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# Museums, Libraries, Informal, and Voluntary Learning Spaces

Libraries are not what you think libraries are anymore. They exceed classic expectations. In many libraries, gone are the days of whispering and diligently searching through card catalogs. From self-checkout stands (with library fines often removed to open access for users) to raucous events for teens and tweens, today's libraries are largely freed of rules that have made them a stereotype of studious silence. Though not universal for all libraries, it is probably not uncommon to venture into your local branch and see patrons engaged in a craft-making workshop; students clustered around a device, animatedly playing videogames together; and children singing, dancing, and listening to storytimes. All these activities are happening simultaneously and with other patrons accessing computers, perusing media, or accessing the information services of on-site librarians.

These practices are not simply a shift to modern times of unplugged and automated convenience (though these are aspects that have dramatically shifted how libraries operate today). Instead, these are cultural shifts that can open and maintain one kind of interpretation of libraries as democratized spaces for information and access. Furthermore, while it may seem that the *rules* of libraries have changed, these

spaces might find even more opportunities for innovation if the data behind them were also to evolve meaningfully. This is not a critique lobbed solely at libraries either.

Museums, libraries, makerspaces, community centers: all of these are spaces that serve important social and civic roles today and that are continually finding new ways to transform in response to changing demographics and demands. Yet, despite this fact, data is too often tied to patron use, time spent within a space, and acquisition/checkout use. These are, of course, important measures. However, they can occlude feelings of joy, the individuals who opt *not* to participate in these spaces, and the ways language practices or surveillance might limit who is able to meaningfully access a given resource. All of this is to say that when the data only reveal for whom we might design, creating the foundations of informal learning environments requires imagination.

We will spend a majority of this chapter focused on informal learning and the environments in which such learning transpires, but, first, we need to interrogate some base assumptions. Before we consider the speculative possibilities of informal learning, let's scrutinize something we, and most researchers, tend to overlook: What is actually "informal" about informal learning? As perhaps an obvious starting place, "informal" stands in contrast to the *formal* contexts of classrooms and schools. Most of the time the label "informal learning environments" acts as a not-so-short shorthand for "not school." While this chapter focuses on the possibilities of these informal spaces, it is worth considering a further question: Why *can't* schools build off these practices? Why must the informal work in these pages live on the boundaries and outskirts of the spaces that are naturally designed with the expectation that all young people will access them?

At the same time, the "informal" label implies that these sites might feel less rigorous. *Relax, these are informal spaces, and the typical rules of schooling don't apply!* Of course, that is not actually the case; as informal as these spaces might be on paper, they are still very much

governed by daily expectations and rules. Our experience working, teaching, utilizing, and studying within these spaces makes clear that traditional data uses in informal settings are every bit as restrictive as in school spaces; the data in informal spaces is as formal as it gets, most of the time. As something of a corollary, there is a whole lot of formality within these informal learning environments. The rules, procedures, and means of access within these spaces are often regimented.

Exploring the meaning of *informality* attunes us to the fundamental tension at the heart of how informal learning environments and their educational spaces are designed, as well as the specific values embedded within them. We engage in this exploration to recognize and uplift the liberatory possibilities in spaces that might be blissfully adrift from the regimented contexts of formality. Also, remember that these are environments that may be maintained through strict regulation and suffocating forms of data collection. For every virtuous public library program, there is a vampiric, understaffed private cram school that exists to turn the money and resources of parents into fodder for an engine of inequity.

This chapter explores out-of-school (informal) education and learning. Parents often consider the safety of, say, an after-school club for their children, but might not consider how, when, and why data from informal spaces is used. Librarians have been and remain careful and thoughtful stewards of data safety and privacy, but sometimes it is not so easy to see when data has real value for children! In contrast, for-profit camps are often sponsored by major companies largely for the data those camps generate. Throughout this chapter, we explore these trade-offs and challenge the nature of informal learning spaces and their applications of current data.

