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## Mapping Access: Digital Humanities, Disability Justice, and Sociospatial Practice

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# Mapping Access: Digital Humanities, Disability Justice, and Sociospatial Practice

*Aimi Hamraie*

The difficult intersectional, interdisciplinary work to be done includes within one frame the spaces of the political economic and the ontological, the battles of the activist and the epistemologist, the tracings of the historian and the artist.

—Beatriz da Costa and Kavita Philip, *Tactical Biopolitics*

In July 2017 Google Maps announced a new crowdsourcing feature: mobile users can now add information about wheelchair accessibility to business listings.<sup>1</sup> This crowdsourcing model mimics projects such as Microsoft's Access Earth, Access Now, AXS Map, and Wheelmap (funded by the Google Impact Challenge), which purport to ease public navigation for disabled people. Despite the popularity of such projects, however, their technological tools, methods, users, and philosophies of access remain underexplored, leaving the concept of access in the domain of legal compliance, rather than critique or activism.

What is the architecture of inclusion? When read as a text, what does the built environment reveal about valued public citizens? And how can digital and participatory mapping, as spatial reading practices, inform architectural and material storytelling? Architectural design produces and enforces norms of embodiment, which digital approaches to spatial reading are attempting to unsettle.<sup>2</sup> Similar to the value-ladenness of architecture itself, accessibility maps are also *composed* and *designed* through observations, narratives, deliberations, and materializations. For radical disability activists of the 1970s, mapping inaccessible spaces was a political tool; visual evidence of discrimination established disability as a minority identity, rather than as a medical problem requiring cure. But the Americans with Disabilities Act of 1990 codified the concept of access as architects' compliance with objective measures determined by law. The limited range of law (and qualified disabilities under law), however, diminishes the promise of accessibility compliance, precluding intersectional and "cross-disability" approaches to what disability justice activists call "collective access."

Critical access theories and digital projects, by contrast, approach access as an “interpretive relation between bodies” rather than an objective quality.<sup>3</sup> Critical accessibility mapping acknowledges compliance as a foundation for the material and conceptual dimensions of digital humanist, activist work, similar to what Beatriz da Costa and Kavita Philip (cited in the epigraph) call “tactical biopolitics.” But this practice goes farther than compliance, using humanistic tools to unsettle the modes of “subjectification,” in the Foucauldian sense, that inform compliance mapping.<sup>4</sup> Using what I call “socio-spatial practices,” critical accessibility mapping reconceptualizes data, crowdsourcing, and public participation. This practice thus treats access as an open-ended process, a negotiation, and an intersectional and multimodal issue, rather than an easily achievable end point.

This essay offers accessibility mapping as a critical method for the digital humanities, American studies, and critical disability studies. My primary example is Mapping Access, a critical design and participatory digital mapping project that uses campus spatial documentation to generate more politicized and intersectional interpretive relations surrounding access. The project’s purpose is not to produce an objective spatial representation but to enroll broad publics in the iterative, troubled work of defining and detecting access. I argue that Mapping Access offers a new method of socio-spatial practice, with distinct benefits over compliance mapping: it recognizes marginalized experts; redefines data, crowdsourcing, and public participation; offers new stories about disability and public belonging; and materializes the principles of disability justice, an early twentieth-century movement emphasizing intersectionality and interdependence.

Each section of this essay uses one iteration of Mapping Access to discuss broader conceptual, practical, and methodological issues. First, I trace the project’s emergence through functional needs and conceptual debates about compliance. Second, I show how *digitization* and digital humanities methods led to questions about spatial reading, thick mapping, crowdsourcing, and multimodality as collective labor processes. Finally, I conclude by discussing opportunities for critical accessibility mapping as “convivial design,” a never finished and always troubled project of access experimentation.

### **Spatial Reading and the Politics of Compliance**

Mapping Access ([www.mapping-access.com/](http://www.mapping-access.com/)) is a critical data collection and digital humanities mapping project established at Vanderbilt University in

2014. As a disabled faculty member who studies histories of access in the US and whose teaching integrates accessibility practices, I developed the project in response to both functional needs and conceptual debates. To train students in courses on disability culture and technology and the medical humanities to read the built environment as a text, I assign “spatial reading” projects, which include accessibility surveys of campus buildings. In disability pedagogy, accessibility surveys are a typical practice, which many instructors use as alternatives to problematic disability simulation exercises. In simulations, nondisabled students act “disabled for a day” to learn about disabilities as individualized differences, whereas with building surveys, students study pervasive structural barriers in the everyday built environment to develop an understanding of ableism as an oppressive system.<sup>5</sup>

Spatial reading trains students to be more discerning readers of taken-for-granted aspects of the built environment, including door widths, signage, lighting, and air quality. Every semester, students characterize the assignment as groundbreaking for their spatial perceptions. Semesters later, they visit office hours to report new data: a building with a broken chair lift, a bathroom without grab bars, water fountains blocked by boxes, or buildings with confusing layouts. While I had regularly assigned spatial surveys, however, I was not archiving the resulting data in a digital form, and the data (which did not include buildings’ geolocations) were not mappable.

