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Moments of closure in the knowledge politics of digital humanitarianism

Ryan Burns

Department of Geography, University of Washington, Box 353550, Smith Hall 408, Seattle, WA 98195, United States

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ABSTRACT

Geographers interested in the social and political implications of the geoweb have recently turned their attention to its attendant "knowledge politics". Such work looks at the processes and discrete moments in development that led to certain knowledges being represented and other knowledges remaining invisible. In this paper I build on these conversations by exploring the knowledge politics of digital humanitarianism. Digital humanitarianism, a technological corollary to the geoweb, is the set of social and institutional networks, technologies, and practices that enable large numbers of remote and on-the-ground individuals to collaborate on humanitarian projects. Specifically, in this paper I offer 4 "moments of closure" when knowledge politics have been negotiated, enacted, and made durable in digital humanitarianism. These moments of closure constellate around the themes of inclusion, categorization, accuracy, and visibility. I then consider the implications of these moments for the kinds of epistemologies digital humanitarianism espouses, and how knowledges come to be represented. I argue that these knowledge politics – the struggles for legitimacy and means of representation – are fluid and contested, yet become more stable when implemented through technology. Through these processes digital humanitarianism, and by extension the geoweb, embodies the social relations that first produced the debates around knowledge representation.

1. Introduction

In recent years spatial and mass-collaboration technologies have come to be integrated into humanitarian practices in a development called "digital humanitarianism." Humanitarian organizations are now beginning to explore the ways digital humanitarian technologies and practices can improve their response and recovery efforts. For example, in Typhoon Haiyan the Humanitarian OpenStreetMap Team (HOT) helped digitize some Philippine islands in association with the World Bank (Humanitarian OpenStreetMap Team, 2013), and algorithms to assist social media monitoring were deployed in Superstorm Sandy response (Meier, 2012a; Shanley et al., 2013). Organizations like the Standby Task Force have recently been developed to "[organize] digital volunteers into a flexible, trained and prepared network ready to deploy in crises" (Standby Task Force, 2013a) such as data processing during the 2011 Libya conflict and improving disaster preparedness in South Sudan in 2012 (Standby Task Force, 2013b). Digital humanitarianism presents new challenges for researchers exploring the social and political implications of spatial technologies, as it relies on different modes of production, processing, curation, and representation of people, places, and knowledges; that is, most often, digital humanitarianism enrolls spatially and socially-distanced people to work with local knowledges mediated through digital technologies.

One potential approach to situating digital humanitarianism within these conversations is through nascent research into the knowledge politics of the geoweb. "Knowledge politics" refers to "the ways in which individuals and institutions leverage digital spatial data and spatial technologies in negotiating social, political, and economic processes, often doing so in ways that rely upon the differential influence and authority that is granted to particular forms of knowledge or representations" (Elwood, 2010, p. 352). Knowledge politics research looks at the social and spatial processes that have led to some epistemologies being included in spatial technology praxis, and others excluded.

Elwood and Leszczynski (2012) have articulated the importance of taking knowledge politics seriously within geoweb research. They show that the geoweb has advanced different ways of making knowledge claims and appeals to legitimacy, with implications for new socio-spatial practices as well as systems of exclusion. Indeed, geoweb-based knowledges reflect social, geographical, and power relations, rather than erasing them (Dodge and Kitchin, 2013), with

E-mail address: Burnsr77@gmail.com.

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prominent examples including gender-based (Stephens, 2013a), and socio-economic (Haklay, 2013) inequalities. Little work has identified specific moments in which technological closures are made on some epistemologies, although doing so could shed light on how inclusions and exclusions become codified (Cope and Elwood, 2009; Kwan, 2002; Sheppard, 2005, 1995). Other forms of the geoweb – such as crisis mapping and digital humanitarianism – are laying new ground for exploring how knowledges are negotiated and materialized in technologies.

Very little work has gone into understanding and theorizing knowledge politics in digital humanitarianism, a field that relies explicitly on the collection, processing, managing, representation, and interpretation of diverse knowledges. Digital humanitarianism, a technological corollary to the geoweb, should be conceptualized as the *enacting* of social and institutional networks, technologies, and practices that enable large, unrestricted numbers of remote and on-the-ground individuals to collaborate on humanitarian management through digital technologies. Digital humanitarianism adds the techniques of crowdsourcing, crisis mapping, social media monitoring, and remote delegation to other, more traditional, techniques applied in the areas of emergency management, political crisis response, and general social causes. Digital humanitarianism can be observed in the operations of HOT,[1] the Digital Humanitarian Network,[2] the Standby Task Force,[3] Ushahidi,[4] and Sahana,[5] along with many other such examples. Digital humanitarianism, because it relies on remote contributors producing, processing, curating, and representing knowledges from and about a distant person or place (both in terms of location, and in terms of material resource possession/need), engages a distinct set of knowledge politics. As such, it bears exploring vis-à-vis current knowledge politics research.

In this paper I show that the mechanisms of knowledge politics identified in the geoweb research operate similarly in digital humanitarianism; however, whereas knowledge politics research in the geoweb has tended to question how claims to legitimacy are made, I instead build on these discussions to bring to light different knowledge politics modalities. I provide evidence of these knowledge politics by considering four distinct 'moments of closure' in which decisions were made that led to some epistemologies being accepted into digital humanitarian practices, and others written out. The moments here, as distinct from previous knowledge politics research, constellate around the themes of inclusion, categorization, accuracy, and visibility, although they all link together under the struggle for legitimacy and for the terms of representation. These moments occurred when knowledges were negotiated, enacted, and made durable in the socio-technical practices and artifacts of digital humanitarianism. The quotidian nature of these moments speaks to how such practices often go without notice and question. I argue that these closures are fluid and contested, but the contexts in which they occur necessitates they be made stable upon technological implementation. In other words, the technology makes concrete the outcomes of knowledge politics negotiations, and therefore embodies the social relations in which the negotiations took place.

