Data Visualizations for Perspective Shifts and Communal Cohesion

By Elizabeth Borneman

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Signatories:

Signature of Author: _____
Comparative Media Studies/Writing
May 11, 2020

Certified by: _____
Cesar Hidalgo
Research Scientist, MIT Media Lab
Thesis Supervisor

Certified by: _____
Catherine D'Ignazio
Assistant Professor, DUSP
Committee

Certified by_____
Rahul Bhargava
Research Scientist, MIT Media Lab
Committee

Accepted by: _____
Eric Klopfer
Professor and Program Head, CMS/W

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Abstract

How can we use data visualizations to facilitate discussions about community challenges and priorities? I hypothesize that data visualizations that convey emotions, embodiment, and arise from a participatory design process grounded in design justice and data feminist principles, can inspire the collective discussions and perspective shifts required for communal cohesion. This thesis highlights projects in which communities, teams, and collaborators have done this well: *The Exhibit of American Negroes,* Anti-Eviction Mapping Project, and *Data Zetu.* Finally, I propose a project, *Crowns of the South,* to put these ideas into practice in an African American community data visualization project, concerned with Black education and employment rates in the United States South.

Thesis supervisor: Cesar Hidalgo

Title: Research Scientist, MIT Media Lab

Chapter 1

Introduction and Research Question

How can we use data visualizations to facilitate discussions about community challenges and priorities? If the goal of data visualizations is to generate new patterns and knowledge, then there can be much potential in the visualization creation process, the new kinds of knowledge generated, and in the visual format itself, to address the research question. When data visualizations can facilitate community discussions, there's great potential for cohesion within the community. The Local Government Association defines a cohesive community as a community that develops strong and positive relationships. A cohesive community shares a common vision and sense of belonging, and diversity of backgrounds and circumstances are appreciated and valued. Moreover, those from different backgrounds have similar life opportunities. I hypothesize that data visualizations that convey emotions and embodiment and arise from a participatory design process grounded in design justice and data feminist principles, can inspire the collective discussions and perspective shifts required for communal cohesion.

The question of how we can leverage data to engender communal cohesion and perspective shifts is vital, especially for historically oppressed communities. In unpacking this question, this thesis proposes design elements for data visualizations - from their conception, production, to exposition, and reflection, that could be pivotal in the process. In many instances the stories we need to tell in order to address a community challenge head on, are not saccharine or simple. Rather than using data to tightly package and generalize the complexity of real situations and experiences, this thesis sets out to uncover the ways communal tales and shared

observations can strengthen data. This thesis highlights projects in which communities, teams, and collaborators have done this well, and proposes a novel project that attempts to contribute to the field, in kind.

Project Inspiration: *The Exhibit of American Negroes', DuBois*

This thesis is inspired by *The Exhibit of American Negroes',* by W.E.B. DuBois and colleagues. The Exhibit beautifully captures data visualization's power to convey sensitive community realities and arguments, especially where traditional dialogue and communications did not suffice. The Exhibit was presented at the Exposition Universelle in Paris in 1900. DuBois exhibited stories and artifacts correcting and contextualizing pervasive stereotypical beliefs and logics about African American intellectual life at the time. These beliefs centered on Black people's capacity for learning, human agency, and claims to their basic human rights (Battle-Baptiste, Whitney et. al. 2018). But securing a spot in Paris was challenging. Thomas Colloway, an editor of *The Colored American* newspaper in DC, petitioned the US government to include an exhibit dedicated to Black life. This was important in that the Exposition Universelle, was a world's fair held to celebrate the achievements of the past century, and to accelerate development into the next. Endorsed by Booker T Washington, Colloway reached out to DuBois about being willing to contribute a social study, and DuBois agreed.

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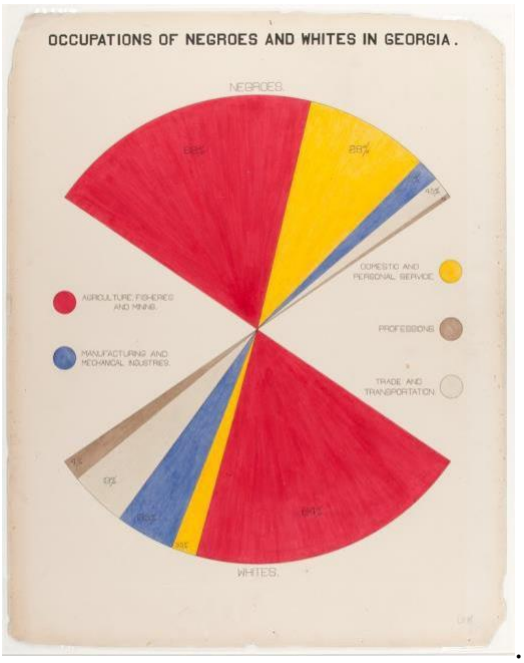
Data Visualizations for Perspective Shifts

The Exhibit was visually striking and vibrant, but the project was principally motivated by challenges they were facing at home. According to Battle-Baptiste et. al, "the core mission of

the project was to forcefully refute the widespread belief that black Americans were innately inferior and incapable of social advancement **(**Battle-Baptiste, Whitney et. al. 2018**).”** The Exhibit featured approximately 60 data visualizations, or info-graphics compiled using data from a combination of existing records and empirical data. The data was aggregated by a team of students, librarians, intellectual friends of DuBois, and researchers at Atlanta University. The team analyzed US Census Data, Atlanta University Reports and various governmental reports to paint a data-driven picture of Black progress post Emancipation, “covering topics such as marriage, mortality, employment, property ownership, education, miscegenation, and various other categories of social progress **(**Battle-Baptiste, Whitney et. al. 2018**).”**

At the time, Americans had resisted associating topics like marriage and property ownership, with African Americas. DuBois was able to facilitate discussions about Black progress, and their challenges in securing these measures of progress, with the visuals and other mixed media materials. Each visual was created in an effort to not only spark conversation that would change minds, but “to represent the Black South as in integral part of modernity, a small people who shared more in common with a broader ‘future oriented world’ vs an insular [and retrograde] United States… in the Jim Crow South (Battle-Baptiste, Whitney et. al. 2018). See Figures 1 and 2 for example visuals of employment and city population data.



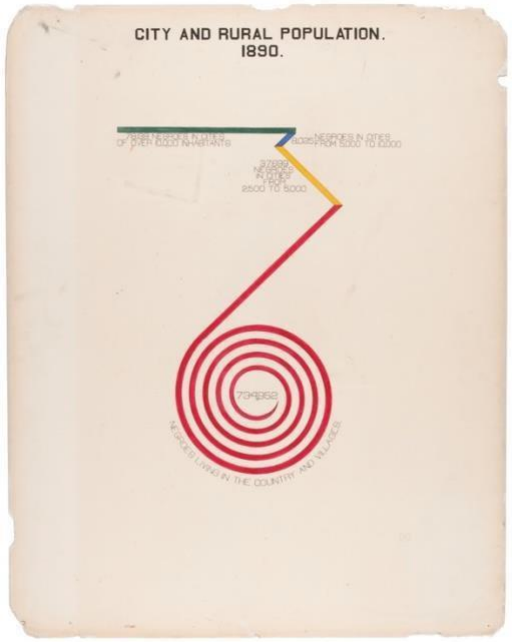


Figure 1. A non-traditional pie chart, comparing Black and White Occupations in Georgia. **Figure 2.** shows Black populations in city and rural areas, and defies a normal key. It reads like narrative flow, and is part bar chart, part line chart, part spiral graph. As shown in the figures, DuBois recognized that traditional graphs would not be as useful to the public. He was among the first great American public intellectuals "whose reach extended beyond the academy to the masses by using a variety of writing styles ranging from scientific prose to lyrical outpourings across a number of genres that deeply touched readers' emotions (Battle Baptiste p 33)."

Framing and Narrative Change for Perspective Shifts

To achieve his goal of facilitating discussions about community challenges, DuBois used two key techniques: framing and narrative change. Framing is about focusing attention on an event, and then placing that event in a field of meaning (Framing Theory 2014). Framing theory suggests that *how* something is presented to the audience (called "the frame") influences the choices people make about how to process that information. In the Exhibition of American Negroes, data visualizations and other mixed media objects literally framed specific aspects of Black life and placed them in a wider context of cultural information and materiality. This wider context provided a framework for discussing Black progress beyond limiting ideas of slavery. To

a similar effect, narrative change has to do with shifting dominant public narratives, in such ways that can often lead to their success or failure (Hallowell 2019). Narratives have the power to normalize or destigmatize a particular issue, leading to reduced public concern. Or they can expose systemic maltreatment and injustices in an issue, leading to increased public engagement and demands for reform. At the time there were many dominant narratives denying Black people's capacity for liberal freedom and progress. These myths in public consciousness were used to justify slavery and restrict Black people from natural human rights. So in order to educate patrons about these experiences and the way Black people were navigating them, the exhibition re-framed these issues and instigated narrative change.

DuBois framed visualizations to promote narrative change about Black enslavement over time. The visualization in Figure 3 tells the story of Black people's transition from enslavement into freedom, back into enslavement, and sharply towards freedom again. In the graphic's frame, note the jagged vs straight edge of the graph to represent numbers of slaves v free Negroes. There is a tension in the graph that maximizes the impact of the narrative, read downwards as if into the ground. Not only does this graphic convey emotional transitions in Black livelihood, it re-frames the narrative of Black progress, showing that, "in reality, this was not a utopian happy narrative about Black progress but gave a sense of the gains that had been made in spite of machinery and white supremacist culture, policy, and law that surrounded them (Battle-Baptiste, Whitney et. al. 2018)."

