

Finding Life in Data: Datafication and Enlivening Data towards Justice-oriented ends

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Abstract: We investigate the process of “enlivening” data and what it entails for youth vis-à-vis its relations, mechanisms, and purposes. Using vignettes, we explore enlivening data and datafication as nested concepts. While enlivening data gives learners agency to take action, datafication affords new ways to collect, analyze and present data about oneself. Educators must be attuned to the socio-political historical aspects of learners’ experiences and as informed, be willing to make changes to their shared environments.

Introduction

Data are intentionally manufactured and they act to order and construct the world (Sadowski, 2016). Lupton (2016) characterized “lively data” as how people are “living with and by our data” (p. 709). That is, lively data is personally meaningful and consequential to how one is making decisions in daily life. In this paper, we attempt to map how minoritized youth “enliven data” which we operationalize as a datafication process involving larger data sets, embodied data, and lived data in myriad combinations shaped by historical and contemporary social interactions. We are interested in investigating what happens during the data enlivening process, who it involves, how, when and what justice-oriented trajectories such data enlivening might initiate, including new datafication directions. Using vignettes across our research-practice-partnership work, we explore the following overarching question: What are the relations, mechanisms, and purposes for datafication and enlivening data?

Theoretical Framework.

Datafication, Lively Data. A focus on data science education assumes a centrality of datafication in everyday life. That data, and questions of when, how, and why people engage with data, matter in the world. Datafication involves how experiences are rendered in data (most often quantified) and mediated by data with intentionality, purpose, and direction (Beraldo & Milan, 2019). Datafication is always a social, historical, and political project, often geared towards economic and political gain (Sadowski, 2016).

Datafication in society has been given authority in ways that lives/stories do not. And yet, datafication is *contingent on lives and stories*. Processes of datafication often make data lives invisible, as experiences in the world become quantified. However, datafication is not static, it is always enlivened, whether acknowledged or not, with pasts, presents, and futures. We draw upon Lupton’s notion of lively data to theorize on the intersections between datafication and enlivening data. Lively data focuses on humanistic entanglements with data, including people’s personal data, big data sets, and daily interactions with technology. It involves how people “live with, by, and through data” (Lupton, 2016, p.1) in their everyday lives, practices and decision making. Thus, making sense of how lives are made visible in datafication is an important practice for young people to be engaged in. We view processes youth engage in to *enliven* data as a way of theorizing the possibilities for justice in data science education.

Data Justice, Data Agency. Our work is grounded in theories of data justice as a way to help us to make sense of how youth call attention to how their lives have been datafied in non-neutral ways. These theories remind us that people are made visible, invisible or hypervisible, represented or misrepresented, treated or mistreated in data (Taylor, 2017). Data is always racialized, gendered and related to socioeconomics (Philips et al., 2015). Engagement with data, and data infrastructures is thus always power-mediated (Vakil, 2016). As Acker & Clement (2019) remind us, meaning-making with data is never “innocent work.”

Datafication does not impact all people equally. Theories of data justice tell us that engagement with data always takes place in sociohistorical and political contexts, shaping what data is made **visible and makes visible**, who and what is **represented** in data, and the **stories told** with and about data. All of these shape youths processes of coming-to-know and act in the world -- whether it be decisions on how to stay safe during a pandemic or taking action against forms of systemic racism such as environmental injustice, or make decisions related to athletics.

Youth not only act with data, but also act on data –to contest, re-appropriate and transform how datafication shapes their lives. Studies show that youth view data as a powerful force for social transformation and justice, and seek to mobilize more just data arrangements. For example, Kahne & Bower (2018) illustrate how youth have used social media in both the Black Lives Matter and the DREAMer movements to increase visibility, share resources, raise critical awareness, exert pressure, and organize action. How youth curate and

distribute data sources can be viewed as a response to systemic asymmetries in data access and knowledge production, shaping what the public is able to know (Lehtiniemi & Haapoja, 2020). Data agency thus extends beyond data fluency by emphasizing youths' understandings of data and their efforts to actively control and manipulate information flows, wisely and ethically.

Research Question & Methodology

Our overarching research question is: What are the relations, mechanisms, and purposes for enlivening data? Specifically, we focus on these sub-questions: 1) What is the process of enlivening data for youth? 2) How do we know that data has become enlivened for youth? What indicators from youth reveal that data has become enlivened for them?