### **Informal Learning Spaces**

Informal learning spaces serve several roles, and they are a crucial element and a core context of any discussion of creative play in education. The ways that informal education is framed in popular media

are notable, as these reflect how it is positioned by institutions of power. Libraries are typically portrayed as boring and quiet, perhaps even borderline-useless for anyone over the age of 10, because they so clearly stand apart from traditional capitalist transactional modes. The wealthy buy whatever books or resources they need, and the library does not charge money for its services. Camps and after-school clubs, however, serve a clear purpose for the wealthy (namely, taking care of children for up to months at a time or on a daily basis). Museums are spaces of wonder, but they are rarely seen as adding anything to society; in movies (e.g., *Batman*, *National Treasure*), they are the locations for parties of very wealthy donors far more frequently than they serve as education spaces, despite the vast majority of the population never experiencing them in this way. In reality, all of these informal environments serve (though differently) as core community spaces for kids, for people without houses and/or jobs, and for people simply looking for places to work or learn. The disconnect between the media representation and lived experience does some work, perhaps, both to ensure that they are perennially underfunded but also to shield them from some of the worst instincts of surveillance capitalism.

Libraries (and their librarians) are a foremost physical site of resistance to this surveillance. Libraries, whether private, public, non-profit, university-based, and/or municipal, have built remarkable safeguards against data spying, and they have been repeatedly punished for it by publishing companies. Remarkably, tools like OverDrive and Libby exist to distribute ebooks without extensive tracking (as far as we can tell). Used to digitally “borrow” books from a local library, these are resources that bring the idea of lending into a digital context. Considering their popularity and distribution models, libraries are charged phenomenal amounts of money per “copy” of ebooks. These are expensive resources for ephemera that cannot be held in your hand.

When we think of the vast array of information available outside of the auspices of libraries, you might wonder if it is necessary to

rely on the archaic model of knowledge preservation in today's digital age. Just look at what is available at your fingertips, through your preferred internet browser. Aside from the dusty academic journals often inaccessible outside of universities (and even those have well-known workarounds), *everything* is available online. And yet, that is not really the point. Perhaps in contrast to some museum archives (which we will get to later), the amount of information available in a library is much less important than the curation of a library to its users. The personalized forms of information, your ability to interact with this information and with experts related to it, and the ways in which such information might cluster community expertise are all invaluable aspects of information and data access that supersede *quantity* for most individuals' needs. These are not practices that have been sufficiently and noninvasively addressed through digital apps and tools. As Martin (2003) describes, even at the turn of the century, the library was considered the every-person's university; a customized education available at one's fingertips is the equitable framing of what the informal learning space can mean.

Importantly, libraries and librarians have played crucial roles in liberatory and justice-centered movements across world history. Within the US we can see important divides in who could access libraries in the era of Jim Crow (Knott, 2017). Likewise, librarians have helped serve as infrastructural support in contemporary movements from Black Lives Matter to Occupy. *Critical* librarianship is an important sister field to the concerns of this book, and we would all do well to work in solidarity with the librarians among us. Whereas contemporary online access to materials is tied to ongoing challenges related to capitalism, surveillance, and hoop-jumping literacy skills, *good* libraries fundamentally democratize access to resources: books, tools, and ideas.

Considering the elements that make libraries so important, perhaps what is the most salient element of informal education to youth is that it is typically situated as a voluntary space within communities.

In a time when there is an increased focus on supporting students' cultural and family backgrounds, few spaces are better positioned than a community center or local library, which are staffed by people whose only job is to help the community. The hyperlocal ubiquity of libraries and community centers makes them stand out in the US. In contrast to the trends in schools, national curricula, and public education for the past thirty years, libraries, museums, and makerspaces often reflect and embody local ethos and histories.

The values and desires of a given community are reflected in the activities, materials, learning, and purposes of these spaces. At the same time, we want to recognize that these spaces are not equally "voluntary" for all members. Children are often foisted into libraries and museums at the whims of adult decision-making. Likewise, these spaces might exclude members based on what languages are privileged within a given space. What might feel like an informal and agency-driven space can often feel stifling for some members of a community.

There is a massive gap, however, between community perceptions of informal education spaces and their possibilities. Most are used as gathering points for access to books and computers (in the case of libraries), viewing of artifacts (in the case of museums), and child care (in the case of community centers). Many such institutions are seen by their communities as static, rather than active and creative, spaces. Recognizing the wide range of these spaces and what they mean, we want to push toward a critical and speculative understanding of the informal.