2. Politicizing knowledge

Knowledge politics are the means by which people negotiate and contest the recognition, legitimacy, terms of representation, and interpretations of ways of understanding and interacting with the world (Elwood and Leszczynski, 2012; Elwood, 2010). This understanding positions *struggle* as the most important dynamic in these negotiations: epistemologies are given differential power and legitimacy depending on the sorts of 'rationalities' they employ (Crampton, 2003; Elwood, 2009; Sparke, 1995). In a technological context, these politics become embodied and temporarily fixed as "moments of closure" as they become implemented in hardware, software, and associated social and institutional practices (Chun, 2005; Sheppard, 1995; Wilson, 2011). This paper situates knowledge politics within conversations emerging from critical perspectives on technologies, as these research areas have identified mechanisms of knowledge politics that may inform a related exploration within digital humanitarianism. Below, I discuss how these areas have drawn important lines between socio-technological practices and power relations, and the ways in which technologies enable and disable possible knowledge politics. In a sense, for digital humanitarianism this paper attends to "the cultural, social and economic relations that bring the interface into being" (Dodge et al., 2009).

2.1. Spatial information technologies: representation, legitimacy, epistemology

Critical GIS debates in the mid-to-late 1990s highlighted the relationship between GIS's development and the epistemologies it could readily incorporate. The outcomes of this research suggested that one way to explore the linkages between epistemology and the social development of technology is by identifying the mechanisms through which knowledges and their representations are negotiated or excluded in the context of spatial information technologies (Corbett and Rambaldi, 2009; Elwood, 2009; Elwood, 2006). For example, Sheppard (1995, p. 14) asserted that GIS, by its nature as "a social technology incorporating an entire institutional and intellectual infrastructure ... reinforces certain practices and ways of knowing at the expense of others," and this understanding of knowledge politics was reflected in a later University Consortium for Geographic Information Science research agenda (UCGIS, 1998). Although at times implicit, these lines of questioning suggest that by exploring how geographic technologies have developed, one can potentially identify knowledges, values, norms, and epistemologies that differ from what is currently utilized in GIS (Harvey and Chrisman, 1998; Schuurman, 2002; for outside geography, see: Feenberg, 1999; Winner, 1985).

Recent geoweb research, informed by these critical GIS principles, shows that individuals and social groups often negotiate how their knowledges are captured and represented through the mechanism of visibility (Elwood and Leszczynski, 2012; Elwood, 2009). This visibility relates to the legitimacy granted particular knowledges and epistemologies. If spatial technologies were developed to represent only limited kinds of knowledges, making alternative knowledges visible can be seen as granting them a greater degree of legitimacy (Stephens, 2013a, 2013b). Many responding to the critiques of GIS have sought to leverage mapping technologies to make visible local, indigenous, women's, and other knowledges that have arguably been written out of the technologies (Corbett and Keller, 2006; Dunn, 2007; Elwood, 2009, 2006; McLafferty, 2002). Recent research into qualitative GIS falls under these efforts (Elwood and Cope, 2009; Jung and Elwood, 2010; Knigge and Cope, 2006), and is reflected in recent arguments that the knowledge politics of the geoweb are both everyday, fluid and made temporarily concrete (Gerlach, 2013; Perkins, 2013). Such mapping projects illustrate a tension between the legitimacy granted knowledges when represented in cartographic form on the one hand, and the problematic nature of using Cartesian-based measures of "accuracy" and a "disembodied" viewer to represent epistemologies antithetical to these logics (Harris et al., 1995; Wei-

[1] http://hot.openstreetmap.org/.
[2] www.digitalhumanitarians.com.
[3] http://blog.standbytaskforce.com/.
[4] http://ushahidi.com/.
[5] http://sahanafoundation.org/.

ner et al., 1995; and more recently: Corbett and Rambaldi, 2009; Brown and Knopp, 2008; Burns and Skupin, 2013; Young and Gilmore, 2013).

However, knowledge politics functions not simply through making knowledges visible, but also through the struggle for control of the *terms* of visibility (Elwood and Leszczynski, 2012; Harvey, 2013). Visibility is not conceptualized as a goal in and of itself, because it both grants legitimacy *and* opens the possibility of vulnerability (e.g., surveillance or physical endangerment). On the one hand, as discussed above, visibility recognizes the value of what has been written out of typical visual narratives. On the other hand, people often express justifiable reasons for wanting to remain *in*visible. At times populations can use invisibility – or selective moments of visibility – to strategically affect their environments (Crampton and Krygier, 2006; Mitchell and Elwood, 2012; Perkins and Dodge, 2009). Vulnerable and politically-marginalized populations, in particular, often place higher priority on anonymity, privacy, and invisibility (boyd, 2011; Nakamura, 2002). Thus, knowledge politics should be seen as one's struggle to represent their worldview *on their own terms*.

2.2. Critical theories of information technologies and knowledge production

Feminist scholars have long conceptualized technology's development as deeply imbued with social norms and values (Harding, 1986; Wajcman, 1991). For Wajcman (2010, p. 7), "gender relations can be thought of as materialised in technology, and masculinity and femininity in turn acquire their meaning and character through their enrolment and embeddedness in working machines." Technologies therefore embody particular ways of knowing, and where certain privileges lead its development, the resulting technology tends to reinscribe those privileges.

Chun (2005) illustrates how software came to embody a particular set of gender relations through specific historical junctures. Each of these junctures, what I call "moments of closure" in the present paper, are characterized by mechanisms that make some outcomes – some technologies, some "worlds" – more likely than others. For Chun, software's particular historical development, and more precisely software's abstraction from hardware, nurtured a distinctive "visual knowledge." She thus shows how by exploring moments of closure in technology development, one may illuminate the knowledge politics that lead to the present condition of socio-technical praxis. Importantly, "closure" does not imply impossibility; however, because software has material impacts on social relations, it has a degree of permanence and longevity.

The struggle around recognition and a politics of "difference" is another mechanism underlying much knowledge politics. In this framework, negotiating a knowledge politics is key to achieving social justice (Fraser, 2000, 1997). Such struggles pursue justice around multiple dimensions by which bodies are marked: race, gender, sexuality, class, and others. The goals here are the ability to participate in social forums, and on one's own terms (Fraser, 2000; Young, 1990). This struggle for recognition mirrors the struggle to have one's knowledges considered representable and considered legitimate. Thus, exploring the terms on which knowledges are negotiated and come to be represented, recognized as legitimate, and engaged critically, all strengthen our understanding of social and political systems of power and privilege.

