, 1969). It is worth noting here that the word curriculum derives in part from a Latin root that signifies ‘to race’ (‘The Nature of Curriculum,’ n.d.).

But learning is more than just an exercise of efficiency from Point A to Point B – and so is mapping. Digital mapping platforms suggest routes to save time by default while extracting

data from user search histories to tailor maps to users' consumer interests. Yet pedagogy – like one's understandings of space and time – is continuous, evolving, and reciprocal. Feminist scholarship underscores that this, too, is the nature of community activism (Rojas, 2014). Mapping, as explored here, has been a means toward such ends. Therefore, mapping should be considered as having a capacity for community pedagogy, and has long been practiced in such ways within geography instruction (Rees et al., 2021).

Feminist STS and Open Source Collaboration

Educational institutions have made alternative and largely unanticipated use of crowdsourced digital mapping. But broader problems deep within the history, production, and political economy of the cartographic remain. They warrant further consideration for the ways they can emerge in contemporary work. One example this article explores lies in projects in the Global South often relying quite heavily on remote (and largely Western) mappers online to sustain them. Indeed, the question of who conventionally participates in such work is crucial. OpenStreetMap (OSM) – for instance – is often celebrated for being open to all who wish to contribute. The vision of many for OSM and its associated projects is that any user can survey data on the ground and add it to OSM. That vision often overlooks considerations of diversity.

Though there is no technical barrier for participation in the platform as an open source project, problems of inclusivity exist. Problems of diversity are reduced to a technical parameter of 'openness,' stripped of the complex social dimensions that also drive the site as a community of participation. Yet the contributor base within OSM is largely Western, white, and male (Holder, 2018). Though there are members of OSM who do not see politics or discrimination at work within OSM, a recent global survey of its membership from GeoChicas, a sub-community

within OSM, found that almost six in 10 women feel silenced in their male-dominated local OSM communities. Nearly three out of every four men surveyed also felt gender-based silencing was a problem in their local chapters. Further, the survey data indicates that one in three women surveyed faces overt hostility in their mapping communities, with eight in 10 men reporting no such problems themselves.

Feminist Science and Technology Studies (STS) examines how formations like race, gender, sexuality, and colonialism are reflected in technological practices and assemblages involving the human and the technological (Catalyst, n.d.). Grassroots mapping is a kindred project that can help amplify voices left marginalized in archived data. GIS research remains mired by this issue. One must thus see geospatial technologies' participation in structures of 'inclusion and exclusion, empowerment and disempowerment,' as critical/cultural scholars contend. The historical inattentiveness to marginalization in GIS projects 'is linked to the ensuing exclusion of their needs . . . from policy and decision making' (Elwood et al, 2011).

Feminist STS recognizes the diversity of technologically enabled activist efforts and thoughtfully conceptualizes their politics. Feminist STS accounts for various subjectivities and imaginaries in play in fights toward equity. In its efforts to inspire collaborations and prototypes that can respond accordingly, there is a need to account for that range, and that can make those collaborations deservingly complex. The ways, for instance, that technological advancements both displace opportunities for labor through automation and enable the nuts and bolts of labor movements through platforms of online organizing provides a grounded example of "friction." Friction, coined by Anna Tsing, describes how concepts that seem oppositional in the abstract (like technology and labor) can instead prove mutually reinforcing when made concrete and

localized, as is the case with online labor organizing, but also in the training of the workforce via technology (Forlano and Halpern, 2015; Tsing, 2005).

These ideas are relevant to geospatial technologies and grassroots mapping. Friction exists between philosophies framing geospatial technologies and philosophies of grassroots mapping. These include trade-offs between situated perspectives and remote labor; between ‘objective’ or ‘complete’ visions of space and the multiplicities of spatial understandings different subjectivities pose; and between crowdsourced mapping platforms and dominant ones like Google for community campaigns to gain legitimacy. Though these dynamics may seem contradictory, in the spirit of friction, they fuel pursuits for community-driven maps.

The community ethos of such projects, not by coincidence, stems from a feminist geographical perspective, which often uses mapping to visualize the multiplicity and situated nature of knowledge. It thus understands how GIS can perpetuate structures of exclusion and disempowerment (Elwood, 2008). This shows that diverse perspectives must be invited into such projects to reflect different subjectivities, spatial locations, and temporalities that can incite friction as they intersect. The next section analyzes Grassroots Mapping Forum articles that demonstrate this while engaging in the work of community activism.

