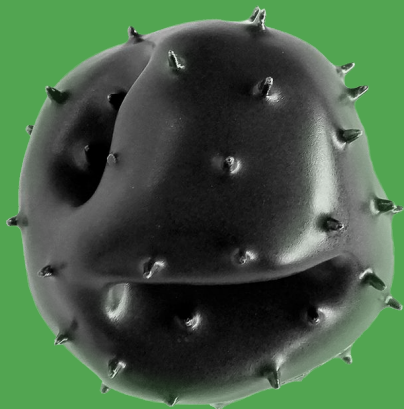# Merging Citizens & Data

A Postphenomenological Investigation on Mediated Practices in Citizen Sensing

–John Walker

The Investigation at a Glance

Case Study

Dustbox & Citizen Sense

Methodology

Postphenomenology and human technology relations understood through Mediation theory

Emerson, a Citizen involved in Citizen Sense

The Relational View of Data
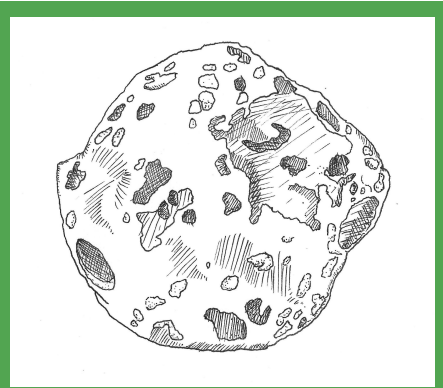
Research Questions

- **What are the ways in which sensors shape the practice of citizen sensing?**

- **What are ways in which citizens interact with data gathered through these mediated practices?**

- **When looking closer at data in citizen sensing; can a relational view help describe better the relationships citizens form with their data?**

5

Citizen Science: Sensing

- A form of Citizen Science that has begun to generate new practices in monitoring environments.
- Citizen Sensing has begun to take on a form of organizing citizens to monitor their own communities in order to trigger a response from local officials.
- PM2.5 is often found in construction areas, busy streets, and idling vehicles. It is famous for causing respiratory problems and environmental damage.

Taking Action: Citizen Sense

- Citizens taking action or joining a research program.
    - For Citizen Sense, the goal was to actively engage citizens in citizen sensing practices as well as uncover and or pin point a cause of concern in the neighborhood.
    - This has been done in many places by these researchers.
    - In this program, they used Dustbox

A diesel char particle

A Dustbox

Together with participants, we then created data stories to establish a method and technique for composing the multiple modes of citizen data. - Gabrys, 2016
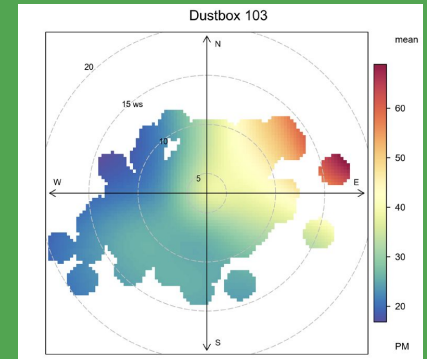
Citizen Sense Tools

Dustbox

- an optical sensor that uses infrared light scattering technology to measure the density of PM in the air.
- **Including Airsift**: a database that received sensor data, and a publicly available data analysis toolkit for analyzing and visualizing sensor data.

