Open Social Mapping

Participatory modeling of social systems

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Abstract

Open Social Mapping is an emerging paradigm for stakeholder engagement in systemic design projects. It combines actor mapping, network modelling and analysis, customer relationship management systems, and crowdsourcing in a method that allows stakeholders to map themselves within a system. Based on observations of some early examples of this tool and two case studies led by the authors, we describe some of the opportunities and challenges of Open Social Mapping. Open Social Maps re-center the stakeholder in the systemic design process, helping designers make data-driven decisions with real-time data while decentralizing systemic design by facilitating stakeholder access and agency to the design process. However, we must address issues of data collection and maintenance, privacy, power and privilege, bad actors, interoperability, and information quality for this tool to become mainstream.

Introduction

> The most powerful knowledge for changing any system—and the minds of sponsors—lies with its deep users and stakeholders. (Jones, 2016)

A vital issue in systemic design is the engagement and representation of stakeholders in understanding problems and developing solutions. Challenges with stakeholder engagement include discovering stakeholders, including them in systemic design processes, learning from them, and delivering value to them as a result of the work. As Norman and Stappers (2016) note in response to commenters like Jones, above: design and implementation are not the sole responsibility of designers, but involve co-creation with these stakeholders. Thus, designers commit to engaging with real stakeholders in the work of systemic design.

The trouble is that this commitment is not always easy. There are at least three challenges in engaging stakeholders in systemic design. (1) Geography: systemic design projects—and the stakeholders invested in them—are often distributed across diverse geographies and affect large

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populations and varied organizations. It can be challenging to mobilize designers to connect with sparsely-located stakeholders. (2) Availability: projects are often long-term, and stakeholders often have limited time and resources to invest in a project while their other responsibilities continue. Systemic designers must find ways to minimize the burden of involvement to stakeholders to maximize engagement. (3) Power: systemic design projects involve and impact stakeholders of varying levels of power, privilege, authority, and access. It can be difficult to accurately assess power distributions and, in turn, to act responsibly in response to power asymmetries. This difficulty is especially present when designers are external consultants or facilitators who do not (yet) understand system culture and context, or who have not gained the trust of system stakeholders.

To resolve issues of stakeholder engagement, many of the models and theories of change used in large-scale change processes abstract the real stakeholder. Designers create personas (Miaskiewicz & Kozar, 2011), empathize with customers (Wendt, 2017), frame problems around the perspectives of our stakeholders (Kolko, 2010), and codesign with representatives of these groups (Muller & Druin, 2012). However, each of these design methods are reductionist. In the best case of these methods, designers obtain representatives from "every" stakeholder group (e.g., codesign) or accurately and completely abstract each stakeholder at a single point in time (e.g., personas). These representations, however, are just that: "that which represents something else"; "a figure, image, or idea that substitutes reality" ("representation," Wiktionary, n.d.). While they are usually better than nothing, these representations contain potential error in the form of bias introduced by designers, chosen stakeholder representatives, and the processes of classifying and abstracting stakeholders into projections.

Open social mapping (OSM) is an emerging approach that leverages recent advances in collaboration models, technology, and systemic design to go beyond representation in stakeholder engagement. OSM enables stakeholders to represent themselves, their relationships with each other, and their relationship with a systemic design problem. This paper explains the concept of OSM, provides some guidelines on how to implement the approach, discusses several OSM case studies and their challenges, and concludes with a discussion of potential issues and next steps.

We offer five novel contributions. (1) We highlight the role of OSM in systemic design projects. (2) We provide brief instructions for the development of open social maps. (3) We present two case studies of OSM. We then present the stories of these maps and the lessons they have generated in the form of (4) eight potential opportunities of OSM in systemic design and (5) a set of tensions to consider when developing an OSM project.

Why Open Social Mapping now?

We use IDEO's desirability, feasibility, and viability framework (2009) to explain why OSM has only recently emerged as a new paradigm for stakeholder engagement.