Analysis and Findings: A Critical Discourse Analysis of Feminist Geography and Grassroots Mapping

Narrating Initial Interventions

Shannon Dosemagen’s ‘Public Lab Five Year Retrospective,’ from the forum’s 5 Year Anniversary Issue in 2015, presents a chronology of events surrounding the BP Oil Spill and Public Lab’s interventions in documenting the spill. Passive phrases such as ‘Oil explosion

discovered' and 'The oil release was plugged' hide actors involved with these events. These stand out from declarative sentences which describe Public Labbers photographing the disaster, raising funds for kits, and interacting with citizens online.

Dosemagen (2015) further activates and personalizes citizens in grassroots mapping efforts by specifically naming them. In community efforts to map the oil spill, Dosemagen relays that '[l]ocal trip organizers and leaders included Kris Ansin, Leo Denton, Mariko Toyoji, Cesar Harada, and Becki Chall.' Subsequently, the article includes information about the spill 'according to the US government,' without any specific citation or agencies named. When Dosemagen conveys that '[w]e were able to take detailed aerial images despite a no-fly zone order banning flights below 3,300 feet' in the aftermath of the spill, there is no indication of which state actors put the no-fly zone in place. Hence, the article does not specifically address failures in government response. Instead, lay public efforts shine through.

These discursive moves that render the state and the corporate passive continue even as members describe partnerships with more powerful entities to fuel their work. Dosemagen (2015) identifies partnerships with OSM and Google. Partnering with the latter involved integrating grassroots images into Google layers. The critique remains that Google images do not foster conversation around mapping images, mapped artifacts, or the process of mapping itself as Public Lab does. This need for dialogue is one that both feminist perspectives on technology and grassroots mapping projects insist on. Instead, what Google presses on its users in its incorporation of Public Lab-generated imagery is largely to enjoy their high resolution. This divorces the imagery from their impetus to effect change, co-opting and decontextualizing activists' labor.

Dosemagen (2015) quotes Public Labber Liz Berry on mapping the Gowanus canal in Brooklyn in a way that equally speaks to the feminist notion of community building as a foremost consideration within grassroots approaches. Berry paints openness as establishing reciprocity and care within mapping. Berry recounts as part of these efforts, ‘our small crew were the only ones freezing our feet off, but by open sourcing our methods, we were supporting and were supported by . . . the global Public Lab community.’ The contrastive phrase at hand (‘but by open sourcing our methods’) attributes the reciprocity of ‘the global Public Lab community’ to its open source approach. It is a moral evaluation, arguing for what is desirable out of knowledge production in line with feminist precepts (Fairclough, 2003, pp. 89, 98). In order for such approaches to work, however, users must become more critical as media consumers.

Framing Critiques of Data

Appearing in the forum’s first issue, Warren and Dosemagen’s ‘Reimagining the Data Lifecycle’ references aforementioned mapping campaigns within critiques of how data is treated within information capitalism:

Where does data come from, and where does it go? Knowing the conditions under which data is produced . . . vastly affects how well we trust it -- one need look no further than the discord triggered by the diverse studies of the BP Oil Spill, or the controversies around the contamination of Brooklyn’s Gowanus Canal. In most cases, though, we're guilty of not asking hard enough questions (Warren and Dosemagen, 2014).

This first sentence presents a question on the nascent circulation of data in contemporary knowledge economies. The second sentence features a moral evaluation of Public Lab projects. The third sentence implicates readers (via ‘we’) in information capitalism by not being critical

consumers. The non-modalized (direct and unqualified) ‘we’re guilty’ pits responsibility upon consumers themselves (Fairclough, 2003, pp. 116, 167). Here, the activation of the mapper as a producer of community knowledge gets coupled with the responsibility to act— to foster more equity in community data production practices. Warren and Dosemagen (2014) follow with contrastive phrase that embellishes the problem: ‘What is lacking is not legibility, but trust.’

Warren and Dosemagen (2014) do, of course, stress the advantages in legibility a grassroots approach affords. They contrast the quality of grassroots mapping imagery from Google’s. In response to the BP Oil Spill, they report, ‘Over a hundred volunteers have hit the beaches to take tens of thousands of photos, depicting slicks, oiled wetlands, and the birds, fish, and plants . . . at far better resolution than Google Maps.’ The authors contend Google imagery does not support the resolution the effects of the disaster demand.