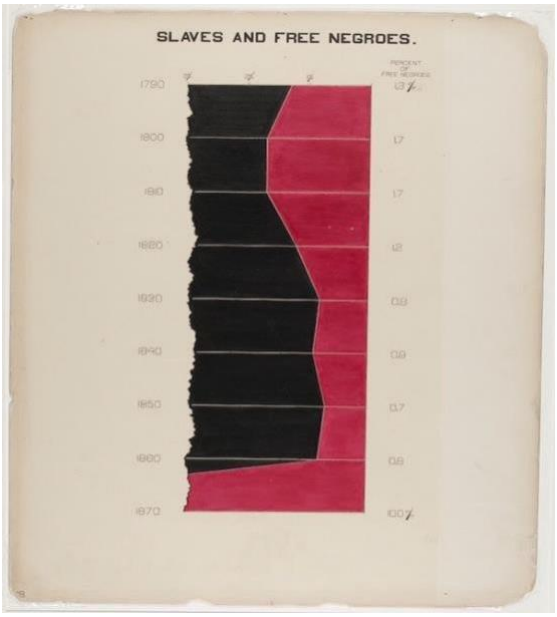


Figure 3. “Slaves and Free Negroes” and Figure 4. *The Exhibition of American Negroes*

The Exhibit used a mixed-media style to shift the narratives around Black agency. The Exhibition itself in Figure 4 featured set of objects, images, and texts including framed photographs of prominent African American leaders and politicians; tools, harnesses, and agricultural products from black industrialized schools, an on-site collection of over 250 publications compiled by a Black intellectual, bibliographer, and librarian at the Library of Congress (Battle-Baptiste, Whitney et. al. 2018). This graphic shows that, “although systematically disenfranchised and dispossessed, African Americans mobilized their agency to rebel and pursue economic survival and respect. This agency went unacknowledged, denied, and disavowed in the South because it conflicted with claims that Blacks naturally existed at the bottom of the Jim Crow order (Battle-Baptiste, Whitney et. al. 2018).” At the exhibit the collection of items together changed the narrative about Black agency and accomplishments. It placed visuals of Black progress and tact next to images of Black dehumanization and state

control. This frame told a distinct story about a Black culture that was emerging and expressing itself anew at a pivotal time in the South.

Data Visualizations for Communal Cohesion, Facilitating Discussions

This work not only led to international perspective shifts outside of the community, but also to cohesion and new perspectives within the community. The act of putting together an exhibit that intended to convey aspects of Black identity, progress and daily lives which they held to high esteem, was cohesive to the community in itself. The visualizations are a product of the decisions about what kind of data to show, the shared community vision, and ways to represent the diversity of the community being appreciated and positively valued. In creating these visualizations, they confronted questions such as: "What unites us as a people? What's unique about us? How do we see our own communities? How do we understand ourselves as a people with a past present and future **(**Battle-Baptiste, Whitney et. al. 2018**)?**" African American culture was young, and the Exhibit created an opportunity for them to illuminate emerging achievements and newly established customs that reinforced community belonging.

An evolving community identity was both a challenge and priority in African Americans conversations at the time. The visualization in Figure 5, "The Amalgamation of the White and Black elements of the population in the United States," worked to facilitate these discussions. The visualization goes beyond the South to make a statement about Black existence across the nation. Shaped like a mountain peak, as if climbing down or away from a critical point in time when Black people were brought to the South, the graph is a stunning data portrait of race in America over nearly a century. Gradient colored areas are hardly objective but represent the

blurry spectrum of races over the century, from Negroes, to Mulattoes, to White. The graphic articulates racial binaries as well as more fluid racial identities.

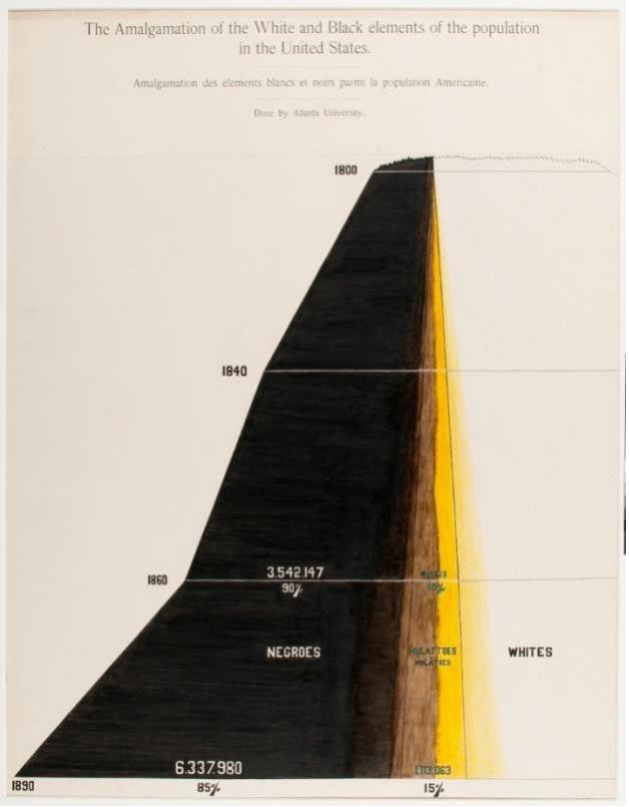


Figure 5. “The Amalgamation of the White and Black elements of the population in the United States”

In using data about community priorities to visualize statements of solidarity, this work re-imagined and created culture that continues to be a pillar and strength of the Black community. Battle-Baptiste writes in her modern analysis of the exhibit: “The entire exhibit recorded black self-determination as a portrait of a ‘small nation of people’ who were shown to be studying, examining, and thinking of their own progress and prospects. These were bold black nationalist sentiments- the black Americans could contemplate their past, present, and future connected with a Pan-African solidarity. The black consciousness of a people who understood

themselves in a particular time and place strongly refuted the notion that the African had no history, civilization, and hence, no culture **(**Battle-Baptiste, Whitney et. al. 2018**).**"

1800 To Modern Day Visualizations

DuBois's Exhibit serves as a counter-example to principles of visual literacy and information design that would be articulated by statisticians dominating the 20th century. DuBois's visualizations mark "an important cross fertilization of social sciences, statistics, and cultural materiality, while offering alternative visions of how social scientific data might be made more accessible to the populations and people from whom such data is collected (Battle-Baptiste, Whitney et. al. 2018). By contrast, the work of Edward Tufte, John Dewey, and other famous data visualization writers, uphold scientific objectivity as the ideal and promote an elitist data visual practice.

Like most of our collective memory, data visualization history has excluded women and people of color. Tufte's "*The Visual Display of Quantitative Information"* has 113 pre-1900 data visualization examples, and overwhelmingly represents the work of white males. I counted the number of men, women, and people of color from the cited graphics and the resulting breakdown was: 97% Men, 3%Women. Of those men, 3% were MoC, and 0% were WoC. In fact, I counted only 3 women referenced in the whole book, and two of those three times were as negative examples of what *not* to do in visualizing data.

In Tufte's section on graphical integrity and sophistication, he argues "the conditions under which many data graphics are produced – the lack of substantive and quantitative skills of the illustrators, dislike of quantitative evidence, and contempt for the intelligence of the audience – guarantee graphic mediocrity (Tufte 2015)." This view and much of his data graphics theory are out of touch with social and ethical perspectives around data science, presentation, and use today. His perspective also narrows the field to individuals from a particular background and excludes a work-force of people who may not have the same access or opportunities to a computational education. This is important to note, as this thesis prioritizes the inclusion of communities with a wide range of data literacy in the visualization process, and assesses graphical integrity and success on the impacts the visualizations have on the communities who are most affected by the data.

Chapter 2: Guiding Models, Principles, Case Studies

Chapter Overview

I plan to incorporate guiding models and principles from *Data Feminism*, *Design Justice Principles*, and participatory design accountability frameworks to think through working with data science alongside communities. In this chapter I will first outline the focal topics from these frameworks and then describe case studies which in practice exemplify these models and principles. The two case studies I will describe and analyze are the Anti Eviction Mapping Project which spans across New York City, Los Angeles, and San Francisco and the Data Zetu project that works with 14 wards across Tanzania.

Data Feminism

There are a couple of key principles from a feminist data science that I will adopt and frame with exemplar case studies: emotions and embodiment, and multiple voices at all phases. *Data Feminism*, a book by Catherine D'Ignazio and Lauren F. Klein, provides a model for how feminist thinking can apply to data science. D'Ignazio and Klein write, "Data feminism isn't only about women, it isn't only for women, and it isn't only about gender. Feminism is about power - who has it and who doesn't. In our contemporary world, data is power - and this power is wielded unequally (D'Ignazio and Klein, 2020)." We draw from Data Feminism when we ask questions like: "How can we use data science to design for a more just and equitable future?" and "By whose values will we re-make the world?" (D'Ignazio and Klein, 2020).

Emotions and Embodiment

Quantification has been defined historically by Theodore Porter as "a technology of distance", in which those who produce knowledge do so at a distance, or independently from themselves (Ablerism 2014). Early 19th century statisticians teach these views - which called for people to set aside their own feelings and emotions when it came to statistics. The more seemingly neutral, the more rational, and ultimately more true the knowledge. Tufte and Dewey's data visualization practices and theory demonstrate this. Criticizing this traditional norm I ask, what gets lost in this approach to harnessing and illustrating data? Data Feminism asks, what happens if we step away from the binary logic and posit two questions to challenge this master stereotype. First, "is visual minimalism really more neutral? And second, how might activating emotion – leveraging it, rather than resisting emotion in data visualization – help us learn, remember, and communicate with data " (D'Ignazio and Klein 2020). Embodiment is rarely brought up in data science, despite the fact that it relies on them as sources of data.

D'Ignazio and Klein write, "...even though we don't see the bodies that data science is reliant upon, it most certainly relies upon them. It relies upon them as the sources of data, and it relies upon them to make decisions about data (D'Ignazio and Klein 2020)"

Rather than valorizing data neutrality, feminist thinking posits "standpoint theory." Standpoint theory was originally formulated by Sandra Harding and promotes a different kind of objectivity which strives for truth *at the same time* that it discloses the standpoint of the designer (Harding 2009). Among other things, this theory acknowledges that standard objectivity represents historical perspectives of patriarchal power and does not include the experiences of women and marginalized groups.

Multiple Voices at All Phases and Design Justice

Beyond simply embracing different perspectives, feminist standpoint theory and design justice assert that the ways to both improve data practices and address systemic injustices in the data pipeline are to begin with experiences of those most marginally affected in the context of the data or by the data- based decisions. In the "Unicorns, Janitors, Ninjas, Wizards, and Rock Stars" chapter of *Data Feminism,* the authors write, "embracing pluralism in data science means valuing many perspectives and voices and doing so at all stages of the process — fromcollection to cleaning to analysis to communication." Instead of lionizing data scientists as solo workers who create clarity out of messy data, a feminist approach to data emphasizes that "working with communities and embracing multiple perspectives can lead to a more detailed picture of the problem at hand"(D'ignazio and Klein 2020). In this section, I expand on this idea ofcentering

community voices in this work. Including these populations in the work exposes blind spots in the way we apply data to the ideas and people it means to explain or represent.