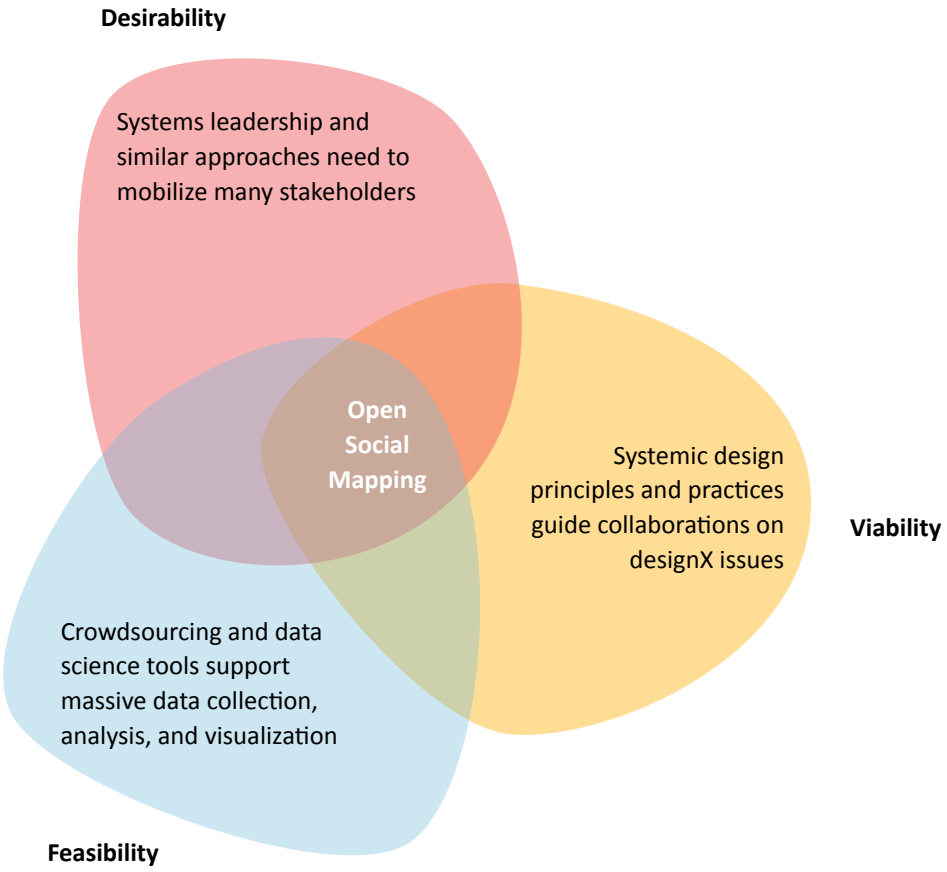

Figure 1. OSM emerges from shifts in desirability, feasibility, and viability.

Desirability:

In the last two decades, systemic design and similar disciplines or philosophies, such as collective impact (Kania & Kramer, 2011), network weaving (Krebs & Holley, 2006), and system leadership (Senge, Hamilton, & Kania, 2015) have emerged. These approaches to collaborative systems change provide leaders with approaches for complex systems change. Of course, these approaches differ from one another in many ways. Still, one commonality is that they all seek to connect problem stakeholders to the design and implementation of solutions. Leaders using these approaches need a way to model, analyze, and develop their systemic networks, particularly as we develop ever-improving technical capabilities to engage more massive sets of data. As discussed above, existing methods for stakeholder engagement suffer from potential bias. These disciplines, therefore, need new ways to discover, involve, and steward complex networks of stakeholders throughout a project.

Feasibility:

Technological capabilities have recently given rise to data crowdsourcing: the mobilization of publics in contributing to data collection or analysis (Murphy & Parsons, 2020). Crowdsourcing methods and principles allow many individuals from different places and contexts to contribute data to the same task over time. Similarly, data science tools and methods have emerged to support the analysis of high-velocity high-volume "big data" (Chen, Chiang, & Storey, 2012; Provost & Fawcett, 2013; Šćepanović, 2018). These tools and methods help analysts rapidly process and use

big data for decision-making. Together, crowdsourcing and data science help mobilize complex networks of stakeholders in contributing and analysing data about a system.