Their article, however, goes beyond these considerations, asserting the user deserves more agency in matters of data aggregation than digital economies and research paradigms afford traditionally. In depicting citizen science efforts as objectifying and humanizing grassroots mapping in contrast, ‘Reimagining the Data Lifecycle’ is a moral evaluation that citizen science reproduces problems of information capitalism. Both invite subjects as information consumers to experience their objectification as ‘data points’ as liberating. Subsequently, the pattern of rendering others passive to highlight mapping as active extends to other crowdsourced mapping platforms. These platforms can still lack support for local perspectives to the extent commensurate with a grassroots approach. Warren and Dosemagen (2014) critique comparable crowdsourcing efforts, including Ushahidi, a crowdsourced mapping platform toward activist efforts that emerged in the late 2000s:

Between May 1 and July 31, over 2,200 volunteer hours, 29 outreach trips, and the support of 46 volunteers was expended towards publicizing the Oil Spill Crisis Map -- an Ushahidi map -- as a way to independently report spill impacts and to gather reports. To this end, 1,595 reports were collected during this period, but only 17% of them were reported directly by residents -- a relatively sparse portrait of the disaster, and far too little for an accurate needs assessment.

Those contributing to the Ushahidi map are rendered passive in phrases like ‘the support of 46 volunteers was expended’ and ‘reports were collected.’ This matches how Public Lab distinguishes itself from the crowdsourced model. It does so in the use of a contrastive phrase and an elaboration in the latter half of the second sentence which disputes the usefulness of the resulting map.

The piece continues this distancing in the next paragraph:

Ushahidi is an innovative tool and its developers are adapting to these challenges. But the promise of engaging with local communities as full actors in seeking environmental justice has recently driven a group of us Grassroots Mappers to begin inventing new tools, based on the spirit of our balloon mapping kit: cheap, participatory, 'hacker' tools which produce excellent, legible, and independently produced data (Warren & Dosemagen, 2014).

Contrastive phrases and inclusive pronouns construct a clear distinction here. This excerpt also returns to the notion of legibility in data. Warren and Dosemagen see grassroots data as more trustworthy in both its quality and its independent production, which frees it from the potential biases of state and corporate work.

Some qualification is certainly warranted here toward the insinuation these practices are value-neutral. But for now, these ideals of trust, community production, and representational value are indeed crucial to the caliber of infrastructure feminist approaches to data champion. Questions a feminist approach to data poses include those of who gets represented, who counts in a given calculation (and at what proportion), how different populations are categorized or

devisibilized in different taxonomies, and how to present data in a way that facilitates community storytelling and community action. In the case of mapping specifically as a mode of data visualization, one must build community capacity toward sustaining a given project at the same time as one builds a call for amending standing policy (D'Ignazio, 2020). Trust is thus just as important to mounting such a critique as is the legibility of what is produced to diverse stakeholders, including those in a seat of power. Enrolling different perspectives in recognition that any perspective is inherently partial creates inclusion as much as it adds vigor to the final product.

Framing the Politics of Countermapping

María del Carmen Lamadrid's 'Tool for Stalling: Mapping' extends these conversations toward the use of grassroots mapping within the Global South. del Carmen Lamadrid (2013) starts the article with a conditional phrase and an interrogative: 'If the official world of maps has mutated into an insane apparatus of surveillance and control, why should communities use maps to make land tenure claims?' By contrast, through countermapping, del Carmen Lamadrid writes that communities 'hijack cartography to make themselves visible and more difficult to dismiss.' This use of 'hijack' proves just as direct as the evaluation of the 'insane' surveillance mapping typically conditions, framing community co-optation as a critique of the dominant. This turn is prescient from a feminist data critique. Both acknowledge and embrace partiality and would question such a universalizing view of space.

To exemplify these dimensions of countermapping, del Carmen Lamadrid discusses working with a Ugandan craft market. The market and its community bolstered the area's tourism industry, and sought to 'build a map . . . to stall eviction by the state . . . [and] to gain

time so the community could organize their next steps, while creating a dialogue around urban planning and the displacement of communities.’ In what follows, del Carmen Lamadrid (2013) confronts issues with Google Maps:

Google Maps oozes an aura of authenticity and credibility that makes it hard to question the information it displays. Partly because the photographic elements seem to be miniature pieces of reality anyone can make (Sontag) and partly because of the companies' emphasis on data collection.