Design Justice provides guiding principles including: "(1) We use design to sustain, heal, and empower our communities, as well as to seek liberation from exploitative and oppressive systems, (2) We center the voices of those who are directly impacted by the outcomes of the design process, (3) We prioritize design's impact on the community over the intentions of the designer, (4) We see the role of the designer as a facilitator rather than an expert, (5) We believe that everyone is an expert based on their own lived experience, and that we all have unique and brilliant contributions to bring to a design process, (6) Before seeking new design solutions, we look for what is already working at the community level (Barnett et. al)."

It's important I understand the practices that must be put in place in order to uphold these principles, and not to take them at face value. For example in principle (3), I would first have to get to know what the community priorities and community-stated challenges are, attending to histories and community sentiments. For principle (5) I would have to address what kinds of contributions are not typically seen as expert, and which kinds of lived experiences I want to acknowledge. Doing so allows us to generate new and critical questions that would otherwise go unasked, as many socio-political information systems historically include the suppression and exclusion of marginalized voices in their design and infrastructure.

In Pursuit of Rigour and Accountability in Participatory Design

'A tool to think with' guiding researchers and practitioners through a process of systematic reflection and critical analysis in participatory design. ***Four lenses: Epistemology, Values, Stakeholders, Outcomes***

Working alongside communities can be unpredictable and complex, whether you are a member of that community or not, so I draw from Frauenberger et. al's work*: In pursuit of rigour and accountability in participatory design.* This work argues that rigor and accountability require structured team debate, critique and reflection. He writes, "a key prerequisite for having such debates is the availability of a language that allows designers, researchers and practitioners to construct solid arguments about the appropriateness of their stances, choices and judgements (Frauenberger et. al 2015)." The writers propose a "tool-to-think-with" that provides a language for guiding designers, researchers and practitioners through a process of systematic reflection and critical analysis in participatory design. The four lenses that the tool prompts designers to focus on are: (1) Epistemology, (2) Values, (3) Stakeholders and (4) Outcomes.

Epistemology deals with knowledge construction, generating creativity, and the knowledge we gain and attempt to ratify in the project. The epistemology underpins the process and the outcomes. Values broadly apply to concepts that motivate and anchor the work. Values explicitly point at what we think is important and we use them to guide us when we have questions about what to do next or what to prioritize in the work as we go. Stakeholders are those involved, or who have a stake, in the work. I have to consider how it is that stakeholders get involved in the process, why, and how do they benefit? Outcomes concern the effectiveness of the work, which intertwines with the epistemological nature of the work, the sustainability of the effects, and can be both material and non-material.

In the subsequent chapter describing my proposed *Crowns of the South* project, I will outline in detail how I apply these four lenses to the current work. So far I anticipate that participants can gain on several levels: improved fluidity and knowledge of statistical methods

and data visualizations in the topics of their interest, capturing and expressing imperative information and narratives about community progress and needs, and building of instrumental collaborative social networks. Collaborative social networks help ensure sharing of resources and knowledge about opportunities for the community to make progress in areas that are priority for them (i.e. Education and Employment). Collaborative networks can also fuel community-led projects that help them to discuss, plan for interventions, and bring more attention to community challenges and needs.

Case Study 1: *Anti Eviction Mapping Project (AEMP)*

The Anti Eviction Mapping Project (AEMP) is a collective working primarily in the San Francisco Bay Area, Los Angeles, and New York City, to study and visualize complicated gentrification landscapes interlaced with "global capital, real estate, techno-capitalism, and political economy (AEMP)." With significant female leadership, the group comprises volunteers, community partners, oral historians, researches, and housing activists to document "dispossession and resistance upon gentrifying landscapes (AEMP)." Working across such a group of stakeholders and movement makers allows them to acknowledge many stories. In this, many of their projects address themes in my current research in data visualizations for perspective shifts and communal cohesion - such as those highlighting evictions, declining Back residents in the city of San Francisco, and more. Alongside the 78 distinct digital maps linked from the AEMP homepage, the collective produces oral history works, film, murals, and community events, using feminist analysis and decolonialization methods. In this section I will describe and analyze two of their exemplary projects: Narratives of Displacement and Resistance and COVID-19 Emergency Tenant Protections and Rent Strikes.

Narratives of Displacement and Resistance

The AEMP's map of oral histories in the San Francisco Bay Area, "The Narratives of Displacement and Resistance", goes beyond mapping eviction locations and eviction analysis. The map shows clusters of red and blue dots that mark eviction sites across San Francisco. The red dots are locations where evictions occurred and the blue dots are locations where interviews were conducted. When you hover over the blue dots you can see the names of the individuals who were evicted, a video narrative of their oral histories, and a written description which ranges in length describing the featured people and specific details about the associated narrative. This map is an example of a data visualization that upholds principles of fore fronting emotions and embodiment, including multiple voices at all phases of the data visualization project, and centering the voices of those most impacted by the issue. In an interview of AEMP's co-founder Erin McElroy by Catherine D'Ignazio, McElroy explained, "So the AEMP's narrative project, *Narratives of Displacement and Resistance*, started about a year after the AEMP began. Prior, we had been making all of these maps about evictions...but we were becoming worried that we were reducing what was going on to just little dots on a map. We wanted to intervene to tell more complex histories, so we launched the narrative wing of the mapping project (D'Ignazio 2020)." This approach to the AEMP map counteracts a trend where cleanliness and clarity of data inadvertently suppresses many voices. In the dense, almost indistinguishable from each-other, clustering of dots on the Narratives of Displacement and Resistance map, it becomes clear through piles and piles of red dots the extent to which evictions have been an omnipresent and overwhelming problem in the Bay Area.

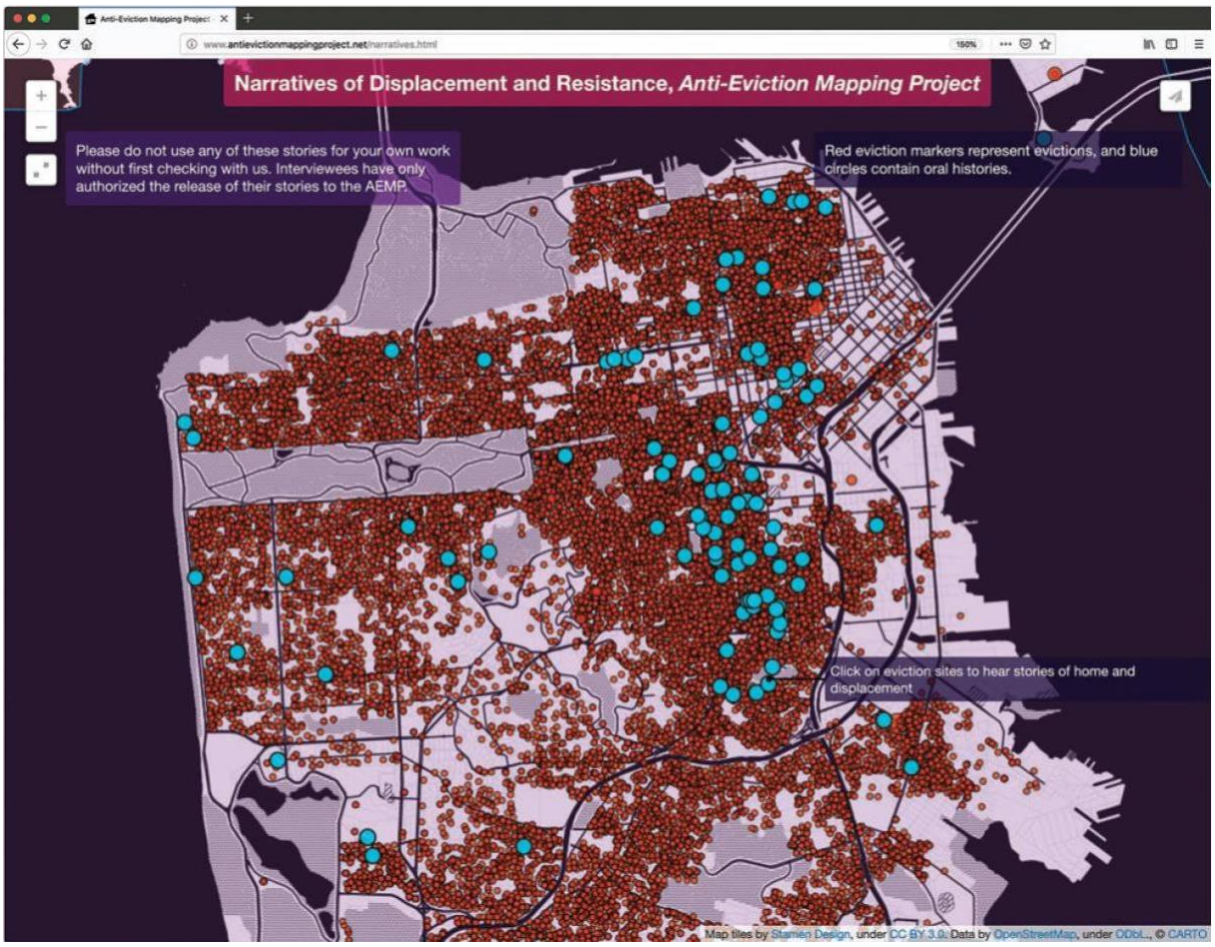


Fig 6. Narratives of Displacement and Resistance

One particular narrative of resistance about Bonnie Wills in West Oakland is an example of the way emotions and embodiment help contextualize, actualize and lay bare lived experiences and "data points" in the displacement crisis. From the narrative description I learned that Bonnie Wills "has moved around during her life, but she's always come back to her home in West Oakland. Now, she's an old-school townie, and she's watched how it's changed over the decades - who left, who stayed, who moved in, who's been pushed out (AEMP)."