Another mechanism through which knowledge politics are activated lies in how knowledges are collected, processed, aggregated, and represented (Bowker and Star, 2000; Elwood and Leszczynski, 2012). The processes between a person possessing knowledge and another interpreting it involve multiple complex steps (Fraser, 1988). Bowker and Star (2000) discuss how standardizing and classifying involve layers of abstraction and privileging some knowledges over others. To establish a classification system requires abstracting from diverse understandings and perspectives, drawing epistemological boundaries around what is possible to experience and to know. Moreover, systems of classification claim to be universal and objective; they aim to capture the full range of "legitimate" human experience and, by effect, classification systems isolate outliers. According to Bowker and Star (2000, p. 81; emphasis mine), "the classification system operates a shift away from our being individuals experiencing the world to our being *kinds* of people experiencing *kinds* of places. ... The classification system ... has become a site that holds these constructions together and, through excluding other kinds of story, makes them more real." This of course masks the system's own history of contestation and negotiation, which Bowker and Star excavate in the context of medical knowledge classification.[6] Such excavation reveals the moments of closure by which contemporary classification systems came into being, and illuminates what could have been.

2.3. Digital humanitarianism

Digital humanitarianism engages explicitly with multiple, diverse knowledges to implement humanitarian projects which formerly had been enacted in a more centralized manner (Liu and Palen, 2010; St. Denis et al., 2012). Because it relies always on differential place-based knowledges and often on mapping technologies, in addition to taking specific geographically contextualized forms, I consider it a corollary to the geoweb.

Technologically speaking, digital humanitarianism mobilizes some combination of crowdsourcing, crisis mapping, social media, and virtual operations (Burns and Shanley, 2013; Crowley and Chan, 2011). Each of these constituent parts has been developing over the last decade (Palen and Liu, 2007), and some formal institutions have emerged or been reconfigured in order to accommodate these efforts (Olafsson, 2012; Reuter, 2012). For instance, the International Network of Crisis Mappers was launched at the first International Conference of Crisis Mappers in 2009 (Ziemke, 2012), while the Digital Humanitarian Network was initiated in close collaboration with staff at the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) in 2011 (DH Coordinators, 2012). Other key organizations participating in the development of digital humanitarianism include the Standby Task Force, HOT, Sahana, the very loosely-coordinated Virtual Operations Support Teams, Humanity Road, NetHope, and Crisis Commons.

In its nascence, the field of digital humanitarianism is actively – if not explicitly – negotiating its own knowledge politics in order to demonstrate its value to intended audiences. These conversations take place in listservs, workshops, Skype chats, conferences, and during and immediately following deployments (Meier, 2012b). Knowledge politics are an ongoing conversation in the field since its proponents would like to see further integration of their perceived and real contributions to humanitarian management. The kinds of skills, outcomes, and capabilities digital humanitarians must convey to the formal humanitarian and disaster management sectors, then, must align with those pre-existing needs. Digital humanitarian organizations make deliberate decisions on what kinds of knowledges to collect, how to manage and process those knowledges, and how to represent those knowledges to their constituencies. While formal sector adoption of digital humanitarianism has been uneven and rife with practical, policy, and research challenges, there is some evidence of increased momentum in that direction (Burns and Shanley, 2013; Cohen, 2013; United Nations

[6] For another analysis of how medical knowledge is laden with power relations, see Mol's (2008) critical book.

Office for the Coordination of Humanitarian Affairs, 2013). In particular, OCHA has advocated for the adoption of digital humanitarianism.

Therefore, central to these knowledge politics negotiations is the paradox that digital humanitarianism relies on multiple knowledges but at the same time must tame them and abstract from them. This involves excluding some kinds of knowledges and representations as irrelevant, illegitimate, or extraneous, while including others. Knowledges included remain deeply political, as they proceed through several layers of complex representation, abstraction, and interpretation (Fraser, 1988; Roy, 2010).

Digital humanitarianism is a productive case through which to explore how knowledge politics operate in information technologies contexts. Similar to the geoweb as a whole, it is driven by discourses of equality, pure democracy, and public participation (Haklay, 2013). Digital humanitarianism is held to be equally accessible and empowering to all people who wish to participate, and open to all knowledges (Meier, 2012b, 2011a, 2010; Poblet and Casanovas, 2012; Ziemke, 2012). In contrast with these discourses, the digital humanitarian community is learning that traditional humanitarian agencies must be educated to engage in this field appropriately (Capelo et al., 2012), and that social norms and relations are reproduced in these contexts (Semaan and Mark, 2012). In this paper I challenge the dominant narratives about digital humanitarianism by showing how mechanisms of knowledge politics identified in the geoweb play out in the digital humanitarian context. The goal is both to advance a more nuanced understanding of the relationship between information technologies and society, and to offer a case for exploring how knowledge politics operate in this new context.

3. Methods

The following section is devoted to presenting four empirically-informed distinct moments when these knowledge politics were negotiated, and have resulted in "moments of closure." These arguments follow a review of publicly-accessible listservs, blog posts, humanitarian action summary reports (called "after-action reports"), video archives, publicly-archived Skype chats, and digital humanitarian organizations' websites. Specifically, I reviewed archived messages on the Humanitarian OpenStreetMap Team (HOT), CrisisMappers, and CrisisCommons listserves; the blogs and archived documents of the Standby Task Force (SBTF), iRevolution, Ushahidi, Sahana Software Foundation, Geeks Without Bounds, and iDisaster 2.0; and after-action reviews referenced in these materials.

Importantly, my familiarity with relatively important sources of information has been informed by longstanding active participation in the digital humanitarian community. Despite this close association with the digital humanitarian community, all data collected and analyzed for this paper is publicly-accessible and sources are provided.

Through this review I inductively identified several topical areas in which knowledge politics often occur, and from these areas isolated four for more rigorous analysis. I selected these particular moments for two reasons. First, because they resonate with extant critical scholarship, building a productive bridge between existing research and new contexts. That is to say, they provide fruitful material for speaking back to existing theories (Herbert, 2010). They add mechanisms of knowledge politics to existing literature. Second, I chose these particular moments because they are illustrative of the broader knowledge politics that play out in this new context. The four moments that follow are highly influential in the broader field.

My analytical framework for identifying and interrogating these moments most closely aligns with discourse analysis, as this approach enables a researcher to question the systems of meaning that circulate within a given context (Dittmer, 2010; Doel, 2010; Elwood and Leszczynski, 2012, 2011). Discourse analysis is particularly useful for studying digital humanitarianism because those involved in the field are often geographically distributed, and communicate policies, approaches, and "best practices" via public forums. Knowledge politics function in the quotidian interactions as well as discrete moments of technological closure, and therefore many other examples exist than those I discuss below. In other words, these four examples are meant to be taken as neither exhaustive nor statistically representative of the entire data sample. Rather, they offer the opportunity for learning about how knowledge politics function in new technological contexts.