**Critical perspectives on informal spaces** There is plenty of important research on informal education focused on access and situated work, which is, as we know, both difficult and necessary. Despite a thoughtful *focus* on data security by librarians, data is still typically used traditionally, often to support arguments for access. Those arguments are crucial and difficult, especially because much of the funding

for these predominantly nonprofit or governmental organizations comes from either public funding (which is fickle and limited) or donations (which take a vast amount of work to collect). The informal learning space is the nexus of a fundamental disconnect between capitalism and social good; these spaces help people, but do not typically make a lot of money. In chapter 7, we look at makerspaces that are, in part, situated in libraries, museums, and community centers (often very successfully); suffice it to say, however, they are not seen as the core mission of most informal education spaces. There is a large amount of research on informal education, but only a small subset of it focuses on creativity or agency.

According to the American Alliance of Museums (Simnick, 2017), the data that are collected trend toward some core competencies: collections, visitor numbers, employee metrics, and resource usage; thus, museum analytics tend toward counting visitors, “dwell time” (how much time is spent at a specific space or exhibit), and various metrics of money flow (e.g., ticket/food/shop sales). These make sense: they are easy to collect, analyze, and interpret. For instance, if your goal is for people to enjoy the museum for a longer time, then dwell time directly reflects progress toward a goal. You might seek to determine whether an exhibit with many smaller displays may be “stickier” than an exhibit with a few larger ones. In addition, if a museum finds that, say, an exhibit abutting a gift shop generates larger purchases at higher-than-normal rates (e.g., a *Star Trek* exhibit encourages people to buy toy starships), that will be considered a success that brings money into the museum more broadly.

There is a natural tendency for these organizations to favor use of metrics that generate resources, and with good reason. To stay afloat, they naturally tend toward the technocratic and neoliberal. That process has many negative implications, but it remains true that these spaces have kept their core mission of public voluntary access to educational resources largely intact over the gauntlet of the past 200 years. Illich (1971), arguing on the side of Foucault (2005), suggests that the

act of positioning educational resources within strictly neoliberal capitalist competitive threat models forces them to orient themselves to self-perpetuation alone. Still, very few (if any) of the people working at museums work there for the cash, as almost all museums run on thin margins. Perhaps because of the core mission, or leaders, or simply the lack of an obviously exploitable massive-profit model, museums and libraries still focus on access to and creation of wonder, learning, and joy for their communities.

The possibilities that inhere in informal spaces make them versatile: they can be made, necessarily, in the form that is required of them at any given moment. This means, however, that they have historically been stretched thin to meet the demands of contemporary forms of surveillance capitalism regarding access to the data of libraries and online spaces. It is hard to argue against generating revenue from selling the data of adult visitors if doing so enables the museum to let local children in for free, especially in an age in which the US has reduced public funding for public spaces so radically.

## Data and Informal Spaces

Data doesn't have to be stuck simply acting as a rationale for profit, expansion, and weeding. User experience data can inform transformational work and can lead toward new kinds of possibilities. In this section, we want to offer a productive critique of existing heuristics of data collection as well as a new kind of speculative questioning for our informal spaces.

In the spirit of interrogating the very nature of what it means to be *informal*, perhaps we might question how formal and how visible our data can be (Morville, 2005). Some of our answers may be intuitive: there are always cultural markers embedded in data about demographics of users, checkout rates, or foot patterns (for example), which can be culled from such data. A level of literacy and



prior knowledge is typically required to engage in informal spaces, so this data carries with it an unspoken assumption of intentionality. Likewise, for locations, language, and geographic accessibility, your data speaks to what kinds of people access what kinds of environments in what kinds of contexts. We can use such data for creative expression—for instance, projects in which students create art through data they collect about their neighborhoods (Rogers & Marshall, 2017). Likewise, such cultural markers also offer important caveats to the data regularly collected.

One problem with data is its ability to be anything. To be more specific, anything can become data if we draw such a boundary around it. So, yes, number of people, time spent engaging, words spoken, and so on—these are all familiar kinds of data. But perhaps we might seek to think about what other containers of data might be counted, sorted, and collected: quizzical looks given, moments of elated eruption, times balloons popped in a quiet installation space (probably not enough!). As an exercise, you might choose to think of five arbitrary things that could take place in your informal learning space, from the mundane to the outlandish:

- Someone coughs distractedly
- Identical twins walk into the space looking for directions to an amusement park
- The power goes out, leaving people in the dark
- An animal yips
- Someone sends a text message in the middle of a conversation

We cannot account for the abundance of what the future might yield, but the preceding is a reminder that, if anything *is* possible in a space, those possibilities might function as points of data and could arguably be designed for or against, and they must be regarded with vigilance. What are the boundaries of AnSpec, and how might the butterfly-wing flaps of your imaginative data collection lead

toward systemic change? While we offer silly examples of data in the examples here, we do so with the intent to prioritize questions of joy, of freedom, and of justice. As the situationists remind us, the playful is not solely for amusement. And amusement is not solely for leisure.