Viability:

The recent development of systemic design principles, frameworks, and practices (Ryan, 2014; Sevaldson & Ryan, 2014; Jones, 2014) advance the capacity of designers to facilitate complex collaboration and engage with designX (Norman & Stappers, 2015) or wicked problems (Rittel & Webber, 1973).

What is OSM?

OSM sits at the intersection of a desire for more systemic approaches to complex problems, technology to support the coordination of complex data collection and analysis at scale, and systemic design principles, frameworks, and practices. The primary goal of OSM is to re-center the stakeholder in systems change work. At their most basic, open social maps are models that allow stakeholders to register themselves as part of a systemic network. From there, they may identify other members of the network that they are connected to while surfacing skills and resources they have to offer, issues they are interested in, and other useful data. These open, visual networks help stakeholders find themselves in the complexity of these systems in a simple—yet concrete—act of participation. In turn, stakeholders can see themselves in the system and identify how they relate to the complex, social whole.

A combination of methods

To do this, the approach usually combines several existing methods—actor mapping, network modeling and analysis, customer relationship management systems, and crowdsourcing—to engage stakeholders in modelling themselves by leveraging the open power of the Internet. We will now explain each of these concepts and their use in OSM.

Actor maps

Actor maps (Gopal & Clarke, 2015) are models of the stakeholders involved in a system, including how they relate to the system and one another. It may include any individuals, organizations, and phenomena of the system. In a typical open social map, stakeholders register themselves and note their relationships between themselves and other already-mapped stakeholders and phenomena. They may also nominate or suggest other stakeholders or phenomena and describe how those nominations fit into the map.

Network modeling & analysis

Network modeling and analysis (Newman, 2010) is a field of research and practice dedicated to understanding the nature of networks by combining ideas from mathematics, physics, biology, computer science, the social sciences, and many other areas. Tools and techniques from this discipline help designers using OSM to understand the structure and behaviour of actor maps as networks. Network phenomena, such as centrality (Murphy & Jones, In press), can then be revealed and used in design and implementation of systemic solutions.

Customer Relationship Management systems

Customer relationship management systems (Payne & Frow, 2005)—commonly “CRMs”—provide administrative information and support to people managing connections with large groups of stakeholders. A Customer Relationship Management system maintains contact information, a

record of interactions, and provides tools for communicating and managing the relationships of stakeholders. These concepts are used in OSM to help "weave" connections between stakeholders (Krebs & Holley, 2006) and facilitate the development of systemic networks.

Crowdsourcing

Crowdsourcing (Geiger, Rosemann, Fielt, & Schader, 2012; Lukyanenko & Parsons, 2018) is the engagement of large populations of stakeholders in the collaborative completion of a coordinated task. Data crowdsourcing (Murphy & Parsons, 2020), in particular, engages the "crowd" in the collection and analysis of data. In OSM, the "crowd" is the system's network—all of the potential individual stakeholders invested in the system. OSM involves the use of data crowdsourcing to help these stakeholders represent themselves and the aspects of the system they are concerned about in the systemic design process.

Early Examples

Some early examples of OSM include the British Columbia Council for International Cooperation (BCCIC) Movement Map (British Columbia Council for International Cooperation, 2019) (a map of actors working towards the United Nations Sustainable Development Goals (SDGs) in Canada) and the "openX" map (a map of individuals and their affiliations working on open data, open government, open data, open access, and civic technology in New Zealand; whitcroft, n.d.; whitcroft, 2018).