4. Digital humanitarianism's moments of closure

The four examples that follow were chosen because they illustrate four different mechanisms by which such knowledge politics play out in digital humanitarianism: (i) inclusion, (ii) categorization, (iii) framing accuracy, and (iv) negotiating privacy and visibility. These moments of closure are moments when decisions were made regarding the kinds of knowledges that can (and can't) be included in digital humanitarianism, the terms on which those knowledges can become included, the representations that were deemed appropriate for those knowledges, and how those knowledges can be used. Each moment led to a "closure" in the sense that, for the specific case, some outcomes became more likely than others, and became codified in the technology itself. Importantly, however, the use of "closure" should indicate privilege given to a particular direction, rather than absoluteness; knowledge politics are always contested. In fact, the seeming banality of several of these examples speaks to the unquestioned and potentially insidious nature of knowledge politics.

4.1. Inclusion

The Humanitarian OpenStreetMap Team (HOT) data model is a framework for the kinds of information OpenStreetMap (OSM) can collect and display. It is a template that outlines specific types of empirical phenomenon; for instance, within the broad category of "Places," one can digitize a "City," "Town," "Suburb," "Neighborhood," "Village," and a few other options (see Fig. 1). This data model is an ongoing site of negotiating and contestation, as new categories are added or others are merged, and deliberation of the merit of categories is ongoing. The HOT data model both enables and constrains those who contribute to OSM when they are activated to assist disaster/humanitarian management data production efforts.

Beginning April 4, 2012, a dialogue opened on the listserv for HOT, in which a new member inquired whether the HOT data model should include information related to natural hazards (Henriod, 2012a). Motivating the inquiry was the idea that those involved in humanitarianism and disaster management are highly concerned with *preparedness*: that is, identifying areas that might be prone to higher damage in the case of a disaster. At the time, the HOT data model did not include information related to risk, which limited the platform's usefulness for formal response communities. Moreover, this member expressed the desire to implement the inclusion themselves, rather than rely on the existing volunteer base to implement the suggested changes. This member embedded in their inquiry a recognition that different "communities" would have different knowledges of hazards, risks, and disasters: "As we can not expect the [digital humanitarian] communities to have

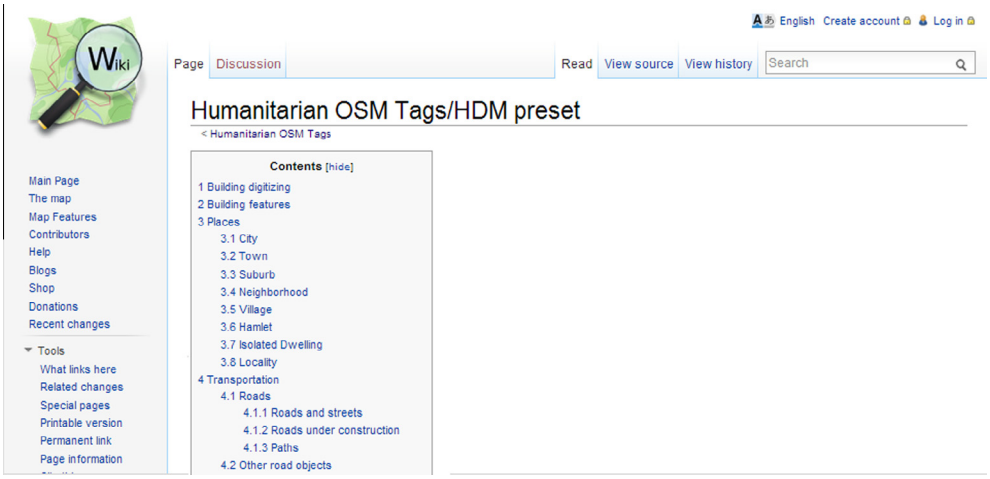

Fig. 1. The HOT data model is the set of instructions for what types of data should be included in their dataset, and how such data should be "tagged."

the technical knowledge of hazard scientists, the [data model's] ontology would have to remain quite simple…" (2012a, l. n.p.). At the heart of the inquiry, then, was whether or not the HOT data model should include this form of knowledge.[7]

Over the course of a week, members deliberated the merits of this idea, with initial resistance based on 2 premises. The first depended on the quality of visibility that a phenomenon may or may not have. As one respondent put it, "OpenStreetMap is usually used to map things that are visible on the ground" (Chapman, 2012, p. n.p.). Notably, according to this explanation alone, this would presumably be inclusive of the disaster's effects *after* they occurred. The second premise for resistance was based on a claim to legitimacy that eludes laypeople: "I see it being difficult for some types of hazards to be collected by the average person (not to say for some types it isn't easier)" (2012, p. n.p.). This argument says that since HOT's membership is almost entirely comprised of lay mappers who may not have formal hazards and risks modelling training, the benefit of such information would not outweigh the amount of effort required to collect and manage the data. However, this second premise contains another insinuation: an 'average' person local to a phenomenon should be able to map the phenomenon if it is to be contained in the HOT data model.

The first premise explicitly sets boundaries around the *types* of knowledges that can be collected and represented in OSM, and by extension produces a framing of legitimacy that excludes particular forms of knowing. Namely, HOT advocates an occular-centric framing of legitimacy, which excludes knowledges lacking a manifestly *visible* presence in absolute geographic space. Non-visible knowledges excluded in this framing include: affective and emotional knowledges, interpersonal knowledges, intuition, personal memory, and collective memory. In the case of hazards modelling this would exclude, for example, a community's non-visible knowledge of an area in particular danger of a landslide, given past landslides in that area. Members of HOT are not unaware of this dynamic, as the original author added in a later message, "From my experience with communities… local people know very well where the main hazard zones are located ('There's a minor landslide on this foothill almost every year' or 'My father told me that once there has been a massive flood that destroyed 10 houses')…" (Henriod, 2012b, p. n.p.). However, this form of collective memory is excluded from HOT because it does not have a visible presence in absolute geographic space.

The second premise mobilizes a particular form of legitimacy that excludes some knowledges while claiming to defend them. Because laypeople are assumed to not be able to map some kinds of hazards, HOT should exclude their knowledges on those people's behalf. This assumption of inability to map hazards was picked up by another member's response:

> "By assuming that the 'average person' is unable to collect relevant hazard information, are we not claiming that only empirical top-down information should be considered? Shouldn't place-based knowledge systems be the most relevant systems for place-based hazards...that is 'things that are on the ground'? Isn't this counter intuitive to initiatives to 'democratize' data?"