Methods

- **Data Stories** draw together different kinds of evidence to narrate the impact that air pollution is having in your area.
    - Forms of evidence that might include citizen data, regulatory data, weather data, local observations and other kinds of visual and auditory media.
- **Engaging Citizen Research and Capabilities**
    - Co-researcher roles
    - Citizen *workarounds* and *appropriations to technology*
    - Check-up meetings with participants

A Dustbox

Airsift Visualization of one Dustbox

The Role of Sensors

Through experiences of citizens and by making room for exploring the new sensing practices that happen between citizen and Dustbox; **new questions arise as to how we can account for the experiences and relations that percolate up from the co-created interactions.**
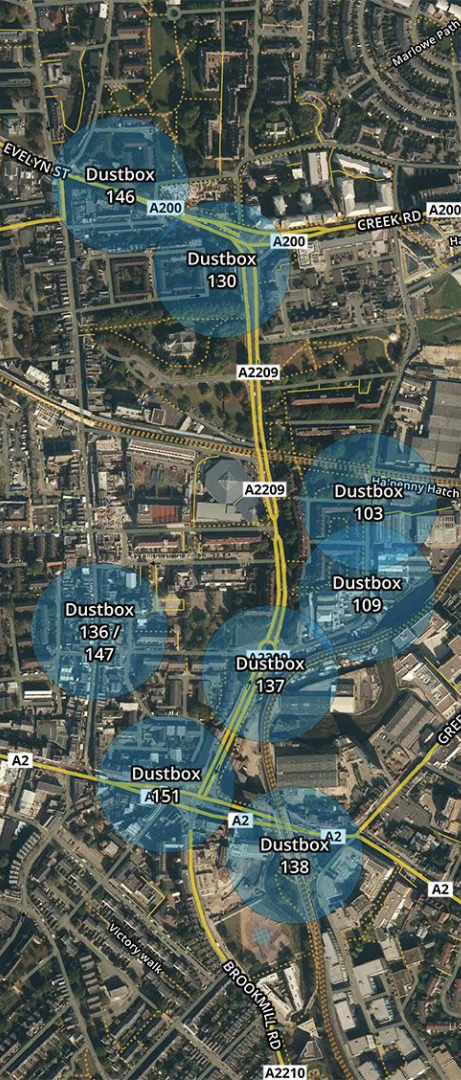
Questions like:

- What human-technology relations should be considered when framing citizen sensing and sensors?
- How do sensors shape a citizen's perspective on their environment and scientific work?
- What language or vocabulary is needed in order to understand better how citizen sensing as a praxis of citizen science is shaped by sensors?

Assembled Dustbox

"Sensing practices might also shift the traditional categories of expert, citizen, and participation to generate new approaches to science and technology studies." - Gabrys, 2019

Leaving the Laboratory

Creating new (Citizen) Scientific Practices
- The Dustbox sensor shapes the way in which citizens do, understand and participate in scientific practices. The sensor co-creates the work found in Citizen Sense and the ways in which Data Stories are told.

Mediation Theory & the Relations
Hermeneutic relations: *Understanding* through Dustbox
- Hermeneutic relations are understood as technological interactions that **expand our abilities to interpret and even perceive the world around us** by enabling access to qualities of it not previously obtained (Gertz, 2019, pg. 67).

Embodiment relations: Living *through* Dustbox

Alterity relations: Living *with* Dustbox

Mediated Sensing Practices

Citizens working with Air

Citizen Sense stems from **improvising with sensors** as activities that are the "generative practices out of which new technologies are made" (Houston et al., 2019, pg. 851).

- **The sensor Dustbox attunes the attention of the citizen towards data concerned with the air. Specifically towards:**
    - Air as data of a certain quality
    - Air in *your community,* not all of London
    - Air as it is in specific times, or in patterns

Citizens working with Researchers

Through sensing practices, citizens begin to attune to both new feelings and sensitivities in their local environments, but also **to the normally inaccessible work of researchers.**

- Questions and intentionality of **citizens become more focused and detailed on specific areas of interest that are based on what information is accessible.**

Citizens working with Data

What sort of relationship is required with data to be able to **infer relevant information** about one's own role in the community? **How can data be both shaped by and actively shape the conceptions citizens have** about their communities?

Sensing Practices are cultivated as a device or term for, **"thinking through how experience and relations are reworked across entities, environments, and technologies"** - Gabrys, 2019

12

Relating to Data

Revisiting Hermeneutics
- Engagement with data about your community must be made sense of in the context and use in which it was gathered.
    - By allowing for play and the feeding into a model their own inferred background information, citizens relate to the data they collect on a richer level (compared to researchers not localized in a place).