The BCCIC Movement Map

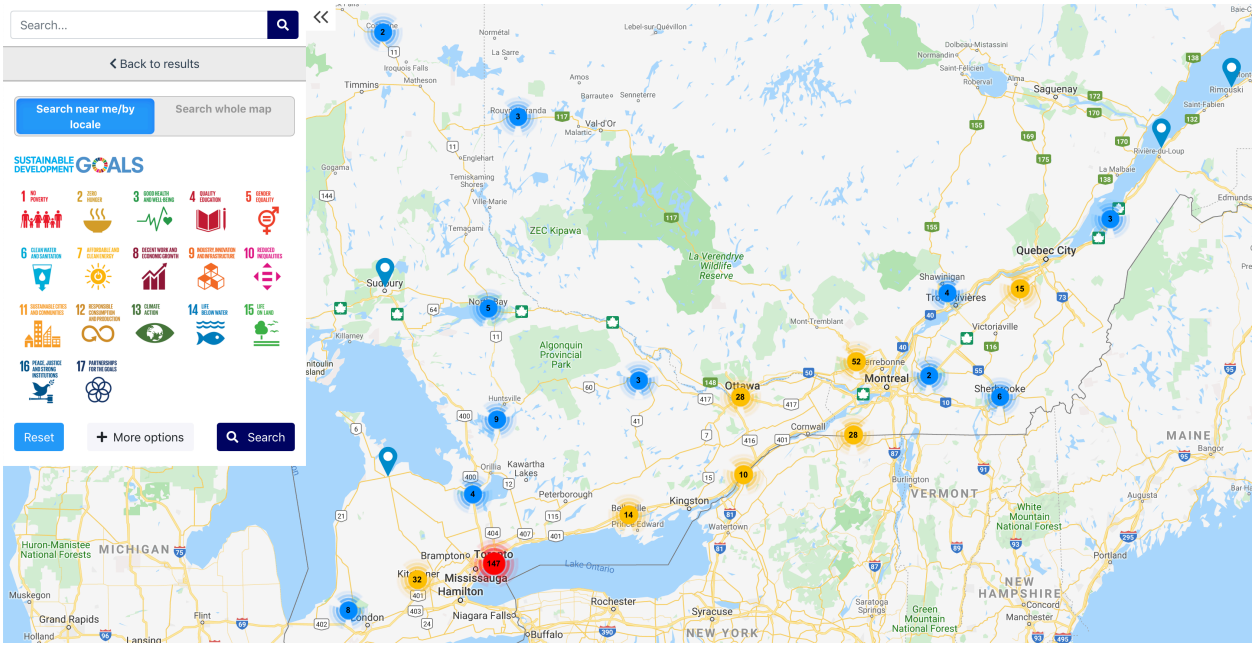

Figure 2. The BCCIC Movement Map.

The Movement Map is an online map showing Canadian Non-Profit Organizations working within the framework of the SDGs. According to BCCIC, "this map can act as a collaboration tool for connecting organizations working on the SDGs, and helps people to find others who are working in their area of interest. It can also help raise awareness of the featured organizations among the general public, and show that civil society is supporting Canada's progress toward the SDGs" ("What is the Movement Map?", 2019).

The Movement Map is a visualization of a map of Canada overlaid with (as of this writing) 11,686 groups working on the SDGs in the nation. Users can pan around and zoom in and out of different regions of the map to explore the listed organizations. Clicking on a group presents the user with the group's description and the related SDGs and associated targets. Users can also use a "Similar Groups" functionality to see conceptually similar groups located elsewhere on the map.

At the outset, BCCIC manually collected, coded, and inputted data using public databases and registry organizations into the map. The latest edition, however, features a form-based interface in which anyone visiting the map can enter their data.