This response connects this local knowledge negotiation with broader knowledge politics struggles. HOT, an organization built on the ethic of democratized data and data production, was contradicting this ethic by setting these particular boundaries around knowledge collection and representation.

Other listserv messages encouraged the author to create a separate database with a duplication of OSM data (in technical terms, "fork" the OSM database) and build hazards data on top of that data (Schmitt, 2012),[8] but as of this writing a full-fledged natural hazards database never materialized. What is important here is not whether or not the hazards database was developed, but that this situation exemplifies a knowledge politics that allowed some knowledges to continue being incorporated, to the explicit exclusion of others. Whereas digital humanitarianism and the geoweb are often lauded for their openness to laypeople and folk knowledges, this case suggests that knowledge politics can undermine such an ideal.

4.2. Categorization

Ushahidi and its freely-hosted equivalent CrowdMap[9] are highly-used crisis mapping platforms that receive "reports" in the form of SMS messages and tweets sent on Twitter using a designated hashtag, and after human processing in the background, display these reports on a map. Ushahidi has been engaged for a number

[7] The Humanitarian Data Model, viewable at http://wiki.openstreetmap.org/wiki/Humanitarian_OSM_Tags/HDM_preset, was not mentioned in this conversation. I mention it here because it includes an element for "hazard_prone", which seems to fulfill the member's need. I am not aware whether the element was added prior to or after this email conversation.

[8] The author of the original message began a wiki to outline these ideas. See: http://wiki.openstreetmap.org/wiki/OpenHazardMap.

[9] The Ushahidi software must be hosted on an individual's or group's own server; CrowdMap is hosted free-of-charge on the Ushahidi organization's servers. For the rest of this paper I refer to the two synonymously, since in practice they operate nearly identically.

of humanitarian, civic engagement, disaster management, and community activist purposes. Individual Ushahidi platforms are generally established, monitored, and populated by informally-organized groups, often volunteers, and their intended uses range widely from community awareness to human rights prosecutions. Each instantiation of the Ushahidi platform involves making basic design decisions (more of which are available by default in Ushahidi than CrowdMap), establishing a hashtag that can deliver reports to the platform, and most importantly for this paper devising a set of categories into which each report will fall. The specific categories are devised for each Ushahidi project, and are entirely dependent on the individual or group setting up the project. Depending on the topic of the Ushahidi deployment, some common categories include "public safety", "public health", "security concerns", and "infrastructure damage." The presumable goal of these categories is to divide the reports into categories that can readily be addressed by an appropriate group of people (e.g., first responders have different roles and interests than law enforcement).

As discussed above, Bowker and Star (2000) have effectively argued that categorization abstracts from a phenomenon's individuality by isolating detectible characteristics and grouping with other phenomena deemed to have similar characteristics. It is through this process that categorization highlights some characteristics while discarding others. Moreover, classification systems interact with their contexts socially, historically, geographically, and relationally. In other words, classification systems both reflect and influence the social and political contexts in which they are used. The classification system for each Ushahidi project, therefore, sets limits around not only the *kinds* of knowledge it can collect and display, but also *how* those knowledges will be treated, and influences *how* they will be interpreted (Fraser, 1988). To classify a report in Ushahidi demands several steps: a human must read the report, translate it where necessary, interpret its meaning, foresee the most appropriate response sector, and place the report in the "correct" category or categories.[10] Despite the complexity of these steps, it is often held that there is a proper category for each report (Morrow et al., 2011). For each Ushahidi instantiation, then, there occurs a moment of closure where the platform will collect only certain categories of knowledge, and will abstract from those knowledges in potentially unintended ways, privileging some forms of knowledge representation over others.

For all the complexities these steps inherently entail, they are not executed in a straightforward manner. As identified in the critical GIS and the geoweb literatures, technologies and information classifications call forth particular social practices in perhaps inconsistent relation to the original intentions. The Ushahidi Haiti Project, a watershed moment for the popularity of this software, was initiated in response to the 2010 earthquake outside of Port-au-Prince. This instance intended to connect emergency responders with individuals in need. This Ushahidi deployment contained 8 categories and 50 sub-categories (Morrow et al., 2011; see Fig. 2). One category in particular, "Emergency", caused significant confusion among those categorizing the reports, since to the volunteers it implied a depreciated importance to other categories. According to the primary evaluation of the Ushahidi Haiti Project, "some ... misclassification was deliberate in an attempt to move critical reports into what were perceived to be more closely monitored categories in order to improve the chance that the reports would trigger a response" (Morrow et al., 2011, pp. 24–25). In this case, the Ushahidi Haiti Project classification system elicited the practice of categorizing in order to effect some kind of desired change. However, in contrast with the intent for the categorizations, those processing the knowledges used the categorizations as part of their engaged practice in order to draw attention to reports they deemed urgent. In other words, the categories are much more than techniques for distillation and abstraction – they are tools that people engage in variegated and often unpredictable ways.

A reported 36% rate of error resulted from three combined problems: non-trivial numbers of "misclassification" into apparently urgent categories, high numbers of misclassification in other categories, and missing category tags altogether. In a statement that has strong implications for digital humanitarianism as a whole, the report continued: "A marked lack of understanding of operational aspects of emergency response contributed to producing sector and location classifications that were not universally applicable to the day-to-day work of responders" (2011, p. 25).

As one might expect, the usefulness of the categories fluctuated across response organization and throughout the course of the Haiti earthquake response. To the authors of the evaluation report, this indicated a challenge to the usefulness of the system as a whole. Other forms of knowledge exploration were encouraged: "Understanding that a single report categorization scheme can't meet the needs of all organizations at every phase of a crisis, consider the creation of an 'advanced search' interface which enables data users to produce more customized subsets of reports based on a user-defined search terms (sic)..." (Morrow et al., 2011, p. 31). Again, my goal here is not to evaluate the usefulness of the Ushahidi Haiti Project classification system, but rather to link knowledge politics negotiation with how those knowledges were put into practice.

Far from appraising the quantitative degree of divergence from "proper" categorization, I want to stress here the inherent social and political complexities of conceptualizing, implementing, and managing categorization schemes. These complexities make some knowledges visible with particular audiences and uses in mind, while closing off other knowledges and coming into conflict with the multiple ways of knowing a humanitarian or disaster situation. The Ushahidi Haiti Project began with a moment of closure which affected most immediately the knowledges that would be (and wouldn't be) collected for this particular project. This moment of closure has had more long-term implications through "lessons learned" documents and after-deployment reflections. Implicitly acknowledging these politics, the authors of the evaluation advised future Ushahidi deployments to "...monitor accuracy of classifications and geo-location in near real-time. Spend time developing classifications in cooperation with experienced emergency responders that understand operation decision making in emergency response" (Morrow et al., 2011, p. 7).