### **Rainbow Agents: In Which We Tried to Use Data Ethically**

As one example of how our considerations of data in informal spaces shape our day-to-day work, let us introduce you to *Rainbow Agents* (Berland, 2022; Pellicone et al., 2019). As a game-based museum exhibit (funded by the National Science Foundation) led by Matthew, Maxine McKinney de Royston (also UW–Madison), Leilah Lyons and Steven Uzzo at New York Hall of Science, and Mac Cannady and Eric Greenwald at Lawrence Hall of Science, *Rainbow Agents* asks players to design and tend to a community garden. Fundamentally, the point is to unsettle and recontextualize what counts as computer science, what computer programming is for, and, most importantly, *who* computer programming “belongs to.” Everyone can use computational tools to achieve goals, but if those tools look like “white guy stuff,” then non-white-guys are less likely to feel that it is theirs to use.

In *Rainbow Agents*, players (typically middle school or younger visitors to those museums) write code that is phrased in tropes from video games that those kids will likely find familiar. Indeed, our design process—led by the terrific Quinn Crossley—involves exploring which of these interaction tropes middle-school-aged girls of color might feel most “belonged” and “made sense” to them. Since we know that almost every child in the US (across any demographic categories) plays games, the questions become: “Which games?” and “What features support people in feeling that the games belong to them?”

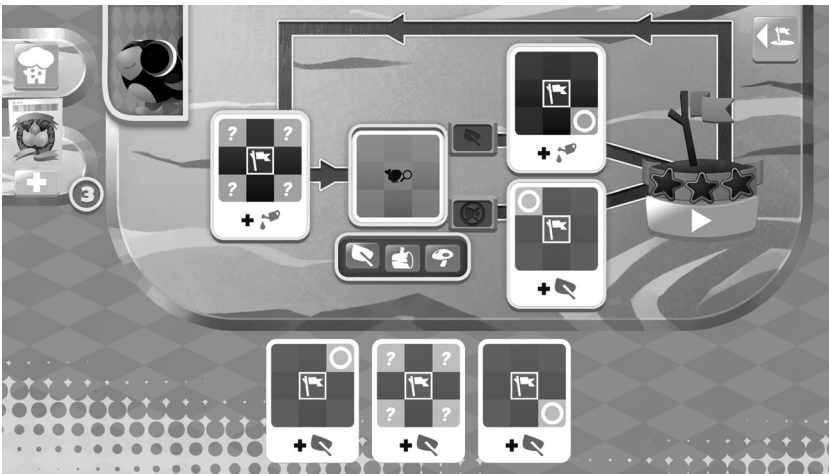
The rationale is clear: girls—especially girls of color—typically do not feel welcomed by computer science or in computer science

(McGee, Griffith, & Houston, 2019). That said, almost all professional jobs may require some programming in the next few years, and you do not need to be a programmer to program.

As a game placed within urban science museums in diverse communities, there were myriad factors that shaped our design of this game, including consideration of the linguistic, physical, cultural, aesthetic, and/or other resources that the local communities might bring into their museums. Indeed, both sites are museums that serve many students of color. For instance, most students enrolled in New York City public schools will enter the Hall of Science at some point during their schooling career.

That said, most young people do not enter a museum with the explicit intention of playing *Rainbow Agents*, nor do they play it for the entire duration of their museum visit. Ambient discoverability and intuitive game play are fundamental to the design conditions of this space. Unlike, perhaps, coordinated video-game or board-games nights at a library or an evening-long adventure such as a scavenger hunt, *Rainbow Agents* was designed with the everyday user and their wide spectrum of interests and abilities in mind. Considering the amount of time individuals might reasonably be expected to engage with this game, it was designed to create a fulfilling experience for most players within a 10-minute period. By that point, they might experience the recontextualization of computer programming—from, say, their Scratch<sup>1</sup> class in school—as gardening, as care, and/or as collaborative play.