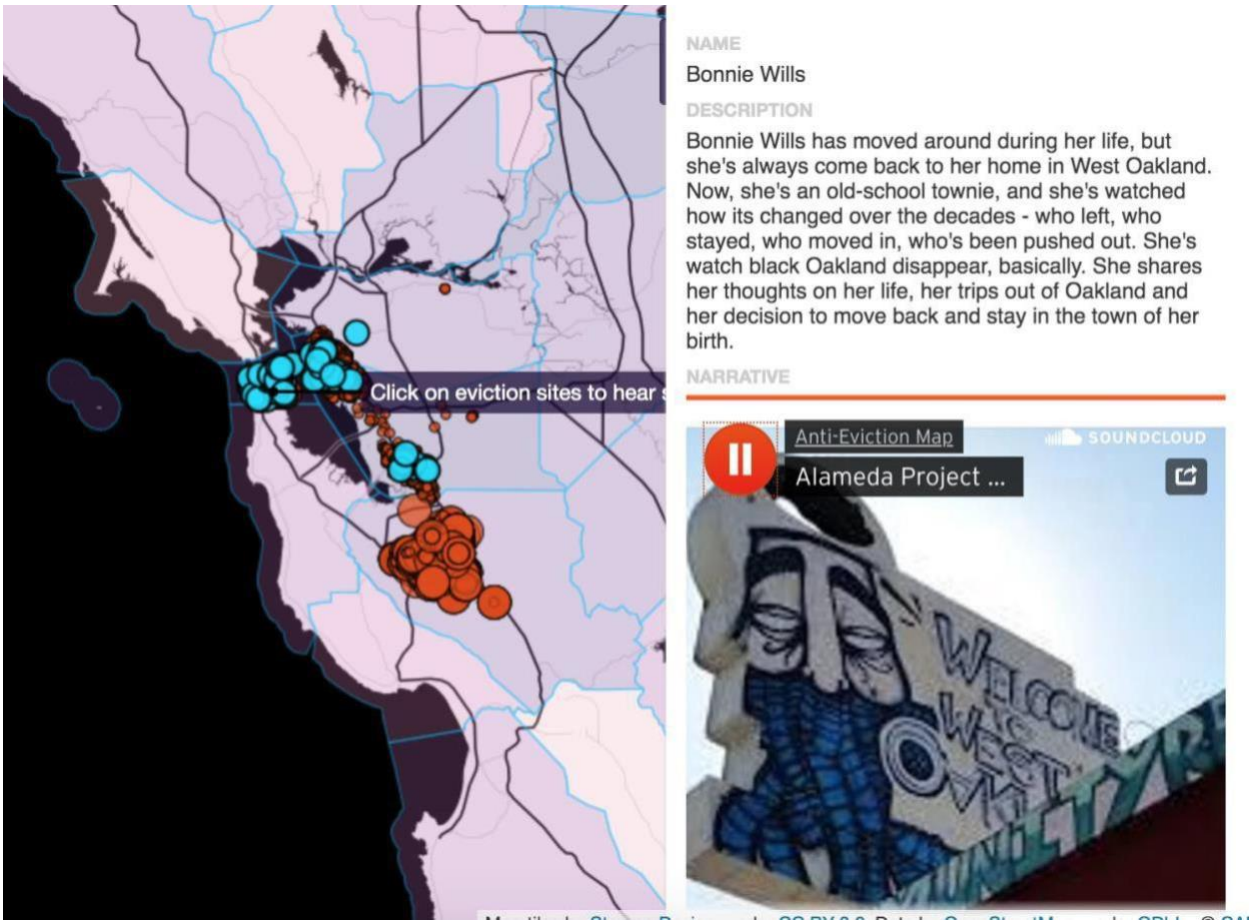


Figure 7. Bonnie Wills West Oakland Narrative, AEMP

Interviewer:
"How do you feel walking down the street in Oakland now?"

Bonnie Wills:
"This is home to me. I always feel secure at home, so I am not afraid… I recognize that my community is filled with wounded people. And I recognize that hurt people hurt people… I go to the SF jail, twice a week. Interaction with men who have been demonized and denigrated by society.. and they have created a myth that these men are dangerous and subhuman.

And there are others even in their fear, their sense of privilege and entitlement shows up."

Interviewer:
"Right, because people are scared of West Oakland, but they are still moving in.."

Bonnie Wills:
"Yeah. Because they figure, you know...eventually we'll get them all out. *chuckle*"

Interviewer:
"How do you feel, because this is your family home?"

Bonnie Wills:
"Well I am not going anywhere."

Interviewer:
"Well what if the block becomes completely different and you are the last person left?"

Bonnie Wills:
"If I am the last person left, I will continue to have the consciousness I have now."

When I listen to this interview I am transported to West Oakland. From the oral narrative I can also hear the steadfastness in Ms. Will's voice that reflects a confidence in her community, a dignified expression of identity, individual agency, and communal cohesion. Her commitment to Black agency in light of her awareness of the dominant narratives that threaten to displace her entire community parallel to the motivations of DuBois's historical and motivational Exhibition of American Negroes project.

COVID-19 Emergency Tenant Protections and Rent Strikes

The COVID - 19 Emergency Tenant Protections & Rent Strikes map shows where United States officials have passed, or tenants are working to pass, emergency tenant protections during the Coronavirus crisis. It shows where "organized rent strikes are currently occurring or may be occurring (AEMP, COVID-19)." It also links out to a list of Tenant Protection Resources from Tenants Together, for those in need. The map has options that allow you to decide the granularity of the information displayed, allowing you to choose between viewing Rent Strikes, Cities, Counties, and/or State level information.

In the Cities, Counties, and State level views, there are pink and green highlighted areas that mark Tenant protections across cities, counties, and states. City level protections are marked with circles, and county and states are shaded either pink or green within the borders of that

county or state. The pink shades represent protections that have not yet passed, and the green shades represent those that have. When you click on one of these tenant protection circles, you can see the Municipality, the Policy Summary, and that status of passing. There is also a link for viewing more info that couldn't fit on the map.

In the Rent Strike view, the map shows a collection of blue house icons, red house icons, and orange and yellow circled numbers. When you click on one of the orange and yellow circles with a number, the map zooms in closer to that location and reveals that number of additional blue house icons at locations where that number of rent strikes is happening. For example, if I click on the "2" in the orange circle over Austin, TX, it zooms in closer to Austin and 2 blue house rent strike icons appear and their respective locations in Austin. The red house icons show where rent strikes may be occurring, and the blue show where strikes are currently occurring. When you click on one of the house icons, it gives specific information about the rent strike: Location, Status, Why?, Start Date, and Resources related to that strike. See Figure 8 for an example of a Rent Strike that's being featured in Santa Cruz, CA.

Analysis

This map includes multiple voices at all phases of the project, even after the visualization has been uploaded and shared, it is not yet a finished product. This is consequential for a graphic showing housing conditions in a rapidly evolving and unpredictable emergency. Even after the map has been shared it can be updated by those who are in close contact with the issues. There is an active and responsive nature to the map as well, as the pandemic continues to unfold: in the primary panel there are linked options for viewers to "Submit a tenant protection update" and to

“Submit a rent strike update.” There is an important aspect of real time community usability in this visualization that addresses aspects of communal cohesion central to this thesis.

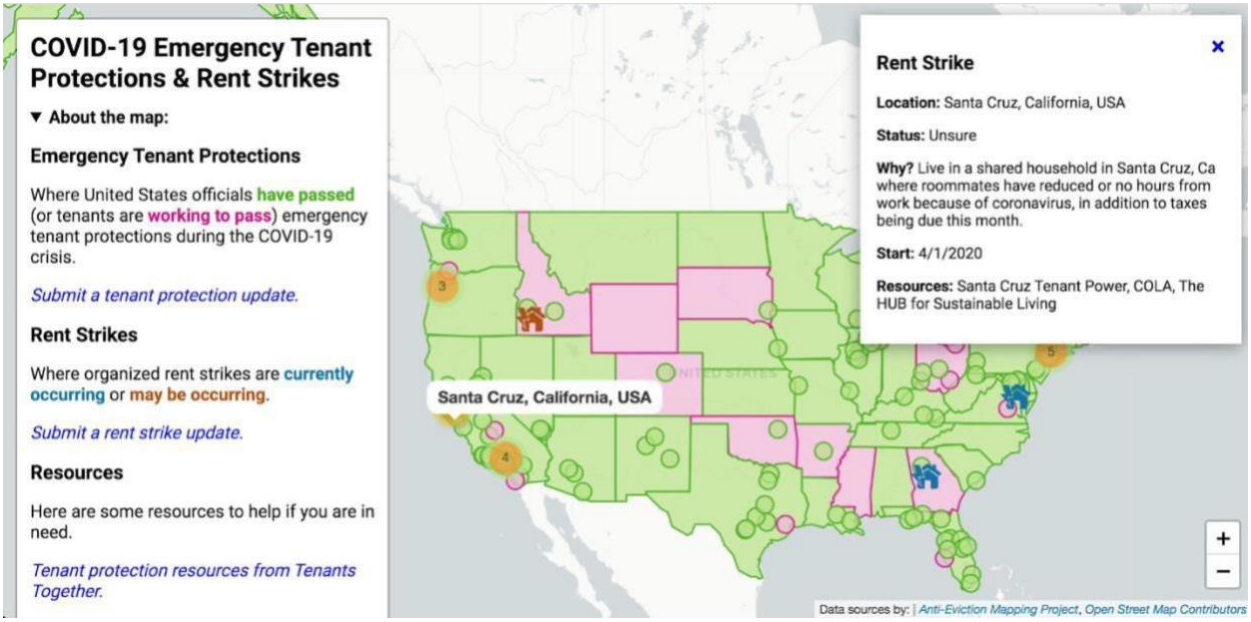


Fig 8. COVID-19 Emergency Tenant Protections & Rent Strikes

Prioritizing Community Impacts

This project also satisfies conditions of centering the impacts of the community over the intentions of the designers. Even in the Figure 8 Rent Strike panel, showing “Status Unsure.” This element of the visualization shows more fluid data reporting practices conveying information, albeit uncertain, that would be invaluable knowledge to the impacted community members.

Case Study 2: Data Zetu

Data Zetu, or "Our Data" in Swahili, is a program that works across 14 wards in Tanzania to empower communities to engage with hyperlocal, actionable, data-informed decisions. In their process they begin by holding "listening campaigns" with community leaders to identify and deconstruct their most pertinent daily issues, run workshops and trainings with community organizations and government leaders to help find and prepare relevant datasets, produce digital and offline tools such as data murals and online platforms, and follow up in "shareback sessions" after the process that include synthesized booklets of community-generated data, challenges, and priorities dealing with sustainability of projects.