4.3. Framing accuracy

Debates around accuracy are more fluid, contested, and ongoing than the previous example. Since the emergence of crowdsourcing, and especially since its incipient integration into high-stakes situations like humanitarian response, many have questioned the accuracy of crowdsourced data production (Flanagin and Metzger, 2008; Goodchild, 2008; Mummidi and Krumm, 2008). Many new metrics for assessing this accuracy are currently in development (see, for example: Goodchild and Li, 2012; Haklay, 2010; Koukoletsos et al., 2012; Poore and Wolf, 2013). Here I look at a moment where debate involved a particular framing of what "accuracy" should entail and how it should be measured, rather than repeating the prevailing question of crowdsourced data accuracy. This moment of knowledge politics foreclosed multiple ways of understanding and interacting with one's environments. In this site of negotiation, space was created for an alternative reading of "accuracy" that would be more inclusive of diverse knowledges. The mo-

[10] Some of these complexities were cited alongside the statistic that out of 15,000–60,000 *translated* messages, only 3854 were mapped (Morrow et al., 2011, p. 22).

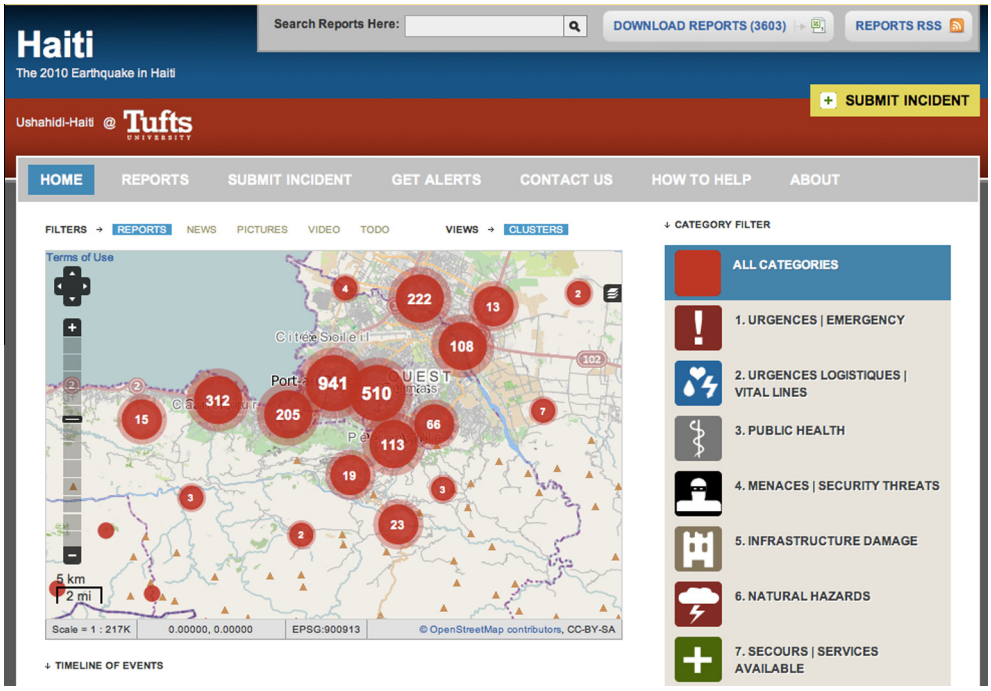

Fig. 2. The Ushahidi Haiti platform had seven primary categories (and one "Other") into which reports were classified.

ment closed on a singular understanding of accuracy, although the moment may prove to be ephemeral in the long run.

In September 2012 the Commons Lab of the Woodrow Wilson International Center for Scholars held a 2-day workshop that gathered digital humanitarians, the formal emergency response community, and academic researchers to discuss the integration of new technologies with humanitarian and disaster management (Burns and Shanley, 2013; see Fig. 3). Panels there explored pressing challenges facing the field, with a particular eye toward federal policies acting as barriers. Recognizing the nascence of digital humanitarianism, this workshop was meant as a propitious moment to clear hindrances, establish best-practices, share success and failure stories, and gain momentum. All panels at this workshop have been recorded and uploaded to YouTube.

Most references to accuracy invoked its common conception as a Cartesian measure of distance from an empirical phenomenon. For instance, one panelist compared the accuracy of OpenStreetMap data to a government-generated dataset, "What you can see is that the positional accuracy is actually quite good. We are talking about things that are up to 10 meters or so" (WoodrowWilsonCenter, 2012a). A third panelist had observed a volunteered geographic information project that was created by the USGS in which of the data that was collected by volunteers, "89% met National Map accuracy standards," and of the data that were peer reviewed, "91% actually met National Map accuracy standards" (WoodrowWilsonCenter, 2012a). The standards to which the panelist referred here were the National Map Accuracy Standards (USGS, 2013), an institutionalized mechanism for judging cartographic objects' Cartesian distance from their respective geographic locations. Accuracy was also framed as a measure of how well characteristics have been recorded and conveyed, either through object attributes or through digital communications such as Twitter. Inaccurate data according to this framing is data that does not properly communicate an event or an object. One panelist called inaccurate data "bad information": "when we look at social media, we have several methodologies by which we try to look at the accuracy of the crowdsource data. . . . We have not seen a lot of bad information" (WoodrowWilsonCenter, 2012b).

Fig. 3. The "Connecting Grassroots to Government" workshop was attended by numerous members of the digital humanitarian and the formal humanitarian response communities. *Source:* WoodrowWilsonCenter (2012c).

This conceptualization of accuracy marginalizes non-Cartesian ways of knowing, since according to these metrics, they cannot be judged as "accurate." Sparke (1995) has usefully illustrated how indigenous mappings of a river conformed to local knowledges of that river and were not "accurate" in Cartesian space. At points along the cartographic river, the representation was wider and narrower than in Cartesian space. Sparke speculated that the width of the river in the map could have represented the time it takes to traverse the river. Other non-Cartesian knowledges such as individual- and community-based memories, affective geographies, and intuition are written out of dominant "accuracy" debates since they appeal to a different sense of geography – what Harvey (1973) has called "relational geography."