The goals of *Rainbow Agents*, we hope, should be clear—for players, for researchers, and for the broader fields of education and CS. However, salient to this chapter, we want to draw out the ways in which data contributed to the design of this work. First, there are the larger instructional goals of increasing access to CS education learning opportunities for historically marginalized communities. These larger goals are often felt as implicit in a research project's design, but we want to acknowledge the multilayered considerations around



**Figure 6.1**  
Rainbow Agents (top) board and (bottom) programming cards.

access and around the assumptions of why one might want to learn the tools and concepts of CS.

As recent scholarship within the learning sciences demonstrates, the ongoing interest in CS education might be posed problematically as primarily focused on issues of workforce development rather than on issues of equitable distribution of skills and democratization of agency within emerging tech sectors. Vakil (2018),

for example, calls for a “justice-centered approach” to CS education. This vision acknowledges learner identities and the historical assumptions undergirding how and why computational thinking and computer science education are taught within formal schooling environments. Though these foundations are concerns we have addressed throughout this book, we want to emphasize that these theoretical arguments about the purposes and meanings of CS education are not solely about framing data within a project like Rainbow Agents. This section is, on the contrary, designed to draw out the aspects of a research design that might typically be couched in the literature review of grants, proceedings, and research articles.

### **Speculative Informal Spaces, Data, and Justice**

It is odd to see the disconnect between, say, the American Museum of Natural History in reality and in fiction. This difference may simply be demographic, but we suspect it to be rooted in models of capital. Countless examples exist in fiction of museums and libraries—science museums, art museums, history museums, local libraries, major metropolitan city libraries, academic libraries—and, almost without exception, they are inert archives of past glories. Matthew remembers reading *From the Mixed-Up Files of Mrs. Basil E. Frankweiler* (Konigsburg, 1967) as a child and getting lost in the vibrant community of the Met, but out of the dozens of libraries and museums that have made appearances in media like comics, it is hard to find any in which a library or museum is anything more than a repository of ancient goods or a location for a fancy party (similar to the movie *National Treasure*). It is often the case in comics that items in the museums (whether in the past, present, or future) are alien in origin, secretly alive, or incidentally explosive; indeed, across the top 20 examples we found, archived alien items were several orders of magnitude more likely to be found there than were children. Most popular media may not be particularly instructive here.

The tropes of rich and *alien* artifacts held by institutions such as libraries and museums illuminates a kind of settler-colonial lens of how these institutions have functioned throughout their existence and—in many cases—still operate today. Archiving cultural artifacts and the remains of past civilizations is important work. It is also work that has the danger of impinging on the material depictions of existing cultures. Within the US, everything from clothing to actual human remains are frequently contested by indigenous communities who rightfully demand that their cultural artifacts belong not in the archived spaces of museums, but back with the communities and people of which they are a part. So, when we see the magical allure of the unknown and perhaps alien past held in museums beckoning to protagonists in a comic book or film, it reflects our own violent and contested set of archival practices. Even the word *alien* is laden with problematic connotations today. Within the context of US immigration policies, individuals in this country who are undocumented are pejoratively referred to as “illegal” and “aliens.”

One particularly novel use of the library—perhaps written about overmuch—is found in *Star Trek*. LCARS (the Library Computer Access and Retrieval System) is the operating system of the *USS Enterprise* and a just-in-time library in which the concept of access is taken to a logical extreme. Everyone on the ship has access to a vast amount of information, but it is often the case that data carrying sensitive information is not on the ship’s computers. Unlike medical records of the twenty-first century—transmitted freely over the internet—these sensitive records are often limited to a single personal access display device (PADD), which we mentioned in the conclusion to chapter 4. These devices are more like a physical notebook than a tablet computer. That is, the information on the PADD is static and limited to that PADD (though the devices may be wiped and reused).

Nonsensitive information, in contrast, is always available to everyone. If you want to learn about the Battle of Thermopylae, you say, “Computer, tell me about the Battle of Thermopylae,” and it will start

listing information on the nearest screen or simply ask you if you'd like to hear the dates or stories from the battle. This function anticipates later search engines such as Google, and, perhaps unsurprisingly, it suffers from the same problem. If you already know how or what to ask and how to ask it, you have already learned something meaningful about it; the problem is knowing what, how, and why you do not know. Furthermore, LCARS is not situated in a contextual community space, and it does not learn from you. Notably, every time a library is given a modicum of sentience in any *Star Trek* property, it becomes radically evil; this is enough of a trope that even the crew members make fun of its inevitability (as in *Star Trek: Lower Decks*).