Researchers [sic] at Google continue looking into ways of providing all the world's information But when your core interests are companies, what information becomes important and how does it get prioritized?

The beginning non-modalized statement weaves in the work of cultural critic Susan Sontag to justify how Google images are often ‘hard to question.’

However, through grassroots mapping, del Carmen Lamadrid and the workers of the market strove to ‘question both the state claims on The Craft Market's importance while subverting the Google Maps representation of the space.’ The additive clause marked by ‘while’ ties the state to Google Maps as detrimental actors, validating grassroots mapping as working against both. del Carmen Lamadrid’s (2013) endorsement is clear:

If Google thrives to make information accessible and Google Maps is a kind of 'macroscope' that helps consult places in a space, then what happens to the places and people that are not business? How can mapping be free from the tyranny of the state and from big corporations to bring visibility to . . . communities that do not fall in line with the macro scale?

As a feminist perspective helps illuminate, since Google Maps is produced out of a clear set of commercial interests that highlight points of interest and target advertising in ways attuned to a particular user’s search history, it is clearly not just a partial perspective – meaning, incomplete, straying from the notions of mapping this article began with – but also a biased one. del Carmen

Lamadrid (2013) argues the answer to the questions posed above lies in indigenous mapping and use of ‘community satellites.’ del Carmen Lamadrid (2013) outlines that community satellites by design feature everyday items to forge high quality aerial images: ‘By lowering the access cost of aerial photography, ‘community satellites’ can be used by communities [to] question . . . mapping as a medium of state control.’ This starts with a clause conveying purpose (marked by ‘in order to’) and associating the high resolution of grassroots mapping with better articulated claims. del Carmen Lamadrid (2013) returns to this point, saying higher resolution makes claims ‘more sound.’ But the modal ‘can’ signals maps do not inherently question and prompt action. How communities utilize and employ them in dialogue in accordance with a feminist praxis is what gives them power.

del Carmen Lamadrid (2013) equally highlights the choice to use OSM in prompting action:

Users of Google Maps are not able to actively shape the maps displayed. Instead, we release the photographic map to the public domain through an open-source GIS, OpenStreetMaps [sic]. Google Maps sometimes takes information from OpenStreetMaps [sic] of areas they are not able to constantly update. This way The Craft Market and I were hoping to affect Google Maps while shaping their online presence in a method that was relevant to them.

The negative non-modalized statement purporting what users cannot do in the first sentence, the conjunctive ‘instead’ to start the second sentence, and the inclusive ‘we’ stressing the community-oriented nature of grassroots mapping reflect del Carmen Lamadrid’s commitment to how Google passivates users. The mention of Google extracting from OSM is equally notable, making the latter a platform for intervention.

del Carmen Lamadrid (2013) deems the resulting map of The Craft Market did not incorporate the community’s touch as much as it should have due to this approach: ‘By being a

polished and finished photographic map, it used a representational value that the state can acknowledge, but left no space to present their own hand drawn map or a systematic investigation.’ The distinction between legibility and trust is thus in play here; more legible modes of representation may not be the most inclusive of community testimonies. del Carmen Lamadrid (2013) reveals that ‘[i]n the end, the community was evicted on February 25, 2013.’ The use of the passive in the description erases which actors were ultimately behind the eviction. It carries the political implications of the passive voice typical in conveying such corporate and government actions.

del Carmen Lamadrid (2013) further punctuates Google’s detriments as an outsider lacking what a community perspective affords:

Google, as a foreign global institution, is shaping our perception of the actual size and impact of the market. Google is making claims on the geographic boundaries of the space by naming buildings and marking roads. The ideas behind the credibility of photographic representations and the prestige of the institution render this map as the most important source to what was physically in the space.

The first sentence, a non-modalized statement, directly confronts Google’s cognitive effect on users. The tensions inherent in its power of ‘making claims’ is one of different space-times: one of the global that Google accords to and one of the local, which experiences and knows the space in contention much differently. In the article, Google Maps is thus a point of friction: both the site of power that suppresses community motives and the site of resistance for their contentions, one which if diverse actors in the community are invited to contribute and deliberate can prove fruitful.