At two moments in the workshop, however, new spaces were opened for alternative readings of accuracy. The first came when a panelist acknowledged much use of social media by the public in an emergency carries heavy emotional significance; in the intense emergency context social media engagement is a way of expressing one's emotional trauma or conveying their emotional well-being. This is data that possesses potentially valuable infor-

mation for digital humanitarians, including on-the-ground responders:

> And so providing these outlets and building a community is how we ratchet down rumor and worry – by providing people a common place to go to share what they do know, to share their worry, to share their concern... If we can have everybody crowdsource and bring in all together in one spot to share their vision, what they're seeing, what the experience is for them, that's a huge factor in the emotional component that I [as an emergency responder] have to deal with (WoodrowWilsonCenter, 2012c).

The emotional knowledge present in social media cannot be assessed for "accuracy" according to metrics mentioned before. This knowledge may be ephemeral and temporally constrained, dependent on the immediate context and developing understanding of the emergency situation. Furthermore, it is an interdependent knowledge that is influenced and developed in conjunction with the "community" mentioned by the panelist. Despite recognizing the potential value of emotional knowledges in an emergency context, the panelist went onto, in one sentence, exemplify two important contradictions in how emergency and humanitarian situations are addressed in an institutional sense. The first was in trying to connect this sort of knowledge and its value with traditional metrics of accuracy, and the second was translating a community's emotional knowledge into response-oriented action: "[Y]ou know, *accuracy in that case isn't critical*; it's more a matter of being able to monitor sort of the emotional state of the community and how they're feeling and what they're feeling threatened with *without having the responsibility to actually respond*" (WoodrowWilsonCenter, 2012c; emphasis mine).

The second moment where an alternative reading of accuracy emerged as a panelist argued that "technologies and solutions" – and by extension, data – have an inherent value in humanitarian situations. The goal for this panelist was to de-emphasize measuring this value and instead to determine how to make data worthwhile for a particular use. According to this panelist,

> "...I think we're really working on: what are the techniques by which we can make things worthwhile? And then, I think, by the time we make them worthwhile, we won't need to measure their worth so much anymore. ... [W]e were more interested in making those things worthwhile and more effective rather than trying to figure out too early what their worth is, because we can't stop [different kinds of data from coming in]" (WoodrowWilsonCenter, 2012d).

I was intrigued by the possibilities this holds for the multiple knowledges expressed in social media. In this framing, measuring the accuracy of data in Cartesian terms is less important than making those knowledges actionable for emergency responders. This negotiation may not have long-term impacts on how knowledges are operationalized by emergency responders, but it illustrates the complex processes that must be navigated for the recognition of the value of some knowledges.

4.4. Negotiating privacy and visibility

In March 2011 the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) activated the Standby Task Force (SBTF) for digital humanitarian work in Libya (Verity, 2011a). OCHA's common role in humanitarian crises is to coordinate the diverse actors to improve resource allocation and information sharing. OCHA did not have a prior presence in the country and was not able to gain physical access, so all work was conducted remotely (Bott et al., 2012). The SBTF was tasked with creating and populating the Libya Crisis Map[11] with information being generated from within the country on social media and other web platforms. This aligns with the SBTF mission mentioned earlier, of recruiting and organizing spatially-dispersed volunteers to assist with humanitarian data processing and visualization. OCHA's goal in activating SBTF was to increase their situational awareness as well as to document potential humanitarian needs, both of which aim to inform on-the-ground decision-making (Standby Task Force and UN OCHA, 2011; UN Volunteers, 2011). For this the SBTF gathered information into the Ushahidi platform (see Fig. 4). The SBTF had been activated in four other contexts at the time of the Libya Crisis Map (Standby Task Force, 2013b), but despite this newness and its consequent mishaps, OCHA later deemed the activation useful and successful (Standby Task Force and UN OCHA, 2011). The mishaps constitute a moment of knowledge negotiation along two registers.

The first pertains to the negotiation of privacy and security. In the Libya context data was of a highly sensitive nature, with some data posing the risk of physical endangerment, or co-optation by forces engaged in the military conflict (Stottlemyre and Stottlemyre, 2012). After-action reports generally accentuate the SBTF's relatively quick rise to "reputation and professionalism" (Bott et al., 2012, p. 20) and the institutional and software challenges encountered because of it (Standby Task Force and UN OCHA, 2011; Verity, 2011a, 2011b). One such challenge was encountered when, upon attempting to secure Ushahidi's data transfer through SSL encryption, the Ushahidi servers crashed. Although the SBTF usually limits its entire project engagement to between 3 and 10 days, it took nearly 48 h – a minimum of 1/5 the project duration, a significant delay – for this security bug to be resolved (Standby Task Force and UN OCHA, 2011). Similarly early in the activation, the SBTF discovered a bug in the Ushahidi platform that allowed the search system to display unapproved reports, and to display some of the descriptions of private reports, both of which are security issues with enormous implications in the Libya context (2011). Despite such security issues, the decision was made mid-activation to preserve and maintain this private map, but to add a second map that would be publicly viewable (2011). Because some participants raised concerns regarding the terms on which the data was collected and the sensitive nature of that data, the public map displayed data on a 24-h delay and stripped of identifying information including descriptions (Bott et al., 2012). The software issues led the primary after-action report to conclude that "Ushahidi's lack of quality control has made it difficult to trust that new features and functionality, while likely quite useful, are robust enough for use in an active deployment" (2011, pp. 17–18).

As argued before, knowledge politics entail not only the struggle for visibility, but the terms on which one's knowledge is made visible. In the Libya Crisis Map context, security flaws challenged participants' need to have their knowledges protected by being strategically invisible. The decision to make the public map had been made by those who had not produced the knowledges. The protections were extended to the public map because one member had protested the terms on which the knowledges were being made visible.

The second register of knowledge politics in the Libya Crisis Map project arises in the significant amount of disagreement regarding what exactly occurred. The account I relay above has been informed entirely by official after-action reports. However, Rob Munro, a prominent participant in the Libya Crisis Map project (and many other digital humanitarian projects), has made the case for a different telling of the story (Munro, 2013a,b). Munro argues that the project initially saw much of the volunteer efforts coming

[11] The URL for the project, http://www.Libyacrisismap.net, no longer features the Ushahidi map platform used in this SBTF activation.