In a *Community-Based Critical Data Practices (CCDP) Collaborative*, involving researchers from three institutions, we collaboratively analyzed data across three extant projects to study youths' critical data practices (see Calabrese Barton et al., 2021, Tan et al., 2019, Clegg et al., 2022). This study takes an abductive analytic approach, which refers to "an inferential creative process of producing new hypotheses and theories based on surprising research evidence" (Timmermans & Tavory, 2012, p.170). Our approach to abductive analysis sits within an historicized and future-oriented design-based participatory orientation where we give witness to and learn with youth and community (Villenas 2019). Our approach is guided by participatory knowledge building approaches within research practice as we intentionally bring analyses into dialogue with partner youth and adults, as critical to the meaning making process. In monthly workshops we identified and explored data/cases that either intrigued us or challenged our thinking in relation to our framework of data justice and critical data to build possible explanations for enlivening data processes. We looked across these projects, drawing on existing analyses from the three projects noted above. We then used the framing of lively data (Lupton, 2016) and data justice (Taylor, 2017) as a lens to look across the cases specifically with a focus on understanding how data became enlivened for participants in our studies and the indicators for such.

Findings

First, we suggest that the work that it takes to enliven data requires people to be attuned to the social political parts and be willing to make changes based on such sociopolitical data-integrated insights. Enlivening data orders and constructs the world in particular ways and how we understand it with particular consequences and actions. Second, the relationship between enlivening data and datafication is dialogic, nested and "live". These processes are not merely taking existing data and giving it life. A generative outcome of enlivening data is new ways of datafication that lends further insights and a wider stakeholder buy-in to the issue being datafied and enlivened. Third, we propose three practices by which youth enliven data, including: a) Re-performing lived experiences; b) Building hybrid forms of data (e.g., community survey data + personal lived, embodied data, takes place through fleshing out data - with stories, range of examples); and c) Recruiting powered stakeholders for sociopolitical allyship towards a shared justice-oriented purpose.

Vignette 1: Collegiate Athletes' Enlivened Experiences with Data on their Teams. In interviews with NCAA Division I athletes across sports, focused on critical data practices in their sport, we found that athletes on low-revenue teams collected their own quantitative and qualitative data from their training (e.g., heart rate, distance, pace, video). We conjecture that these data became enlivened for them as they integrated them with their own "felt" data (i.e., sensory-oriented reflections from their experiences). For example, Lei, a middle-distance runner on her university's track and field team mapped her speeds and heart rate to her own sense of "felt" exertion during runs, "Let's say I'm running four miles at a 7:30 pace. I'm feeling good, and my heart rate is 150... By the end of the season let's say I'm running that same four miles, but the 7:30 pace feels like I'm jogging and my heart rate is 130 average. That feels good because you feel like you're improving." However, Lei carefully about how she could and would leverage data on her team with her coaches. While she did not verbally leverage the aforementioned data integrations with her coaches, she and her teammates used them to determine when to collectively speed up or slow down from coach-set paces.

On the other hand, athletes like Omar on high-revenue teams had less agency on these metrics of data collection because of extensive staff set and implemented data practices on the team. However, Omar became animated in interviews when he realized film review counted as a data practice, "Because it's everything. Film shows you how an offense operates, their tendencies, how they line up to tell you if it's a run or a pass." This data, we conjecture, was so enlivened for Omar because this was a data practice that required Omar's agency and because he brought his unique "felt" experience to bear on when, and how, to use insights from film review in games. For example, Omar described the importance of appropriately weighing film review insights with the felt data of reading his key, "...the most important thing they emphasize is, 'Read our key,' each position has a key. My key is the shoulder of the linemen, if he's turning down, I know it's a run block and then someone else is

coming at me, so I got to play differently... It's good to have tendencies but you can't rely on that, you always have to trust and rely on your key." These findings suggest that while datafication abounds on Division I athletics teams, these data become *enlivened* for athletes as they integrate it with their unique felt experiences during training and games and as they leverage this data to enact change on their teams (e.g., in training or in game-time decisions). Yet, athletes needed to be socially and politically attuned to navigate the complex power dynamics of athletics (e.g., knowing how they could and could not advocate for and with their data).

Vignette 2: Mood Board. In a 6th grade STEM classroom, a group of students engineered "a mood board" to address concerns about classroom morale they documented through surveys and interviews. Sage stated the mood board was important because, "Students normally don't have a way to express their feelings and show how they feel. Normally you can only talk to someone or use your body language. Some people don't feel comfortable doing that. When someone's using the Mood Board, it's easier for them to express their feelings." Layla pointed out that she is sometimes sleepy in class because she stays up late to greet her mom coming home from her night shift. Her sleepiness causes her to feel cranky and get in trouble.