The data that citizens collected felt important and relevant to their own lives as citizens of London. It was not meaningless or deprived of context, it was wrapped in stories and experiences of themselves and others.
- **'just good enough data'** : or the ways in which citizen data, "gives rise to alternative ways of creating, valuing and interpreting datasets" (Gabrys et al., 2016).

A Relational View of Data:
- Leonelli's relational view of data begins to move us away from understanding data points as some 'undisputable source' and instead towards questioning what constitutes the data itself.
- **Data journeys:** "the myriad of techniques, efforts, instruments,..used to process and mobilize data so that it can actually serve as evidence"

The Mediating Role Of Technology in the Relational View Of Data

The Investigation:
- An attempt to understand how the technologies used in citizen sensing shaped their connection to the data collected in their sensing practices focusing primarily on **hermeneutics**.

Data = Technological Artifact

Adding Value from Mediation and Relational Data :

1: **Recognize the non-neutral role of technologies in our interpretation and relation to data;** citizens and researchers alike are, as it were, living within the values created from a data-centric and a technologically shaped world.

2: **The work of sensing practices becomes more full-bodied** and able to combine different imaginaries of data use, **which in turn provide the necessary parts of both qualitative reports and experiential concerns.**

Envisioning and Actualizing Mediated Citizen Sensing Practices
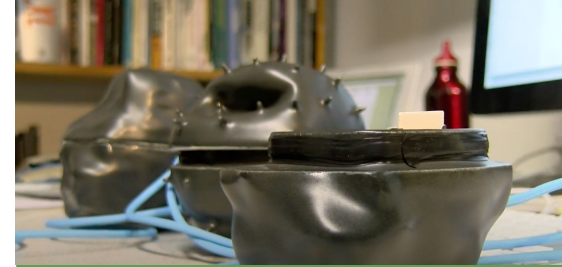
Envisioning

- General Overview
    - Benefits of postphenomenological approaches to understanding citizen sensing
    - Benefits of embedding the relational view of data into citizen sensing as a way to better account for experience and data use.

Actualizing: A Workshop Proposal
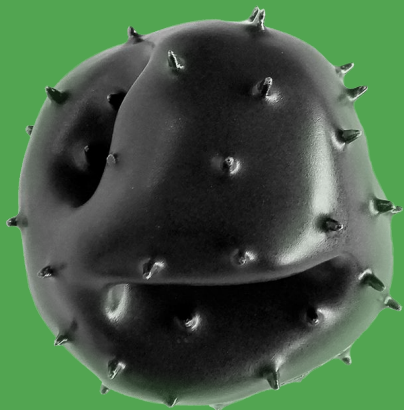
The workshop is to be broken up into five parts:

1. **Gathering First Context**
    a. Intimate interviews regarding community experiences
2. **Integrating Sensing Practices**
    a. Sensor use and ownership
3. **Assembling Mediated Context**
    a. New sensing practices and expectations about sensor data
4. **Incentivizing Data Curation**
    a. Data as relational presentation, open data forum
5. **Collaborating Through Experimentation**
    a. Intimate interviews on community images and open dialogue

Data science needs to stop feigning neutrality, and instead work collaboratively with domain experts and relevant communities toward forging socially beneficial solutions
- Leonelli, 2021

15

Let's Review!

Case Study

1)	That both the role of technology in shaping our interpretation and relation to data cannot go unrecognized.
2)	That through the relational view, the work of sensing practices in citizen sensing becomes able to combine different imaginaries of data use, which in turn provide the necessary parts of both qualitative reports and experiential concerns.
3)	A workshop designed to exaggerate both the mediating role of technology in the work of citizen sensing, as well as start creating space for new ways of encouraging citizen participation in co-researching work.

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