The Data Zetu project worked to connect Tanzania's data ecosystem and fashion industries to promote dialogue on gender-based violence and sexual health. Young people in Tanzania are vulnerable to poor sexual health outcomes, often facing the most, "social, cultural, economic, and structural barriers to accessing sexual and reproductive health information and services [globally]," and these challenges were consistently raised in Listening Campaigns across the 4 wards in Temeke district (Bakari 2018). Despite a general awareness about these issues, there is a gap in youth engagement with these facts - which inspired Data Zetu, led by partner Tanzania Bora Initiative (TBI), to collaborate with Temeke-based FARU Arts and Sports Development Organization (FASDO), to explore intersections between arts and data-driven health messaging. While FASDO had been holding fashion shows and design competitions to highlight young Tanzanian artists, they had not previously linked the competitions to health and development challenges.

Through November and December 2017 Data Zetu, TBI, and FASDO held a Khanga Data Design Challenge across the Temeke district. They challenged 75 young local artists and fashion designers to use data to create khanga artwork that promotes reproductive health and gender equality. Khangas are fabrics traditionally containing social messages. Designers were encouraged to incorporate specific data or information into their designs that directs the wearer or viewer to actionable next steps, in such a way that might spark conversation and learning among the women who wear khangas, and among those they pass on the street. In preparation, the artists participated in training from the TBI and FASDO teams to learn about data concepts and significance and how to search for credible data. Two months after launching, over 100 designers submitted their khanga design via the Love Arts Tanzania website, where a panel of judges from fashion and public health fields narrowed the pool to 20 designs (Daudi 2019). These 20 designers participated in secondary training to refine and professionalize their designs, resulting in 20 final designs for the judges to review. Judges considered the designers' use of data, creative, and relevance to the topical areas that emerged from the Listening Campaigns, so select three winners. Those three winners got a chance to showcase one attire each in the final fashion show, and their designs, featured below, were printed and given to four renowned fashion designers.

1st winner Danford Marco and his Khanga design

Figure 9.*"If you keep quiet they will make you cry"*

Figure 9 shows Danford Marco's first place winning khanga design, *"If you keep quiet they will make you cry."* It sends a message to women who are being abused to report the abuse to authorities, because if the violence prevails the woman might end up getting other severe health problems (Katuli 2019). Danny's design used data on Gender Based Violence among married women which he obtained from the Tanzania Demographic Health Survey. Danny's replication of two hearts around the border of his design, with one of the hearts colored red, represents the 1 out of 2 married women in Tanzania who have been emotionally, sexually or physically abused by their past or current husbands. Additionally, the figure in the center represents a woman who has lost hope (Katuli 2019). The second and third place winning khangas were designed by Winfrida Touwa and Shahbaaz Sayeed, featured in Figure 10 and Figure 11, respectively.

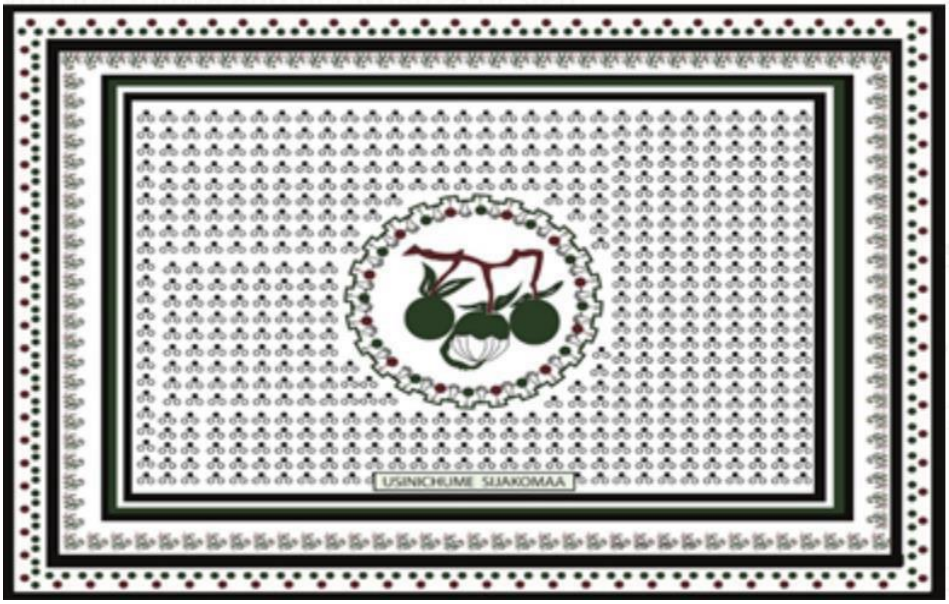


Figure 10. 2nd place winning khanga by Winfrida Touwa

Figure 11. 3rd place winning khanga by Shahbaaz Sayeed

Project Impacts and Outcomes

There are many notable outcomes from the Khanga Data Design Challenge, including changes in HIV and sexual health perception, new ways of making data accessible, new skills working with data, sharing data literacy skills with others, encouraging more use of data with fashion, and

distributing the khanga's message. Specifically, 100% of surveyed participants reported an increase in their perceived value of data and skills in handling health data (not all participants were surveyed, 92% of surveyed participants reported sharing these new data skills with others — with each one sharing them with average of almost four people, and 2,000 khangas were distributed responsibly to women in Temeke District (Daudi 2019). Daudi writes in his report that, "assuming each khanga is viewed by 50–100 Tanzanians before it can no longer be used due to wear and tear, the message should reach at least 100,000 people (Daudi 2019)." One Challenge participant was later hired to make uniforms for a hotel near Mount Kilimanjaro. He told the project coordinators, "I checked for data on what is one of the most visited area and I found it to be the Maasai land. 8 out of 10 tourists who visits this area goes to maasai households. Using this data I incorporated the maasai huts on the uniforms and other household utensils they use in their daily lives (Daudi 2019)." On an individual designer level, designers gain confidence and experience at designing for social challenges that matter to their customers, informed by data.

Figure 12. Models display the Khanga data competition's winning design, which depicts data about gender-based violence in Tanzania. Photo credit: K15 Photos.

Analysis

The Khanga Design competition does an excellent job at harnessing emotions and embodiment in the data visuals, including multiple voices at all stages of the project, and prioritizing impacts on the community over intentions of the organizers. The project also does a fine job at rigor in participatory design by reporting their means of accountability to stakeholders and sustainable project outcomes.

Emotions and Embodiment

Emotions and Embodiment run throughout the entire project. Not only is the data on sexual health and violence in Tanzania emotional, but this emotion was conveyed through the designs and literally centered in the patterns through images of women. The emotional imagery

and data conveyed motivate wearers and viewers of the khangas to take action. The project forefronts embodiment in that the khangas themselves are physically worn on bodies. Interacting with bodies is unavoidable in seeing the data as intended by the project, and in conversation about the issues.

Multiple Voices at all Phases - Listening Campaigns and Stakeholders

Data Zetu led with listening campaigns to hear what the community itself identified as the issues and topics they wanted to work on, and also collaborated with organizations with multiple lines of expertise and resources. The listening campaigns were the starting points in the process. In my interview with Dara Lipton from Data Zetu and ISTE, Dara explained, "We start with listening campaigns. The data only matters if they feel like it's linked to pain points that come up from the community. We brought in men, women, community leaders and subgroups, and we focused the topics on their interests. These were HIV, educational health, we identified the major vectors." The listening campaign ensured that multiple voices were included in early ideation phases of the project. The project also included voices from multiple stakeholders at many phases, including the individual artists, local designers, FASDO, and TBI. Project coordinators were highly considerate of stakeholders and the ways both individuals and groups would participate from start to finish. For example, four renowned fashion designers were given the winning designs to showcase during the fashion show, as a way of getting more involvement from the fashion industry in these issues.

Stakeholders and Outcomes

As for outcomes, this project benefited multiple stakeholders involved and extended their ability to integrate community concerns into their work. For the local artists who designed the

khangas, the competition challenged them to use their art to bring awareness to challenges most faced in Temeke, and to encourage the wearers or viewers to take actionable steps. The organizers at FASDO were "empowered to bring valuable social messaging to their fashion events, local designers are challenged to consider the value and impact of bringing development priorities into their designs, and citizens have the issues and messages that are most meaningful to them reflected in their clothing (Bakari 2018)." On the community level, Data Zetu reports that "individuals and families...are [also] introduced to these products through innovative social media campaigns that inspire conversation, debate, and direct individuals to resources to access more information to inform their health outcomes (Bakari 2018.)" DCLI also worked to measure the networked effects among stakeholders. Dara explained in our interview that in network analyses and surveys they found that, "there were 4 or 5 new organizations that they built a new partnership with or strengthened their relationship with. These were new and strengthened linkages. We asked about sharing data, sharing money, and new projects." There is additional value in extending the project outcomes beyond the immediate participants and expanding into new industries in Tanzania. This could be a model for other fashion designers and creative organizations to get involved with important issues in their communities.

Prioritizing Community Impact over Designer Intentions - Sharebacks

In Shareback sessions the project organizers prioritized the impacts on the community, over the intentions of the designers. In these sessions communities see their own citizen-generated data from the project, which catalyzes dialogue and debate. Oftentimes when outside organizations come into communities in these data and social challenge driven projects, there is no substantial effort to follow up with communities about outcomes. In my interview with Dara

Lipton we discussed the Sharebacks, and she explained that, “this is what we heard that this is something that communities wish would happen more often since most of the time people come in and take their data and they don’t hear what happens with it. We share the data back and provide booklets in Swahili. Each booklet was individualized by ward and had photos of people at the wards. We produce content to elevate the effects.” These sharebacks act to facilitate sustainable civic engagement and create a space for the citizens and leaders to address those challenges that surfaced in the data.

Figure 13. Example excerpt in English from Shareback booklets in Makangarawe ward, Tanzania

Figure 14. Example excerpt in Swahili from Shareback booklets in Makangarawe ward, Tanzania

In a report about the sharing sessions "during discussion community members and leaders shared their views and perceptions on insights that were provided to them, leading to discussions about better ways to solve challenges in their respective communities, and about which stakeholders are needed at the table (Adinani 2019)." This aspect of helping to uncover which stakeholders are needed at the table is critical, and ties into each of the other aforementioned guiding principles that the Data Zetu project models well.