The openX Map

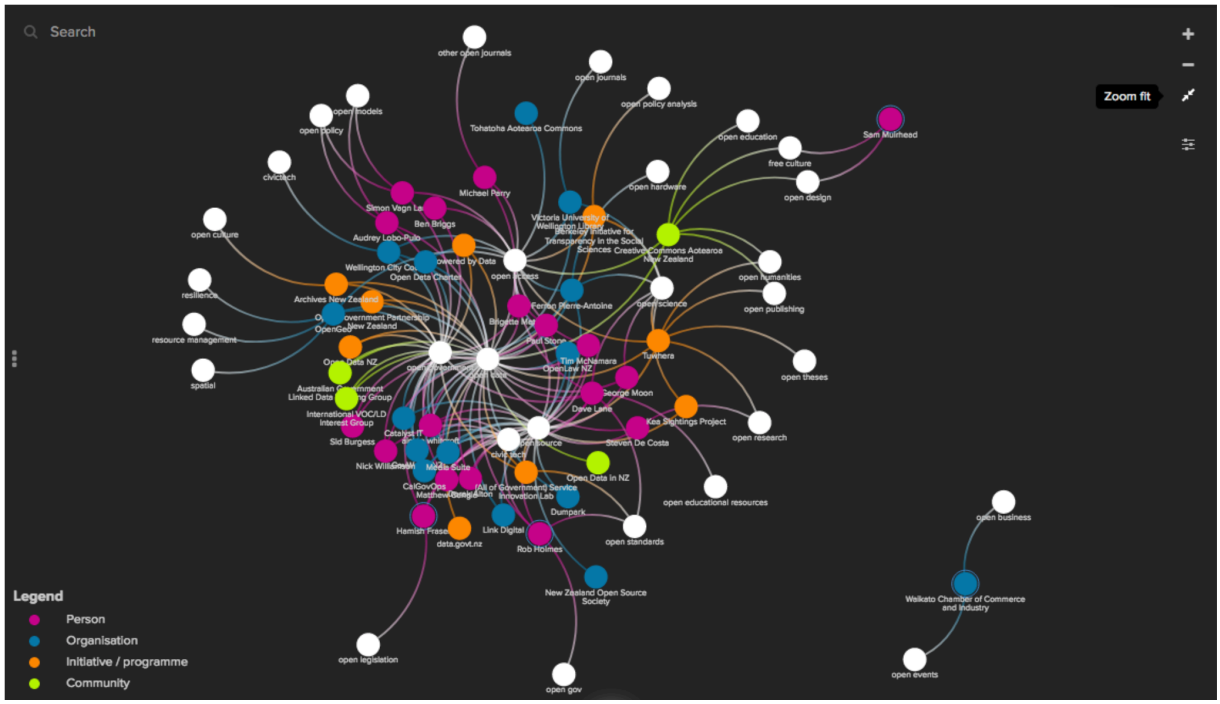

Figure 3. An example view of the openX ecosystem map.

aimee whitcroft [sic] started the openX map because New Zealand lacked a cohesive overview of the individuals, organizations, and communities working on open data, open government, open source, open access, and civic technology ("openX" initiatives in the nation; whitcroft, 2018). The map "takes in information about people, organisations, communities and initiatives / programmes working in the openX space, and turns it into a [Creative Commons By Attribution] 4.0-licensed spreadsheet and network graph you're able to analyse in any way you like."

The main view of the map displays a set of interconnected nodes or elements alongside a legend and some interface controls. Users can select a node by clicking on it to get a detailed description and some metadata (e.g., location, focus area, tags) of that individual, organization, initiative, or community. From there, a user can explore the mapped relationships of that entity by traversing its connections. As in the BCCIC Movement Map, a simple form interface allows a user to add their data to the map.

How to do OSM: A (very) basic tutorial using free tools

Implementing an open social map is straightforward. The essential elements are a visual interface for exploring the map, an interface for data collection, and a coordinator who will promote and maintain the initiative.

1. The Kumu software (https://kumu.io) provides an excellent and free (for public maps) implementation for the visual interface. Kumu is a web-based systems mapping software in which you can represent data as elements and connections between elements.
2. While there are many ways of generating the data you will visualize in Kumu, Kumu provides a free integration with Google Sheets. Therefore the second tool to implement is a

Google Forms input form (https://www.google.com/forms/about/) that collects data on a Google Sheets spreadsheet (https://www.google.com/sheets/about/).