In spring 2014 I organized an event on critical design and accessibility. The goal was to welcome local disabled people and activists, in addition to the university community, for a discussion about design and social change. I wanted to provide visitors accessibility information. The event also dovetailed with and highlighted the politics of university “diversity work,” which Sara Ahmed describes as “non-performatives” that “do not bring about the effects they name.”<sup>6</sup> In conversations about accessibility, I have frequently heard the refrain, “the campus is 100% compliant with the Americans with Disabilities Act (ADA).” But despite an institutional commitment to legal compliance, extralegal and qualitative dimensions of access are often unavailable and illegible. Because of my own disabilities, for example, I know that there were no official policies about fragrance-free spaces or accessible (non-LED or fluorescent) lighting because the ADA does not address these issues. Similarly, when I searched for campus accessibility information, maps of accessible restrooms, parking, and paths were unavailable on university websites, including the campus map, disability services, parking, or student housing. After hours of searching, I discovered a PDF map of accessible entrances (those with auto-

mated doors and zero-slope thresholds) on the campus facilities management site. These were the first data integrated into the broader mapping project.

To capture accessibility data before the event, I offered participation in the first iteration of Mapping Access as an extra-credit opportunity. Several students searched the campus for accessible parking spaces and followed the most accessible route to the event space, checking for barriers such as stairs or broken pavement along the way. Students drew the navigation pathways, along with notes, in marker on a printed campus map. Participants added this information to a PDF, which was included along with the invitation to the event.

Students' experiences with spatial reading led to inquiries about other possibilities for accessibility mapping. Could they create data-rich digital maps that would store and display more information? Could they map the campus's all-gender restrooms? Benches? Shortcuts for navigating large classroom buildings? Designated prayer spaces? Campus cultural spaces, such as the Black Cultural Center, Women's Center, and the LGBTQIA office? Could they use a digital map's layer function to show the relations between these spaces? And could involving the broader campus community in spatial surveying help communicate the need for more accessibility? As the possibilities for critical spatial readings of the campus built environment proliferated, it became clear that engagement with mapping was transforming participants' ways of knowing and perceiving the built environment.

Overwhelmingly, however, participants (both disabled and nondisabled) pointed out the limits of a compliance-centered approach. While the map of accessible doorways indicated many wheelchair-accessible entrances, it did not show that some entrances immediately led to stairs and thus were not designed with full access in mind. Others led to interiors with heavy doors or flickering, migraine-inducing fluorescent lights. Restrooms, while marked as accessible, were often difficult to find.

Initial campus surveys revealed that even a "100% ADA compliant campus" could have significant access barriers. Compliance checklists could not communicate navigation on a campus with ungridded paths, trees, and elevation changes. Nor could they tell users about dimensions of access tied to historical design decisions, university policies, or shifting social norms. Mapping Access participants hypothesized that new methods of spatial investigation, paired with robust digital tools, could offer a new way to engage with issues of campus inclusion. Reorienting our understanding of a usable map beyond the PDFs provided by campus planning, we imagined maps rich with text and images, and that even pushed the boundaries of what we assumed a map could be.

Mapping Access thus became as an iterative critical design project, aimed at unraveling compliance-centered assumptions about disability inclusion.

### Unsettling Compliance

Student insights about campus accessibility aligned with an emerging consensus in critical disability studies and activism that liberal rights-based approaches to accessibility, pursued through antidiscrimination law, have failed to provide meaningful inclusion for disabled people.<sup>7</sup> In addition to the ADA's failures to improve employment access, compliance philosophies also pervade practices and cultural phenomena beyond legal mandates. As Universal Design proponents have argued since the 1980s, compliance only establishes a *baseline* for accessibility, but does not incentivize designers to go *beyond* this baseline.<sup>8</sup> While recognizing compliance as a necessary foundation for broad accessibility, scholars and activists argue that compliance produces single-issue understandings of who needs access and what forms it should take.<sup>9</sup> For example, standardized checklists are often literal and functional: they seek inclusion for a specific subset of the disabled population (particularly wheelchair users), but do not interrogate assumptions about disability and public citizenship through an intersectional framework for spatial study. Compliance also precludes politicized, cross-disability, and intersectional understandings of access, which address how diverse disabled people experience environmental exclusion based on their gender, race, class, and lived experiences of disability.