Discussion

CDA Findings

Overall, Public Lab's brand of 'counter education' in working outside of traditional institutional structures toward more equitable research practices seeks to empower lay publics (Stein and Miller, 2016). The user ideally becomes both a consumer and producer of geospatial data. Rather than thriving off disconnection like satellites, grassroots mapping – often employing kite, balloon, pole, and drone mapping – connects mappers, mapping tools and environments. These investments align with Dewey's philosophies on connecting pedagogy to life experience. Bypassing the slow and ineffective pace of the institutional on its own in such matters within an on-the-ground community praxis situates tools within their context and merits play with everyday, on hand materials toward real-life impact. This helps not only to assemble tools for data capture that can ground community stances, but also builds an assembly in the sense of a community infrastructure that a feminist perspective of pedagogy and technology seeks (Latour, 2005).

Public Lab's mapping tactics find use in educational contexts. When one reviews locations mapped the most on the Public Lab site, many are schools, reflecting the rising number of making initiatives within elementary and secondary education. One of these is a private episcopal grade school in California. The school spotlights its interdisciplinary efforts in sponsoring a making environment for its students. On a webpage where the school highlights these pursuits, it even includes a quote from Dewey: 'Give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking; learning naturally results.' The frame of making is thus a deeply pedagogical investment that critical technology studies and critical pedagogy anticipates.

Comparable OSM Initiatives

OSM initiatives can also demonstrate a similar pedagogy of learning by doing. OSM provides a means of inspiring, empowering, and mentoring students as well as means of supporting preexisting curricula. This has meant deploying mapping in gender-based advocacy, public infrastructure assessment, and charting cultural heritage sites. Across projects, the ideal process – commensurate with Public Lab’s approach – is to start with a social issue (rather than a fascination with the deployed technology), define the issue, loan the technology, and provide mentorship accordingly.

This is clear in the rise of chapters like OSM Liberia, which has been particularly geared toward improving mapping of public health developments in Liberia in light of the Ebola crisis (‘OSM Liberia: Developing Young Mappers,’ n.d.). OSM Liberia’s provides not only technical training for prospective mappers in the area, but focuses on the ‘art of the possible,’ expanding what one might typically conceive as applications of such approaches and tools. It is far from alone within OSM; kindred projects in the Global South map in pursuit of social equity and public health.

OSM Nigeria’s initiatives demonstrate diverse applications for mapping and the technical approaches involved. UniqueMappersTeam within OSM Nigeria using maps to support citizen science and sustainable development. Projects the team has assisted include campaigns to map the brain in efforts to combat Alzheimer’s and mapping adverse effects of floods and oil spills (Human Computation Institute, 2017; Osuampkpe & Sunday, 2018). Another recent competition OSM Nigeria held was in honor of International Women’s Day 2018, with the winning mapper adding 7465 buildings to OSM base layer data over two weeks. Some of the challenges in running such events includes gender disparities in technological literacies and participation rates.

Ensuring a proper balance between such labor and students' regular schoolwork is equally cited as an obstacle.

LetGirlsMap, a campaign within OSM Nigeria but one also present within different OSM chapters, seeks (as many aforementioned feminist geography projects do) to augment the presence and participation of women in crowdsourced cartographic work. It includes women from different disciplines and grade levels within a mentoring effort connecting them with female leaders across HOT projects. It inspires initiatives on gender-specific issues, such as mapping of educational facilities posted in women's residences on-campus toward safe routing to lectures and classes, women's health centers, and – as with the campaign del Carmen Lamadrid highlights – craft market spaces (Oshoma, 2018).

OSM Nigeria's modes of organizing feature various common strains with other HOT chapters – the mobilization of students via competitions, a justification of preparing students for jobs with skills translatable toward opportunities within a global knowledge economy, and a focus on addressing gaps in rural areas. Why are these communities gathering to work in this way? Data toward managing environments and populations is increasingly important in urbanized contexts, yet often lacking in non-Western rural areas. Government bodies in such areas are increasingly looking to residents themselves to fill these gaps, even as some entities are wary from a data quality standpoint (Greene and Myers, 2018). Monrovia City, Liberia's capital, is one area warranting this, with patterns of resident mobility altering drastically in recent decades out of civil war, flooding, the Ebola epidemic, and job precarity ('Open Cities Africa – Monrovia City Project – Liberia,' n.d.). This political, environmental, and economic precarity demands community data management to properly assess. Without this, government perspectives are unlikely to capture such dynamics fully.