The mood board was a light-up board where students could call attention to how they were feeling that day. As Sage explained: "Students can put their hand in the box and pick a mood that fits how they're feeling. Then they put it on the board. If students want to light up the board, all they have to do is turn the hand crank." Layla further explained that they switched to a parallel circuit instead of a series circuit because they wanted to light up many lights, supporting them in calling attention to their mood because: "if a student sees someone share that they are feeling angry or sad", then "you can practice empathy and try to make them feel better in some way or show you understand." In this way, the students pushed for the importance of recognizing and making visible a range of student feelings as important in school science. Students also handed out "mood board cards" to their peers, school personnel, and family members to encourage use of their design.

These findings suggest that students *enliven* their analyzed survey data through layering their own embodied experiences onto them, such as when Sage described how being sleepy caused her to be cranky and get in trouble. By making visible how their embodied experiences shape their lives in classrooms, they could orient their data towards having consequential impact on their classroom culture. Additionally, the mood board itself offered a process by which students' moods were *datafied*, making them visible and learnable by their teacher and peers through a new communication platform – via the physical operations of the mood board. As students posted their moods, new ways of *datafication* and learning became possible, as the teacher tracked differences in moods across the school day and week, and among student groups. As students *datafied* their experiences, then cranked the lights, they invite others into their experiences. Such *enlivening*, through performance provided spaces for youth to engage agency to do the things they needed to foster better classroom morale, e.g., I want to use this board so that people know how to interact with me in class today.

Vignette 3: Black youth vaccine resistance. As the pandemic unfolded and Black communities were disproportionately impacted by poor health outcomes, the Black youth with whom we work in our weekly community-based STEM programs recalled mental anguish caused by accessing statistics on COVID rates in their cities and states and hospitalization and death rates in the Black community through the CDC and the WHO. Such *datafication* positioned them as a statistic—*hypervisible* in a demographic group with higher infection, hospitalization, and mortality rates. However, when vaccines became available, datafication rendered their lives *invisible* as their experiences were not fully considered in how vaccines were tested or made accessible to the public. Many of the youth articulated their reluctance to get the Covid vaccine when it was finally approved for children 5 to 18 years old. The youth invoked historical abuses on Black bodies in Western Science and medicine, saying that "they experimented on Black people" as ample reason to not trust CDC (Center for Disease Control and Prevention) guidelines. One Black youth, Selena explained why she refused to get the Covid vaccine: "I have sickle cell [anemia] and they did not test the vaccine on people with sickle cell. They think I don't know science, I know science!"

However, even for those youth who wished to be vaccinated, information and access was limited. Fourteen-year-old community member and research participant, Jazmyn, shared her experience as she navigated tensions of a) standing up with her community by leading a Black Lives Matter protest but also b) wanting to avoid COVID-19 exposure: "I had to decide whether to protect myself and my family against injustice by protesting, or to protect myself and my family by not going." It is because of navigating realities like Jazmyn's that our participants did not anticipate a vaccine rollout to serve them in a just manner. First, vaccine distribution has been chaotic, and well-known statewide structures to reach communities who need it most are glaringly absent. Jazmyn wondered where were "the televised PSAs and billboards, phone banks, citywide text/email alerts," along with volunteers, and centralized resource access locations that seem so readily available during "political campaigns"? In both cases youth observed their lives *datafied* – as statistics in a pandemic.

Implications & Tensions

Enlivening data has the potential to lead to new territories and possibilities when youth and young adults experience how particular kinds of data might be salient to their lives now and inform their lives in the future. Sociopolitical allyship with more powerful others is an important element of enlivening data, both in the enlivening process and in the setting into motion new modes of datafication. As we can see from the mood board in vignette 2, Layla and her teammates had the support of their science teacher to pursue and create their engineering project which datafied and enlivened data on students' moods, with concrete social-relational outcomes in the classroom. There are also tensions that arise out of the data enlivening process, with implications for sociopolitical allyship. For example, Omar's data agency in vignette 1 with how he enlivened film data is contingent on how he negotiates the information from this data with the data apparatus and coaches within his Division 1 team. In vignette 3, while Selena was wise to consider historical exploitation on Black bodies in western Science, how she then couched current covid vaccine data against that historical backdrop was problematic. Jazmyn was highly insightful when she articulated the tension between prioritizing what kinds of safety for her community, as a Black youth committed to Black lives. Given these insights, how do we move forward in mapping the affordances and constraints of datafication and enlivening data? How might we design more student-agentic, justice-centered learning experiences for youth concerning critical data literacy?

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