Fig. 4. To assist with the processing of data related to the Libya crisis, the United Nations Office for the Coordination of Humanitarian Affairs enrolled the efforts of the Standby Task Force, using an Ushahidi platform. *Source:* Meier (2011b).

from on-the-ground Libyans, who had participated under the condition of privacy and anonymity. In this re-telling, the decision to produce a public map led to the exodus of every Libyan volunteer, having a substantial impact on the remainder of the activation (Munro, 2013b).

My goal here is to illustrate a moment of closure in which the terms of knowledge visibility were decided and, in the case of the security flaws, endangered. I characterize the disagreement about the public-facing map to illuminate the ways narratives are negotiated as knowledges come into conflict among one another. Digital humanitarianism comes to embody these complex knowledge politics through such moments of closure. The terms on which knowledges are made visible are often decided not by those possessing the knowledges, but those empowered to make such decisions. Further, in retelling the story of digital humanitarian projects, official accounts are recorded and alternative viewpoints strategically marginalized. Knowledge politics here pertained to the visual representation of knowledges on a map artifact, while these politics are certainly not limited to this form. The reports and knowledges present in the Libya Crisis Map also exist in non-visual, non-map form, as humanitarian staff discuss them, interpret them, circulate them, and make decisions based on them. Extending onto a map is often seen by the digital humanitarian community as amenable to the objectives of humanitarian intervention, although politics occur through mechanisms broader than the visual. In describing these knowledge politics my goal is neither to evaluate the Libya Crisis Map as a whole, nor to argue against the decisions made in the project. Instead, I provide this case in order to understand when map representation (i.e., visibility) is *not* desirable and how those terms are negotiated through contestation.

5. Discussion and conclusions

The previous sections discuss moments of closure in digital humanitarianism where knowledge politics were negotiated, and some socio-technical development paths became more likely than others. I have offered four distinct moments that approximate knowledge politics mechanisms identified in literature to date, yet take new forms in digital humanitarianism. These shifts in knowledge politics impact how – and where – we should conceive of the social implications of technology. In this section I synthesize three potential broader social implications of these moments of closure.

First, on a pragmatic level, representing knowledges in official contexts like digital humanitarianism influences the recognition of those knowledges' importance and relevance. In digital humanitarianism some knowledges have been effectively excluded from representation. In the examples above, marginalized knowledges include individual and communal memories, and interpersonal knowledges, in the case of the HOT data model; and those with non-Cartesian geographies such as emotion or affect, as in the case of the Commons Lab workshop. Such knowledges are deemed not legitimate for representation within the context of digital humanitarianism, but have been shown in critical GIS and feminist literatures to be important expressions of epistemologies. This could have two implications for the practical operations of humanitarian agencies. If a map is the primary visualization tool for a digital humanitarian project, an exclusion may happen when individuals do not find mapping to be culturally relevant for conveying and visually representing their knowledges. Applying broader representational techniques and capturing broader epistemologies may encourage more individual contributions. Further, knowledges and epistemologies currently excluded may find some practical value in humanitarian operations. Response efficacy could improve by considering the value of broader ways of knowing.

However, whereas knowledge politics research to date has largely focused on the legitimacy granted visual epistemologies, here I have suggested visibility is not uniformly sought as a strategy for legitimacy. The terms on which knowledges are made visible (vis-à-vis visual epistemologies), and the ways in which those knowledges are processed and interpreted can be more important. In the Libya Crisis Map case, invisibility ensured privacy and safety; visibility risked endangerment. The process of classification builds on this struggle to exclude knowledges that fall in the margins of

acceptable categories. There are multiple kinds of needs that can be represented visually, but the technologies and crowdsourcing strategies are designed precisely to marginalize some of them. The decisions to include, exclude, and generalize some knowledges rely on power relations particular to each context, each of which bears exploring. Who makes the decision to visualize, hide, or exclude knowledges? Who determines the specific ways in which those knowledges will be represented?

This is a paradox at the heart of digital humanitarianism: discursively and in practice it relies on multitudes of knowledge expressions, but must tame them and abstract from them in order to maintain its own relevance to humanitarian response. Knowledge politics appear not just in the expression or visualization of those knowledges, but also how they are processed, interpreted, and understood. This constitutes a complex web of negotiation in which some knowledges and epistemologies are privileged over others.

Second, digital humanitarianism embodies the moments of closure by its nature as a technical and social interface. As I have shown, knowledge politics are fluid, contested, and contingent. They rely on negotiations by stakeholders and invoke – often while challenging – power relations between different actors. As fluid and contingent as this process is, it becomes more stable when implemented in technology artifacts. The moments of closure are not "closed" in the sense of irreversible path-choosing, but rather in making some outcomes more likely than others. In a sense, digital humanitarians are both limited and enabled in their activities by past decisions. For example, the classification systems of Ushahidi platforms persist not only in its limited individual deployment, but also in "lessons learned", after-action reports, community knowledges such as Skype records, and in the discourses that flow through digital humanitarianism. On a software level, the decision to address security issues or platform functionalities frame the uses to which digital humanitarian platforms can be put.

Third, digital humanitarianism is a pertinent and imperative case to examine because its stakes are so high. Emergencies and crises are not only sites where populations' lives and well-beings are at stake in a very material sense, but they are also sites for unusually large-scale social and political transformation (Hyndman, 2007; Klein, 2007; Scarry, 2011). As such, the implications of knowledge politics may be more impactful in the contexts of digital humanitarianism. Moments of closure occur not just in these cases of emergency, as the examples I provide show; however, their full implications emerge in such cases.

This paper has focused primarily on leveraging theories of technology and society in order to understand digital humanitarianism. It is important to mention, though, that the ideas surrounding this discussion of digital humanitarianism may also translate into an understanding of the societal implications of the geoweb. Digital humanitarianism employs geographic technologies in many cases – often under the moniker of 'crisis mapping' – but relies on assumptions, power relations, and knowledge politics that are inherently geographical. Further, digital humanitarianism constructs spaces through which knowledge politics are negotiated and enacted, and in this paper I have offered four mechanisms for understanding how these spaces operate. Despite the level of closure that has occurred in the examples I provide, individuals and social groups still possess the ability to contest how their knowledges come to be represented. In this way knowledge politics hold a great amount of promise for social justice and empowerment.

As governmental and non-governmental organizations come to adopt digital humanitarian techniques, the knowledge politics identified here will have wider ramifications. Understanding how these knowledge politics operate in diverse contexts could improve how these organizations engage with the geoweb, and geographic technologies more broadly. I have provided four mechanisms through which knowledge politics operates in digital humanitarianism, and many more remain to be understood.

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