Community and institutional partnerships are focal to these strategies. Liberia's OSM chapter holds regular trainings, mapathons, and local town hall events. It partners with local schools, NGOs, and state organizations. Communicating with schools poses several challenges; the group corresponds with university faculty and advisors to promote understanding of their work and the 'route toward employability' it provides. Part of the justification for this work thus lies in providing training for youth to meet the contemporary knowledge economy, signaling the its import for youth.

The GAL (Global Active Learning) School of Cusco, Peru has equally become well known for implementing OSM as part of an active, self-directed pedagogy that redirects relationships between communities and institutions toward furthering equity. It walks students through how to plan projects and considers how projects can transform social circumstances. Project designers see the path to engagement as one of cultivating inspiration, empowerment, and fit with pre-existing curricula. Engaging similarly with the art of the possible as OSM Nigeria, the project asks students to establish what they would like to change about society, the means by which that might be accomplished, why communities impacted by this issue have not been sufficiently mapped, and what role institutions and impacted communities can play to fill that gap. Such lines of questioning help define mapping tasks students can complete. Examples of student projects include mapping transportation and disaster management infrastructure, cultural sites, and locations of sexist advertisements (Humanitarian OpenStreetMap, n.d.).

HOT supports promising initiatives financially through its microgrants program. HOT provides \$2000-\$5000 to projects to cover internet access, technology expenses, and training to community-based mapping projects in the Global South (Firth, 2017). Crowd2Map Tanzania, one of many initiatives to receive such funding, uses HOT to combat female genital mutilation in

Tanzania's rural areas. The group cites that deaths during the region's cutting season went down from 12 to four from one year to the next under their watch. They equally contend that '[h]aving better maps' from their work 'helped prevent 2257 girls from being cut' (Chapman, 2017a).

Rural regions are poorly mapped compared to the urban areas of Tanzania. The group deems them 'blank in Google Maps,' continuing the critique of seeing dominant spatial platforms as complete. The group found that this was not quite the case on OSM, but omissions remained. It sought to bring open data available through the Tanzanian government to OSM, and developed training materials to do so in spite of a lack of access to enough laptops. A picture from a Crowd2Map Tanzania slide presentation illustrates one training session where a large group of people receives training on the only laptop accessible for the session (Chapman, 2017b).

Pedagogical settings are important to the campaign. Many of those trained are university students. Crowd2Map Tanzania founded seven of the 17 YouthMappers chapters in Tanzania to support these mapping efforts. Like OSM Liberia and OSM Nigeria, competition and play are key motivators in building impactful local mapping capacity. Crowd2Map Tanzania uses monthly competitions among users to incentivize contribution to the project. Collaboration over a group Facebook page as well as via WhatsApp helps determine names of different villages, estimates for resident counts, and roads or bridges connecting one area to another. The group trained local volunteers and girls occupying a safe house how to map for this campaign. This has led to the safe house not only discovering more impacted communities, but also reaching them with improved knowledge of the limited roads networks connecting them, better knowledge of how much fuel they need to reach said communities, and a more independent means of mapping for these tasks. As of August 2017, the group had mapped 130,608 kilometers of road networks,

1,827,920 buildings, 1737 schools, and 389 medical facilities: all the labor of a total of 3465 volunteers (Chapman, 2017b)

Though much fieldwork and labor behind such projects is hosted locally, frictions between situated knowledge production and contributions on a fast-paced, global scale persist. The predominance of remote contributions brings various considerations to the fore in terms of structures of difference in the production of data and maps. Among this volunteer group, Crowd2Map Tanzania cites notable differences between subjectivities of remote mappers and community mappers. Remote mappers are often highly educated, well exposed to maps, and tech-savvy. Many community mappers, however, do not complete any education past primary schooling, never get exposed to a map of their home, and have never used internet-enabled technologies (Chapman, 2017c). While remote labor helps fill in gaps, it continues the colonizing practice of mapping and may further misrepresent and marginalize communities being mapped for lacking local knowledge (Fusco, 2004; Mitchell, 1991).