This is remarkably apropos for many of the future-looking models of informal education from the 1970s: when they came to pass, they turned evil. Even the extraordinarily progressive, well-intentioned models of education described in Illich (1971) bear a prescient similarity to the Facebook of the 2020s. In Illich's *learning webs*, people form communities unbound by institutionalist models of learning and education (e.g., traditional school) and teach others from their personal expertise. Unfortunately, that has resulted in millions of people whose only expertise may be hate-teaching that vaccines are filled with Jewish mind-control microchips. This eventuality—widespread data sharing connecting people to the most virulently harmful learning webs—was not foreseen. So, does it have to be this way?

Perhaps.

It may be the case that data collection is better avoided than embraced. As the old scholars say, "one must build fences around fences." It would be an egregious act of ignorance if this chapter did not highlight the terrific work done across the information sciences on the dangers of collecting and using data in museums and libraries. Noble (2018) provides an invaluable resource; her scholarship is one of the reasons we wrote this book. Noble's title makes concrete and indisputable the fundamental argument that naively reproducing

the statistical patterns of human interaction creates a feedback loop of prejudice, racism, and hate. People who are more explicitly racist in their private lives are more implicitly racist in their public actions; because search engines use those data to shape the information that we see, users are subject to the racism that is amplified by those statistical patterns. It is a nightmare scenario, and it is also the current reality. O'Neil (2016) argues that some of that hateful structuring also exists at an even lower level; it is not simply in the architectures of the search engines, but in the code that underlies all of the systems with which we interact. Her thesis is arguably more hopeful: she suggests that auditing that code and adopting an antiracist lens to the code of the major systems may reveal ways to unravel this feedback loop of hate. It may be the case that the very collecting of any meaningful amount of structured data will inherently lean toward neoliberalism or fascism. Comments from a blind peer review of the proposal for this book suggested that even trying to consider "data for good" was a naïve and potentially harmful act. Certainly, many information scholars have taken that position, and it is consistent with the *Star Trek* position that any library will become evil, given enough data and enough time.<sup>2</sup>

## Toward Just Futures

Evidence of human behavior, when used in good faith, can help us wander (however unevenly) toward emancipation. Looking at the critical work in any classroom, you would be hard-pressed not to see teachers making moment-to-moment, tacit decisions based on the ephemeral data around them. Some information, like test scores, might help calibrate specific kinds of pedagogical approaches, but the quizzical look on a student's face or the consistent signs of uncertainty are also indicators of support that teachers might lend. Likewise, activist movements rely on data in order to further progress. The



most insidious threats to individuals in the US—from gun violence to loss of bodily autonomy to continued land dispossession and blight—are all deeply unpopular initiatives, based on quantitative sampling and survey data. Thus, efforts to push forward new paradigms of living and reform do not simply attempt to foist a minority voice upon the public. On the contrary, the data for emancipation are robust and they are awaiting our harvesting for transformation. How can we situate data in good faith as a tool for emancipation? What data, what evidence can museums and libraries use as tools to help people build agency?

In some ways, informal spaces are perfectly situated to work with communities to build agency. The focus on communities is in itself an act of resistance to neoliberal globalism. Every small-town library and local museum exists as a site of resistance to the homogenization of US culture. If this seems like an extreme statement, we invite you to the small towns of the US where, in many cases, few (if any!) public spaces exist for people to simply *be* free of charge other than on roads or in government buildings, libraries, and community centers.

The resistance, then, might come not from the grand aggregation across millions of libraries but from a focus on the hyperlocality of the information that is coming in. What sets a community apart brings it together, as the adage goes. By determining what makes communities unique, they become closer and more mutually supporting. By focusing on supporting creative work that expresses a community's difference, one can elevate and celebrate it.

This is already the role of many of the small museums that dot the nation, though they largely do so without any technological infrastructure. This is ethically wonderful, but logistically problematic, as they do not then have the tools to resist the encroachment of a new bank or mattress warehouse. How do we build those tools?



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# The Left Hand of Data

## Designing Education Data for Justice

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