3. Define a form that asks contributors to provide information relevant to the system you are interested in. Data like names and contact information can be reasonably free-form, though you should use Google Forms' features to ensure users do not make mistakes. However, if you are looking for patterns in specific dimensions of the data, define those input fields carefully. Use features like checklists or enumerated lists to limit the possible inputs such that no user can enter the same data in multiple ways.
4. On the Google Sheets spreadsheet, create three tabs. The first tab will be the source tab that takes in data from the Form. Name the second tab "Elements" and the third tab "Connections," and follow Kumu's documentation (https://docs.kumu.io/guides/import.html) to label the columns on these tabs for effective import. Last, use Sheets' reference data tools (https://support.google.com/docs/answer/75943) to fit data on the first incoming sheet to the second and third tab as appropriate.
5. Follow Kumu's instructions (see (Mohr, 2015) to connect that spreadsheet to your Kumu open social map project.
6. Use Kumu's documentation (https://docs.kumu.io) to style the resulting map to surface key features of the map relevant to your project. It may be useful, for instance, to use Kumu Controls (https://docs.kumu.io/guides/controls.html) to allow someone using your map to filter or cluster data using some mapped dimension.

Opportunities and Challenges of OSM

In this section, we describe two OSM case studies based on projects led by the authors. Analysis of these case studies and our experience in implementing and leading these projects led to a variety of lessons learned. We frame those lessons here as sets of opportunities and challenges for OSM.

Case Studies

The Interoperable Mapping Project

The Interoperable Mapping Project (IMP) includes open social maps developed with civil servant and multi-sectoral innovation groups in Canada. The map aims to alleviate the need to re-create stakeholder and other network maps from scratch when new projects started, and to provide a place to consolidate data stuck in spreadsheets, contact databases, and customer relationship management applications within different projects. IMP aims to maximize interoperability while enabling the independence of any given map. To accomplish this, the design of IMP allows designers to begin mapping by branching out from another map. They may then customize and add to the data on their new map while adhering to protocols to ensure backwards-compatibility with previous maps. Functionally, IMP maps look like those of the openX project described above. IMP currently consists of seven "mini-maps" that interoperate as one larger map.

WeavEast

WeavEast is a "regional platform for connecting and serving people and organizations who are making positive social change in Atlantic Canada" (WeavEast, 2019). The platform was conceived of in 2018 to help Atlantic Canadians collaborate better across the region's disparate communities. The project aims to connect social change participants, supporters, contributors, and changemakers, increasing awareness of who is doing what in the region while enabling these different stakeholder groups to find, connect, and coordinate with one another on social change projects. Simultaneously, by amassing data on the vital social change work happening in the region,

WeavEast can demonstrate the breadth and scope of what is happening in the region and how to support that to government and potential funders.

The WeavEast map's front-end is built with Kumu, while the community development software HiveBrite and customer relationship management software SimplyCast support the collection and maintenance of the map's data. WeavEast collects data on stakeholder geographical location; type; issue or focus area; community connections, partnerships, and affiliations; populations serviced; and events attended. Additional tags help code these entries with other metadata.

Opportunities

Based on our reviews of the early examples and our own experience with the case studies above, we have identified eight key opportunities open social maps uniquely provide in contrast with existing stakeholder engagement techniques.

Centering the stakeholder

These models center real stakeholders in the work. Instead of looking at abstractions, it becomes possible to visualize—and connect with—the real people who make up those groups. The data and insights from these real stakeholders inform the systemic design process, instead of potentially problematic insights generated from projected empathetic personae or a representative of a given stakeholder group. This, in turn, should lead to more authentic design responses to system issues.

Moreover, since open social maps are public and stakeholders capture themselves and their interests, the focal systemic design project is public and known to all stakeholders, too. These tools, therefore, offer a way of demonstrating transparency—and therefore building trust—with disparate stakeholder groups.

From "CRM" to "SRM": Systemic Relationship Management

Designers can leverage these maps as a relationship management tool, similar to sales Customer Relationship Management (CRM) software. It is possible to reach subsets of stakeholders with specific queries, activities, or events by filtering the data and using stakeholder-provided contact information. Of course, this was always possible with standard contact management tools. Unique to open social maps is a novel network-management perspective: a designer can analyze their map to identify critical gaps between subgroups or individuals and draw together collaborators who might not otherwise have connected with the focal change agenda. Contributors can likewise do the same, decentralizing the coordinator role.