Chapter 3:
Project Proposal: Crowns of the South

The aforementioned case studies: *Data Portraits,* Data Zetu*, and* AEMP, serve as examples of data visualization projects that facilitate discussions around community challenges and priorities. In illuminating under-exposed issues and presenting counter narratives that re-frame the status quo, these data facilitated discussions stimulate communal cohesion and perspective shifts for members inside the community especially. In the spirit of these projects, in particular *The Exhibition of American Negroes* and *Data Zetu,* I propose a data materiality project with an African American community in Florida, titled *Crowns Of The South.* This project proposal is an outline and plan to demonstrate how to encode many of the insights from the case studies into a contemporary community data project. Given the limitations of the COVID-19 pandemic, I was deeply disappointed to not be able to execute on this plan. However, the design itself is a key contribution of this thesis. In this section I will outline how my *Crowns of the South* project *proposal* aligns with interconnected guiding principles from Data Feminism and Design Justice**.** This chapter weaves these guiding principles under four key lenses in the framework from *In Pursuit of Rigour and Accountability in Participatory Design* which capture the structured and critical inquiry underlying this participatory design work: (1) Values, (2) Stakeholders, (3) Epistemology, and (4) Outcomes.

Chapter Overview and Themes

First, In the Values section I will cover the ideas, challenges, and overlying visions that anchor, guide, frame, and inspire the work. Data Feminist principles such as Elevate Emotion and Embodiment will be included in this Values section. In the Stakeholders section I will describe the project participants, why that community in particular, the nature of their participation and their own priorities. This Stakeholders section will include combined Data Feminist and Design Justice principles, which I will refer to as incorporating 'Multiple Voices at All Phases' and 'Centering Those Directly Impacted' by the data. In the Epistemology section I will cover the kinds of knowledge we will construct in the design process. In this section I will also outline the co-design plan and process itself. Finally, in the Outcomes section I will cover my pre-reflections on the results and effects of the project, as well as some sketches from the data hats that might emerge from the creative process.

Values

Core Project Values

The core values of this project, Crowns of the South, are Black agency, culture, and style. For this project agency refers to Black self-determination in terms of our own progress and prospects. Black culture refers to a unique way of being in terms of our customs, arts, social institutions and achievements; style refers to the way one carries them self through an appearance in accordance with particular principles. This project is about using the power of data and materiality in a participatory process to drive these values forward and expand dialogue around community priorities. Overarching goals are to strengthen communal cohesion alongside perspective shifts around these community priorities. Communal cohesion here consists of establishing common visions and a sense of belonging for the community members as well as strong and positive relationships between those in different workplaces, schools, and neighborhoods. Communications are fundamental for buttressing cohesion, and they rely on a communities' ability to convey critical information between members.

I would like to model some of this project after some of the features from DuBois and his team's exhibit, explained in the subsequent sections. I plan to work alongside a community of

African American church-going women in the South to construct “data hats”. These data hats are inspired by the elaborate hats Black women in the South have historically worn to church and other significant ceremonial gatherings. Together we will look at Black educational and occupational data in Florida. From this data, we will discuss both statistical trends and emotional insights, then construct material representations of these into the data hats. After the women make their data hats, the plan is for them to wear them to church and discuss them amongst each other in the traditional social hour after the service concludes. Figure 15 below shows examples of some of the church hats women wear in Southern communities.

Figure 15. Church hats obtained and photographed from Mrs. Smith’s home in Gainesville, FL

Emotions, Embodiment, and Why Hats?

In terms of the Data Feminist principles of Emotions and Embodiment, there are different layers of preservation and representation of African American style and grace that I want to

accomplish with this project. Similarly to the *Data Zetu* project, there is an aspect of tapping into embodied dialogue norms already existing in communities. As khangas in Tanzania are fabrics that traditionally contain social messages, church hats in the South traditionally animate social interactions and take center stage in conversations between senior Black women. In this way I want to use this socio-cultural norm around church hats to spark and facilitate dialogue about educational and occupational stats of concern to this community.

Hats play a number of critical roles in Black history in the South. In the 19th and early 20th centuries, Sunday church service was one of the only opportunities for Black people in the south to dress up and break away from everyday clothing (Kidder 2015). Hats were a special part of these special days; the bolder the better, really. There is also hat symbolism in 1958 civil rights protests (Kidder 2015). Major themes and motifs related to culture, style, emotions and embodiment running through church hats that I plan to include in the construction and design workshop process are: hats as a symbol of status and economic success, hats meant for holidays and communal celebrations, and rules of style and dress as related to hats, and colors. I plan to draw parallels between these themes and the project values, core research questions, design methods, and impact goals of this project.

Stakeholders: Who and Why?

It is important to me that this process joins the power of data with honoring and reviving the knowledge and wisdom passed down through generations of church-going African American women in the South. Oral and material traditions are timeless foundations of Black culture and the elderly community has tended to be invisible. Black histories are under-recorded. Working with senior adults to build data hats both preserves tradition and values in ways that are timeless,

and creates an opportunity to cross fertilize data science, social sciences with their cultural materiality.

Aligning with Data Feminist and Design Justice principles, I chose to work with this community in Gainesville, FL in order to center the voices of those directly impacted by the data and to ensure there are multiple voices at all phases. Hats are a significant part of senior women's attire in the Black community. In early project planning stages, I connected with a community leader, Barbara Smith, about her own hats and what kinds of values and topics of discussion that Black people in her community are primarily concerned with. We looked through photographs of her at community functions wearing the stylish hats, and also took about 15 hats out of her closet and discussed the stories behind each. Mrs. Smith heads communications and event planning at her church, Mt. Carmel Baptist, is a senior member of the Red Hatters society, and happens to be my Nana. From the conversation Mrs. Smith held with church members and other women from the community, I learned that topics around education, jobs, black identity, agency and culture resonate the most. I learned from her that the hats, "make a statement about your special day and shows high fashion of dress for a lady of style. It's also a part of culture."In asking about what kinds of conversation the community might prioritize if they could use the hats to convey and communicate about Black data she said, "Discuss the attire of the people, but jobs and status play a big role in community too. Because we have four institutions of higher learning, many people get a chance to go to school. We want to keep the young people in touch with these values."

Aligning with Design Justice Principles of prioritizing the design impact on the community over my own intentions as a designer, we chose to narrow in on educational and

occupational data, and wanted to center the hats as visual representations highlighting Black culture, agency, and style. This includes aspects of positive attitude and confidence required to wear a hat well. We also decided to capture the spirit of DuBois project in that we wanted to accomplish a project that supports community members to contemplate their past, present, and future.

Epistemology

In the Pursuit of Rigour and Accountability in Participatory Design (PD), the Epistemological lens of PD raises the questions: What are the kinds of knowledge constructed? What is the potential for transfer? How is knowledge shared? Knowledge in this case refers to information (Frauenberger et. al 2015). There are two major strands of research that provide a valuable background to framing the epistemology of PD. One is Design Research and the other is Action Research (AR) (Frauenberger et. al 2015). For this project I'll cover the AR aspect, which aims to create a new understanding of people's practices by becoming part of the practice and to bring about change by action that is informed and shaped by this collaborative understanding (Frauenberger et. al 2015).

Like DuBois, these data visualizations will emerge within a broader mixed-media context, including material objects, or southern church hats. DuBois's plates were meant to educate patrons on the forms of education and uplift occurring at Black institutions and in African American communities in the American South at that time (Battle-Baptiste et. al 2018). Through modeling the design and exhibition process in *The Exhibit of American Negroes',* I can explore my research questions about how the creation process and wearing of data hats in a social context during and after church might facilitate cohesive discussion and perspective shifts

about education and jobs. Similarly to DuBois's project, this work could offer "alternative visions of how social scientific data might be made more accessible to the populations and people from whom such data is collected (Battle-Baptiste et. al 2018). These knowledge sharing models are essential to the current thesis. Next I outline the Design Process to expand on the (1) the data hat creation process and (2) wearing of data hats to church. These are the sites of knowledge construction, sharing, and transfer.

Why the title: *Crowns of the South?*

The project title, *Crowns of the South,* was inspired by Michael Cunningham and Craig Marburry photo anthology, *Crowns* - which tells the stories of 50 hat-to-church-going women in the South (Kidder 2015). Adapting these stories to the stage, playwright and director Regina Taylor wrote the play *Crowns* which focuses on 6 composite characters from the 50 women - telling their story over a course of a Sunday (NPR 2002). This Thesis section is a commentary on both pieces in ways. The term 'crown' is fitting for this Thesis in that it connotes the sense of pride and dignity the wearer experiences themselves and portrays. In re-using the term 'crown' this work intends to not only comment on and contribute to the ongoing bodies of creative work on hats in African American women's culture, but also to intentionally increase the visibility and build upon the previous work.

Church hats are like statement hats, their elaborateness is memorable and rest front and center on the wearer. Quoted from the *Crowns* play, a woman recounts, "Back when I was a little girl in Petersburg,VA I thought hats had a mind on their own. Every woman in our church wore one. Big women wore big hats with big brims, and little women wore little hats. I'd sit next to my mother and watch the hats in front of us express themselves. If the hats liked what the

preacher was saying, they would bob up and down. If a hat liked a song it would sway from side to side. If a hat thought you were talking too loud, it would whip around in your direction." In an interview with three hat makers, Evetta Petty, Cathy Anderson, and Wanda Chambers, the women shared that they are hoping to pass the crown down to the next generation. The women have committed their lives to crafting elaborate and vibrant hats for women to wear in church, and have also been featured in Vogue. Evetta Petty explains, "We've been making hats for more than twenty years. A church hat is a very special hat, especially in the African American community. As a child growing up in the south in the 60's, we always wore hats. Sunday is the one day historically, when we had a chance. And we stepped out in our Sunday best." Cathy Anderson further illustrates, "I come from a long line of church-going women. Everyone wore a hat. It was a parade, it was colors, it was magic." Wanda Chambers further reflects on the communal experience of wearing hats in church, "When you go to church and you step in and you see all of your sisters with hats on. We all eye each other and under our breath say, boy that's a really gorgeous hat. So, it's wonderful to be in a room filled with women with hats on and each one of us looks absolutely amazing in our own right." The title of this thesis is an expression of these reflections, a statement capturing a wide range of cultural statements emerging from Black women during church proceedings.