Technologies and interfaces employed in such campaigns can also have obvious Western inflections. Offline smartphone applications like MAPS.ME, one of many the OSM community employs on the ground, can require tailoring to meet the language needs of the groups employing them. In the case of Crowd2Map Tanzania, this involved reworking the interface to translate it into Swahili (Chapman, 2017b).

At the same time, remote mapping provides a labor force for updating base layer data that can propel the efforts of such projects in effecting local change. Curricular efforts can use that data to work around licensing conditions creeping into cartographic production. Map Lesotho, for one, emerged out of a need for openly licensed mapping of the country. Proprietary licenses local mappers had previously used for mapping expired. There were no funds for renewing them.

Through partnerships with both local government and Irish government organizations (culminating in a memorandum of understanding between Lesotho and the Fingal County Council in Ireland), the community began creating tasks through HOT. It set up local surveying as well as mapathons in Irish schools and universities. A similar approach of working via government councils, both local and abroad, is also occurring in Zambia (Fingal Independent, 2014). The state thus has a stake in what these educational collaborations can produce, and the added legibility they sponsor is one of several points I unpack to close this article.

Conclusion

This article explores grassroots mapping practices and their pedagogical extensions. The texts analyzed explore issues of information capitalism and dominant spatial platforms' often unquestioned authority. They present consumers and governments alike as complicit within these issues. They illustrate grassroots mapping's vision of the mapper as an active critic of the proprietary nature of data.

With more and more aspects of community life being commodified, many advances in mapping are allied with state and corporate interests. The texts thus portray grassroots mapping as much about the production of a more critical consumer within information capitalism as it is about a mapper. Among other patterns noted in the findings from the Grassroots Mapping Forum is how a 'lifecycle' analysis of data underscores a need for enhanced responsibility to users.

This aligns with feminist education perspectives centered on building community and equity, as outlined previously. When one sees the charting of space less as a race toward profit and knowledge and more as a node for critical inquiry and applied pedagogy, one sees mapping as an act of learning: as everyday, socially driven, and community focused. Crowdsourced

mapping, when designed thoughtfully toward inclusivity, can facilitate active learning that pairs the experiential with the empirical in ways that particularly support an exploration of structures of difference.

Though the care and thought put into designing such campaigns are still key to considering legacies of cartography, examples explored here demonstrate public turns on technologies and practices once applied solely toward efficiency and control. Jürgen Habermas fears the rational logic of such forms seeping into means of communication and depriving them of their capacity to preserve a sense of what is humane and worth valuing. He finds that technologies, much like economics and states, are ‘integrated action fields’ from which a romantic and face-to-face view of communication must be protected. However, when designed with an attention to community dialogue, as tools of the citizenry made with more accessible materials and in an open manner, technologies can serve as a route out of these formations, rather than being so strongly encoded by them as to have no potential for resistance (Kellner, n.d.).

As a pedagogical tool, the approaches discussed toward mapping can thus have the kind of applied and real-world impact Dewey desires. Technologies associated with globalization are not inherently instrumentalizing; appropriations from the Global South explored here exemplify that. Yet as feminist and grassroots mapping perspectives would demand, making space more legible within such efforts should not come at the cost of trust with the communities being charted or their voluntary participation. James C. Scott (1988) (echoing Habermas on legitimation) deems that legibility grassroots mapping demonstrates one of the key deficiencies of statecraft. The state attempts to develop metrics to better know both subjects and environments under its governance, simplifying complex dynamics. Texts and initiatives analyzed here juxtapose the actions of citizens in mapping against a passive and uncritical

consumption of state and corporate-produced spatial representations. They chart a route out from the passivation that can result from state management via global technologies toward an unattainable ‘complete’ spatial vision.

Thus, the vision of the curriculum this article endorses, to borrow from Donna Haraway (1988), ‘makes room for unsettling possibilities’ rather than continuing to reify settled narratives on technology and the public sphere. These narratives can certainly reflect very real issues at hand in using maps as a representational mode or to inform and enable participation. But this vision does add an important wrinkle in that frictions between local spaces and global institutions, and trade-offs between lay publics and state organizations, must thus be seen as co-constitutive and not prohibitive. Pedagogical initiatives employing digital mapping must navigate the complexities of articulating particularities of a local space-time, deploying a broader community to chart situated contexts, and relying on hegemonic spatial forms to render what is captured legible and legitimate.

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