Increasing contrast on the unknowns in a system

Open social maps objectively model designers' real-time awareness of the system they are working within. It is impossible to hope or to pretend that a design team has reached all stakeholders equally—the map's data reveals if one stakeholder group is overrepresented or if another is missing. In other words, open social maps reify gaps in diversity and inclusion. Systemic designers can query the "negative space" of the map to identify gaps in their engagement. Similarly, public open social maps allow stakeholders to notice these gaps—and resolve them—themselves.

Stakeholders see themselves in the context of the whole system

A key challenge in many systems change initiatives is getting stakeholders to realize their role in sustaining systemic problems (Stroh, 2015). Open social maps place stakeholders in the context of the whole system at scale. Moreover, the model of the system is developed simultaneously and

transparently from many independent input sources (e.g., other stakeholders), and they may watch this development in real-time. This whole-system view is a rare vantage point in conventional modeling approaches, as most stakeholder engagement practices take the form of small group discussions. This perspective may help stakeholders understand their role in the system from the perspective of other stakeholders. In turn, it may help them acknowledge their responsibility to change in response to system needs.

Decentralizing systemic design

The transparency and openness of OSM decentralizes systemic design. With public maps, stakeholders can access and use the same data designers are using to self-facilitate responses to systemic issues.

Self-weaving networks

Building open social maps leads to building networks. As stakeholders add themselves and their connections to the model of the system, they have the opportunity to notice and act on missing connections. This growth leads to a network effect—every new stakeholder that contributes makes the open social map more valuable for the next stakeholder, helping to sustain the growth of the map.

Frame translation

As contributors capture their knowledge in an open social map, they may notice others who are contributing similar information but under different labels. For instance, a stakeholder working in youth leadership may see other organizations doing similar work under the label of changemaker education. By surfacing these labelling differences, OSM facilitates what we call “frame translation”: the recognition of alternative frames or language used to describe system concepts. By helping stakeholders understand the ways others describe their views of the system, open social maps enable connections that unlikely to surface in a more centralized stakeholder engagement paradigm.

Challenging boundaries

These models help designers access new perspectives on system boundaries (Jones, 2014). Instead of drawing imaginary lines between abstract entities or organizations, open social maps have real edges. These edges are the result of the successes and failures of designers’ stakeholder engagement tactics. Further, participants contributing to the map can point out missing components of the system that may be invisible to the designer. In turn, designers can make more informed, data-driven decisions about what aspects of the system they are focusing on and what they are leaving out.

Challenges and tensions

While we are excited about the potential of OSM, our experience has also led to first-hand encounters with the challenges of the medium. Our experience can be conveniently summarized: while setting up an open social map is easy, governing and maintaining it can be very difficult. Here we detail the barriers and tensions that have caused problems in our implementation of open social maps.

Promotion and maintenance

Once a map exists, how might we get stakeholders to contribute to it? Even if interacting with an open social map is more straightforward than participating in many other forms of stakeholder

engagement, the individuals and organizations that designers need to reach have limited time and resources. Asking for them to pay attention to yet another request for data is sometimes too much. Moreover, that is only the initial contribution—in the long-term, stakeholders need to remember to return to the map and update it should anything change about their role in the system. These issues will only become more significant if open social maps proliferate as a mode of stakeholder engagement and requests for participation become more common than they are at present.

Data privacy

Decentralized, transparent data enable many of the opportunities in OSM. However, we must not leverage these advantages while ignoring the urgent issue of data privacy. Many people and organizations may not be able to or want to provide their data to a given project. This holds for contact information and also for other aspects of the data. Participants may be unable to report the nature of connections between individuals and groups—or the lack thereof—for instance. Some of these privacy challenges may be overcome with adequate privacy controls, such that only those involved in a systemic design project can see certain kinds of information. However, this obfuscation limits the decentralized power of the tool. This is a tradeoff that needs further exploration.

Power dynamics and inclusion issues

It may be naïve to assume that all stakeholders are willing, able, and interested in participating in an OSM project. Moreover, systemic design should endeavor to empower the marginalized—but creating tools only accessible to those privileged with the time and technology to use them likely achieves the opposite effect. Arguably, vulnerable groups need equitable access to systemic design projects, not *equal* access. Creating a supposedly "level" playing field by decentralizing systemic design may only exacerbate existing issues of inequality. Instead, it may be more appropriate for systemic designers to find ways of acknowledging inequality by involving vulnerable stakeholders more deeply.