Design Process:

Establishing Shared Project Goals and Vision

In the Stakeholders section I described I'll be doing this project with a church-going community of Black elderly women in Gainesville, FL. We will plan to convene for one half-day together at Mrs. Smith's home to discuss the following project overview: shared goals, the data

and understanding/interpreting it, the potential ways to create hat designs that represent memorable trends and interpretations in the data, the plan to wear the hats to church on the following Sunday paired with post-service social engagement, and finally a plan to assess the success of the project and brainstorm the way it might live on past this first community experience. We'll write these down on large pieces of paper to have up on the walls as we kick off and to return to at the end of the day. Communal cohesion here consists of establishing common visions and a sense of belonging for the community members as well as strong and positive relationships between those in different workplaces, schools, and neighborhoods. Communications are fundamental for buttressing cohesion, and they rely on a communities' ability to share salient information amongst members.

Data Review and Discussions

Based on the Values and Stakeholders section of this process, we will focus hat ornamentation around Education and Employment data for African Americans in the South. I learned that education and career security are community priorities, specifically University and College degree statistics. So, this is the kind of data I will research and bring with me to this workshop. First, I plan to motivate this data learning experience with the aforementioned case study examples: *Data Portraits* and the Data Zetu project. There are inspirational examples of data visualizations, photographs, and objects from DuBois's mixed -media exhibition that also display Education and Employment data; the Data Zetu project is a powerful example of designing wearables informed and inspired by data focused on community issues. Many of these women are educators, and might also have a general knowledge about data, but I'll include these motivational examples also because they shared similar goals as ours around communal cohesion

and community perspective shifts. Once we get through sharing thoughts about the motivational projects, we'll break into small groups to look at the data at hand.

Since this community is elderly adult women, I want the data to be clear and accessible for them so that they can have more time to hone in on their own thoughts and reactions to the data, discuss it amongst themselves. I will print out, explain, and share the raw Educational and Occupational data along with summary statistics that I research and compiled beforehand. I'll also include brief reports about the data and relevant imagery. Examples are data shown in Figure 16. We will look at these data and images in small groups and discuss and brainstorm design ideas. Near the end of the discussions, I'll work with the women to think through ways to design their own creative representation of the data and/or what it means to them, through thehat ornamentation. At this point we'll look at an example Mrs. Smith will have put together beforehand. It's especially important as we transition next into this creative design aspect of the workshop, that I focus on the Design Justice principle: focus on the designs' impact on the community**,** not the intentions of myself, the designer. The hats the women create should express a trend, creative translation, or sentiment that the women feel most concerned about and inclined to discuss about the data in the context of their community.

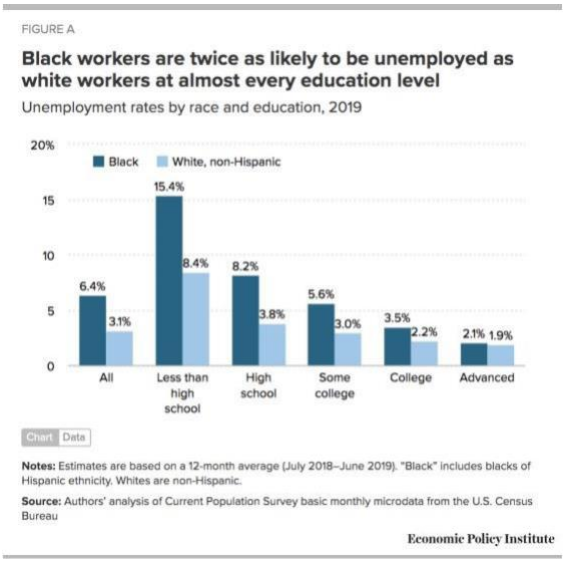
After this brainstorming of the data we will incorporate into the hat design, we will have a light lunch.

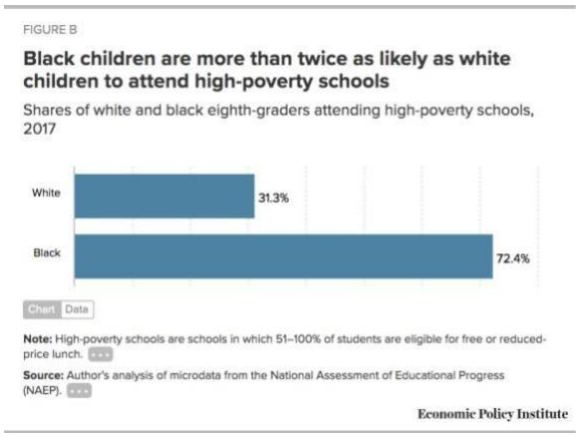
Designing Data into Hats

We will plan for the women to bring along a few of their own favorite hats for inspiration, and for potentially adapting them with new designs about the education and

employment data. As I learned when rummaging through my Nana's many closets, Marburry learned that most women have a lot more than one hat. He wrote, "I would interview them and ask 'how many hats do you have?' On average, the 50 women in the book had about 54 hats each (NPR 2002)." Ideally the women would not make hats from scratch during the workshop, keeping time in mind. Instead they could bring in their most basic hats and embellish them from there. In my interview with Dara Lipton from Data Zetu she shared that In the khanga competition, there were guidelines about design elements to focus on in the khangas. Dara explained, "We worked through the khanga design idea. Khangas usually have a central image in the middle, they have patterns, and a statement. We were not reinventing the wheel." We will similarly work from existing simpler hats in the church hat design workshop." Working from simpler hats, the women can decorate them with pieces that should correspond with data quantities and ideas about Black employment and education that they want to highlight and spark conversation about. Similarly to the Khangas in the Data Zetu project - the data representations in the hat designs are up to the workshop participants own interpretations of the summary stats in the data, and can range from more objective to subjective interpretations of the data. I learned from Dara Lipton from Data Zetu that in the khanga design competition artists were asked to visualize the data so to share a message with Tanzania. I would similarly ask the women in the church hat workshop to design to convey a message that matters to the, about education and employment trends. Examples of the kinds of hats that might be produced are below in **Figure X**. Each hat will have a printed note sewn underneath that explains the data and ideas that the designer's hat means to convey. Depending on how far we get in the day, each woman can make a hat for herself and one for a younger woman, as this aligns with their goals of extending the hat-wearing tradition to the younger generations.

The majority of these women have ample experience in sewing and working with clothing. So we expect the hat design process to flow naturally, with collaboration and helping taking place where some women have less experience. For materials, we will need scissors, fabric, ribbons, needle thread and sewing kits, and various meshes, and the simpler hats. Although we will begin working on their data hats together, once the women have begun to solidify a hat design with some early construction, the women will be encouraged to finish up in the comfort of their own homes.

<table>
<tr>
<td>Education Data Example:
 
</td>
<td>Hat Sketch:
This hat shows multiple representations of the unemployment rate between black and white workers, by education level. Education levels increase along the brim of the hat, with the highest education level, “Advanced” being represented on the top. At the top, the color ratios are the most equal - with purple flowers representing Black unemployment and turquoise flowers representing white unemployment. The center of the hat shows equal purple and turquoise flowers, which is the ideal.
 </td>
</tr>
<tr>
<td>Employment Data Example:</td>
<td>Hat Sketch:
This hat shows 2 times as many red feathers as grey feathers to represent the Black children who are twice as likely than White children to attend high-poverty schools.</td>
</tr>
</table>



Employment Data Example:

TABLE 2

Black–white and Hispanic–white state unemployment rate ratios, 2018Q4

State	Black–white ratio	Hispanic–white ratio
United States	2.1	1.5
Alabama	3.0	NA
Alaska	NA	NA
Arizona	NA	1.7
Arkansas	2.7	NA
California	1.8	1.5
Colorado	NA	1.1
Connecticut	NA	2.1
Delaware	2.6	NA
District of Columbia	5.7	1.3
Florida	1.9	1.2
Georgia	2.0	0.8
Hawaii	NA	NA
Idaho	NA	1.5

Hat Sketch:

This hat shows 2:1 Pink to Green polka dots to represent the Black to White employment ratios in 2018.

Figure 16. Examples Sketches and Associated Data for the Data Church Hats Project Proposal

Wearing the New Hats to Church and After

Following the data hat construction process, community members will wear the hats to Church. Throughout the service, upon women's' heads like crowns, they will be on display and animated throughout the service. The service is a socially engaging community experience in itself, and is always followed by a social hour in the church lobby and between pews before going home or to brunch. This part of the project would be completely free form in that women should socialize as comes naturally for them, and discuss the hats in a familiar setting. Here, the

community values of culture and style emerge. At this traditionally gregarious hour after church, the women will have the chance to reflect and share about issues behind the hats, all the while through the expression of their own fashion and creative craftsmanship. Through the compliments and discussions, women will educate one another and younger generations on education and employment trends, on issues and personal reactions to the data, and the community aspirations they have after they saw the data. Conversations about education and employment data behind the hats might be motivational for young people to stay focused on school, and on prioritizing a sustainable livelihood - both in careers that are pillars to the community, and outside of the community.

Pre-Reflections on Outcomes and Measuring Success

I will address 'Outcomes' as the fourth lens in Frauenberger's PD framework. The success of this project would not only rest on whether the data hats were organized according to some data specifications or whether the visualization was able to classify and convey statistics properly, but on the extent that we were able to reach community goals and intentions, while championing our values. Like DuBois motivational project, this work aims to cross-fertilize social sciences, data and culture, while offering alternative visions of how social scientific data might be made more accessible to the populations and people from whom such data is collected (Battle-Baptiste et. al). Outcomes should be a reflection of the community's goals, laid out in the Values and Stakeholders, and Epistemology sections. Collecting information from our community members about whether or not we were able to achieve these goals is essential in evaluating the success and outcomes of this proposal.

In assessing outcomes, I will perform simple observations during the free-form mingling time after services. In DCLI's (*Data Zetu* sponsor) report on collecting citizen-generated data about community priorities states, "familiarity with local formal and informal leadership structures, norms, and lifestyles is important to ensure meaningful participation and buy-in... especially familiarity with tools to facilitate brainstorming and prioritization, will also help the process (Sparks 2019)." I will float between groups to make usual comments about the sermon, and of course compliment hats and ask about the designs. This is a good time to check in about their families, learn about education in their family, and how they are doing with jobs. I can ask questions about where their children are going to school, where they want to, and what they are passionate about studying. What are they struggling with in school? We can talk about their experiences with the church hat-wearing tradition starting up when they were young, or from their mother's time. During this gathering I'd like to capture photos for the memories, for the Shareback Sessions, and to enjoy the style and grace these women embody.