Interoperability and limiting redundancy

In line with the issues of promotion and maintenance discussed above, designers must strive to limit redundancy as open social maps proliferate. A contributor who provides their data to one map should not have to exert more effort when a second, related project begins. Instead, interoperability should be designed into maps by default. Ideally, this may take the form of a mapping standard that facilitates sharing map data between projects.

Information quantity and quality

As maps grow without a central data collection mechanism, contributors may provide low-quality information, such as contributions that are out of scope for the project or that contain errors (Lukyanenko, Parsons, & Wiersma, 2014; Lukyanenko et al., 2017). A key question for the efficacy of OSM, then, is whether the quality of this user-generated content is sufficient for designers' needs. Even without erroneous entries, systemic designers need to ensure that they can effectively find the signal in the noise of large quantities of content. Tools for analyzing and structuring massive amounts of data may provide a way forward here.

Bad-faith actors

As with other Internet-based open tools and media, OSM is vulnerable to corruption. Without effective deterrents or moderation, actors who seek to harm a given project would be able to contribute false information, coordinate campaigns of misinformation, or put the information made

available in an open social map to a malicious purpose. Managing these potentially nefarious acts is compounded by the complexity of the social issues systemic design aims to address. In some cases, it may be challenging to determine whether a corrupt contribution or use is actually the will of system stakeholders.

Discussion

In our observations, we have noticed that the desirability, feasibility, and viability of OSM are the result of relatively recent shifts in a variety of disciplines. As such, we expect open social maps and the tools that power them to become more prevalent in the near future. The present research surfaced several important considerations for these projects and the designers that lead them.

Limitations and future directions

OSM is a nascent paradigm for stakeholder engagement in systemic design. This research is an early exploration of the potential for the tool—and its perils. As such, it suffers from a few limitations. We based this research on a cursory review of a few early examples of this phenomenon and introspective analysis of our first-hand case studies. As such, we acknowledge the subjective nature of the theory we present and welcome further study and critique.

If research on OSM continues, an obvious next step is to conduct a more comprehensive review of potential OSM projects. Codifying the different manifestations of OSM may help researchers establish more refined definitions of OSM and lead to a typology of these maps and the techniques used to design and manage them.

Another important next step is to conduct intensive studies of both failed and successful OSM projects. These investigations may help to delineate principles of successful projects, making it easier for designers to implement this methodology.

In practice, to reduce redundancy and to maximize the interoperability of maps, there is a need for a common standard for open social map data. Examples of this kind of open standard are plentiful—see, for instance, the Creative Commons (https://creativecommons.org) and Wikipedia (https://wikipedia.org). With an established standard data structure, maps that adhere to the protocol can leverage one another's data.

Conclusion

It is not surprising that OSM projects seem to be gaining traction. There is a clear need for collaborative, systemic leadership to address the wicked problems of the 21st century—and these kinds of initiatives will need powerful ways to engage complex networks of stakeholders. Combined with principles and practices from systemic design, these crowdsourcing and data science-based tools provide one way of centering stakeholders in systemic design projects. OSM offers systemic designers a new tool for getting "the whole system in the room" (Weisbord & Janoff, 2007), albeit a digital room at that. This tool promises to re-center the stakeholder in systemic design projects, helping designers find the real boundaries of their focal systems, discover gaps in their systemic awareness, and manage the network of actors within the system. At the same time, OSM decentralizes systemic design, giving more power to stakeholders themselves. This decentralization may help them find ways to change themselves to respond to systemic problems, grow the network of actors seeking systemic change, and understand the different frames through which other actors view systemic issues. However, OSM projects feature significant tensions that need to be addressed, including maintaining data and information quality, addressing power asymmetries, ensuring the privacy of sensitive data, and managing the influence of bad actors. If we can overcome these issues,

OSM may help designers more deeply understand stakeholders than existing engagement mechanisms.

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