In assessing outcomes, I plan to conduct semi-structured interviews with a handful of women about their experience. I'll ask: whether and how the project facilitated community discussions around Black education and employment in the South. Whether there were perspective shifts about educational and employment stakes in the Black community. What aspect of culture, style and dignity did they experience and share? I'll ask questions such as, how sustainable are these outcomes? In particular do we see changes in youth's local practices in respect to educational attainment and employment? How might this work lead to a sense of community agency- getting a degree and nourishing youth intellectual life, and inspiring creative progress towards careers? How has and might this work help sustain cultural traditions and communal cohesion in an appreciation for church-hat wearing culture and history?

I also draw from the insights I learned in my interview with Data Zetu project leaders about their process and how they assessed the outcomes of the project. In Shareback Sessions, the project organizers in Data Zetu did a good job at following up with communities to review and reflect on citizen-generated data, the data visualizations produced, what could have been done better at the outset, and how they might sustain the project. I propose to also run Shareback sessions where I provide summary booklets of the experience - including images I take from the hat creation process and of women in the hats in the social hour after church. In the booklets I can also highlight the data that went into the hats and a gallery of all the completed church hats. When we sit down as a group to reflect, we can think through the ways this project helped, or didn't, to facilitate discussions about education, employment, and culture. We will try to identify which moments in the project felt productive to our goals and which could have used additional voices at the table and community inputs. Success looks like our values coming forth throughout the project, such as strengthening generational cultural ties through reinvigorating hat wearing practice. We can invite the younger generations to the Shareback session and hear their perspectives on the hat-wearing practices, and their appreciation of the education employment data embedded in the designs. We can talk about the extent to which women enjoyed the process and felt a sense of belonging. These are all aspects of community cohesion I hope we can achieve and compose. My personal outcome markers would be about what did I also learn about this community and the way they work together on a project like this? What's the inspiration and potential for future work? And, have there been outcomes we didn't anticipate?

I draw from Data Zetu's strategies in ensuring that there are ways for community members to learn about the project once it's over, and to expand their knowledge about the community challenges and priorities that we addressed. I learned from Dara Lipton with Data

Zetu that each khanga connected viewers to the data via a tag and link printed on the khangas. Data Zetu reported that, "each khanga is printed with a link to a webpage that directs readers to SRH and GBV resources... surveys visitors about their perceptions about the value of health data to inform their decisions, and links readers to digital tools that help them find help and access to services **(**Daudi 2019)." In a similar way, in our design workshop the women will stitch a tag on the inside of the hats that directs readers to the data resources they used in their designs. The links might also direct them to a survey about the value of education and employment data in the church hats to inform their decisions about their own education and employment prospects, and advocacy, in the community.

Conclusion

How can we use data visualizations to facilitate discussions about community challenges and priorities? In order for communities to discuss challenges, it's important to begin with uncovering their existing perspectives on those challenges, and the community vision for change in tackling those challenges. This work leads to community cohesion. To ground this inquiry in exemplary community data visualization projects this thesis described and analyzed: *The Exhibit of American Negroes*, AEMP's map work, and Data Zetu khanga design competition. Finally, I proposed a project, *Crowns of the South,* to put these ideas into practice in an African American community concerned with education and employment rates. Through these lenses I gather that there is great potential for perspective shifts and cohesion when data reflects emotions, embodiment, multiple voices at all stages of the project, and takes action to prioritize the impact of the data on the community. This work can inform future methodologies and principles for data visualizations projects which aim to support communities in their conversations around complex

issues which impede their cohesion. This applies especially for projects that require perspective shifts within the community. In this process, new and untapped knowledge can be generated for similar communities with parallel priorities, and can equip communities with new data tools to utilize for their own community imaginaries.

Citations

Ablerism. “a ‘Technology of Distance.’” Abler., April 7, 2014.https://ablersite.org/2011/05/19/a-technology-of-distance/.

Adinani, Hawa. “We Borrowed Data from Citizens. Now, We're Giving It Back.” Medium. Data Zetu, January 2, 2019. https://medium.com/data-zetu/we-borrowed-data-from-citizens-now-were-giving-it-back-c1d256cdbc52.

AEMP. “About / Acerca De Nosotros - Anti-Eviction Mapping Project.” Anti Eviction Map. Accessed May 8, 2020. https://www.antievictionmap.com/about.

AEMP. “COVID-19 Emergency Tenant Protections & Rent Strikes.” COVID-19 Emergency Tenant Protections and Rent Strike Map. Accessed May 8, 2020. https://antievictionmappingproject.github.io/covid-19-map/#close.

AEMP. “Eviction Mapping Project - Narratives of Displacement.” Anti Eviction Mapping Project. Accessed May 8, 2020. http://www.antievictionmappingproject.net/narratives.html.

Battle-Baptiste, Whitney et. al. *W.E.B. Du Bois's Data Portraits: Visualizing Black America: The Color Line at the Turn of the Twentieth Century*. The W.E.B. Du Bois Center at the University of Massachusetts Amherst, 2018.

Bakari, Omari. “Data Converges with Fashion for Social Change.” Data Collaboratives for Local Impact. DCLI, 2018. https://dcli.co/impact-story/data-converges-with-fashion/.

Benjamin, Ruha. “Resources.” *Ruha Benjamin*, 2018, www.ruhabenjamin.com/resources.

Benjamin, Ruha. *Race After Technology: Abolitionist Tools for the New Jim Code*. , 2019. Print.

Barnett, Victoria, et al. “Design Justice Network Principles.” *Design Justice*, designjusticenetwork.org/network-principles/.

Bond, Sarah. “How Is Digital Mapping Changing The Way We Visualize Racism and Segregation?” *Forbes*, Forbes Magazine, 20 Oct. 2017, www.forbes.com/sites/drsarahbond/2017/10/20/how-is-digital-mapping-changing-the-way-we-visualize-racism-and-segregation/..

Cunningham, Michael. “Crowns: A Brief History of Church Hats - Photo Essays.” *Time*, Time Inc., content.time.com/time/photogallery/0,29307,1874131,00.html.

Dara, Lipton. “Data Zetu: Amplifying Tanzanians' Voices through Information.” *IREX*, Data Zetu, Dec. 2018, https://www.irex.org/project/data-zetu-amplifying-tanzanians-voices-through-information.

Daudi, Tunukiwa. “Linking Data and Art to Promote Dialogue on Gender-Based Violence.” Medium. Data Zetu, January 2, 2019. https://medium.com/data-zetu/linking-data-and-art-to-promote-dialogue-on-gender-based-violence-a0b772549d06.

D'Ignazio, Catherine, and Lauren Klein. “Data Feminism.” MIT Press, 2020.

D'Ignazio, Catherine. “5 Questions on Data and Mapping with Erin McElroy.” Medium. DATA FEMINISM, March 19, 2020. https://medium.com/data-feminism/5-questions-on-data-and-mapping-with-erin-mcelroy-ac978def7ffc.

Dewey, John. *Art As Experience*. New York: Minton, Balch & Company, 1934. Print.

Du, Bois W. E. B, Adrienne Brown, and Britt Rusert. "The Princess Steel." 130.3, 2015: 819-829. Print.

Du, Bois W. E. B. *The Negro Artisan*. Atlanta, Ga: Atlanta University Press, 1971. Print.

Du Bois, W. E. B., *The Souls Of Black Folk*. Dover Publications, Inc. New York, 1994.

DuBois, William E. B, Henry L. Gates, and Arnold Rampersad. *The Autobiography of W.E.B. Du Bois: A Soliloquy on Viewing My Life from the Last Decade of Its First Century*. Oxford: Oxford Univ. Press, 2007. Print.'

"Framing Theory." *Mass Communication Theory*, 18 Feb. 2014, masscommtheory.com/theory-overviews/framing-theory/.

Frauenberger, Christopher, Judith Good, Geraldine Fitzpatrick, and Ole Sejer Iversen. "In Pursuit of Rigour and Accountability in Participatory Design." *International Journal of Human-Computer Studies* 74 (2015): 93–106. https://doi.org/10.1016/j.ijhcs.2014.09.004.

Gitelman, Lisa et al. *"Raw Data" Is an Oxymoron*. Cambridge (Mass.): MIT Press, 2013. Print

Hallowell, Beth. “How to Change a Narrative: A Guide for Activists and Peace Builders.” American Friends Service Committee, August 5, 2019. https://www.afsc.org/story/how-to-change-narrative-guide-activists-and-peace-builders.

Harding, Sandra G. *The Feminist Standpoint Theory Reader: Intellectual and Political Controversies*. London: Routledge, 2009.

Katuli, Maana. “Young Artists Use Fashion and Data to Promote Dialog on Sexual Health.” Medium. Data Zetu, January 2, 2019. https://medium.com/data-zetu/young-artists-use-fashion-and-data-to-promote-dialog-on-sexual-health-517429662ec2.

Kidder, Nicole, and Editorial. “The Fascinating History Behind Black Women's Church Hat Cultural Tradition.” BGLH Marketplace, August 14, 2015. https://bglh-marketplace.com/2015/08/3-historical-reasons-why-black-women-wear-elaborate-church-hats/.

Milner, Yeshimabeit, et al. “About Data for Black Lives.” *Data 4 Black Lives | About Us*, 2017, d4bl.org/about.html.

NPR. “'Crowns: Portraits of Black Women in Church Hats'.” NPR. NPR, December 14, 2002. https://www.npr.org/templates/story/story.php?storyId=876404.

Smith, Shawn M. *Photography on the Color Line: W.E.B. DuBois, Race, and Visual Culture*. Durham, NC: Duke Univ. Press, 2005. Print.

Sparks, Sahara. “Collect and Share Back Citizen-Generated Data about Community Priorities.” Data Collaboratives for Local Impact, November 2019. https://dcli.co/resources/tool-sharing/.

Tufte, Edward R. *The Visual Display of Quantitative Information*. Cheshire, CT: Graphics Press, 2015. Print.

Weltzien, Friedrich. "Guerrilla Media: Towards A Media Theory Of Fashion." Fashion Media: Past and Present. Ed. Djurdja Bartlett, Shaun Cole and Agnès Rocamora. London: Bloomsbury Education, 2013. 109–117. Bloomsbury Fashion Central. Web. 22 May. 2019. <http://dx.doi.org/10.5040/9781350051201.ch-009>.

Woodward, Sophie. *Why Women Wear What They Wear*. New York: Berg, 2007. Print.