Critical access studies, an emerging subfield of critical disability studies, examines the political, ethical, epistemological, and experiential dimensions of built environments, even those fully compliant with the ADA. The point is not to improve the law and compliance with it but to ask what modes of subjectification and sociomaterial practices—including acts of *noticing* and *documenting* features of the built environment—can better facilitate disability justice. The disability justice movement, which is led by disabled people of color and queer disabled people, shifts the conversation about access from compliance to principles such as “intersectionality,” “leadership of the most impacted,” “anti-capitalist politic,” “cross-disability solidarity,” “interdependence,” “collective access,” and “collective liberation.”<sup>10</sup> The activist Mia Mingus argues,

we need to think of access with an understanding of disability justice, moving away from an equality-based model of sameness and “we are just like you” to a model of disability that embraces difference, confronts privilege and challenges what is considered “normal” on every front. We don't want to simply join the ranks of the privileged; we want to dismantle those ranks and the systems that maintain them.<sup>11</sup>

Mingus's call to "change the framework" for access clarifies the practices and values that critical accessibility can embrace. Critical approaches to accessibility are not idealistic admonitions to go "beyond the code" but specific strategies for challenging the modes of subjectification and relations of power around which accessibility coheres.

### Mapping Crip Noncompliance

While Mapping Access began as a functionalist mapping project, it soon became a disability justice experiment informed by my concurrent work on *Building Access: Universal Design and the Politics of Disability* (2017). This critical history of accessibility in the US traces the relationships between disability activist design and compliance-centered access. Disability activists in the "independent living" movement of the 1960s and 1970s centered disabled people as design experts.<sup>12</sup> Pursuing accessible public spaces as alternatives to institutionalization, activists used mapping and design as tools for composing disabled citizenship. For example, power wheelchair users and their nondisabled allies conducted audits of Telegraph Avenue and drew maps to demonstrate the need for more curb cuts.

Mapping also established disabled people as "non-compliant users," whose "crip" politics and cultural sensibilities allied with Berkeley's counterculture and opposed medical expert control over their bodies.<sup>13</sup> Similar to the recuperation of *queer*, *crip* reclaims the word *cripple* as resistance to "compulsory able-bodiedness" via assimilation, cure, and rehabilitation.<sup>14</sup> Rather than accept exclusion, activists demanded the right to move through and occupy the community beyond the university campus, including countercultural spaces such as the "People's Park" and spaces of state power, such as the offices of the Department of Health, Education, and Welfare, which they occupied for twenty-five days.

Beyond aiding navigation, accessibility mapping became a device for asking questions: what counts as access, for whom, and under what conditions? Proponents crafted narratives about curb cuts as inclusive technologies, claiming that curb cuts were usable not only by wheelchair users but also by skateboarders, people pushing shopping carts and strollers, and pedestrians. It followed that accessibility benefits everyone, not only disabled people. But blind people challenged this essentializing narrative about disability. They argued that the sudden, unexplained sidewalk drop into the street without any change in surface texture was unsafe and increased the risk of being hit by a car. Debates about who counts as disabled resulted in a new design: raised yel-

low bumps on the curb cut would announce the change in elevation and also give chair users additional traction. Consequently, activists began to theorize “cross-disability consciousness” (or awareness and affiliations across and within disability categories) as a necessary framework for design activism.

### **Compliance Regimes**

Accessibility compliance emerged from institutionalized medical and legal expertise, rather than disability activism. In the US, accessibility standards derive from rehabilitation research on white, male disabled veterans, who were seeking to “overcome” their disabilities and return to productive work.<sup>15</sup> The objective was not to foster crip culture but to reintegrate disabled men into the realms of productive labor and consumption. As a mode of subjectification governing compliance, rehabilitation shaped accessibility codes, which addressed spaces shaped by mid-twentieth-century race, class, and gender norms, particularly workplaces, homes (and their kitchens), and places of public consumption (such as shops and restaurants). In the mainstream, compliance approaches have become normalized through the displacement of liberation-centered frameworks. ADA standards for accessible entryways, ramps, and restrooms continue to rely on data about particular (white, cisgender, and physically fit) bodies as representative (and global) disabled citizens.<sup>16</sup> Disability rights likewise focus on inclusion in exchange for contributions toward national productivity. Compliance has thus become a way to provide access to what David Mitchell and Sharon Snyder term “ablenationalism,” and what I call “productive spatial citizenship”: access contingent on productive labor and consumption, pursued on an individual basis, rather than an understanding of access as a collective responsibility toward all disabled people, regardless of their productivity.<sup>17</sup>

The first iteration of Mapping Access tested the tensions between compliance and disability justice, but revealed the need for further conceptual and digital experimentation. In a compliance-centered institutional context, the first iteration raised the question of how a cross-disability and intersectional approach to access *mapping*—visualizing and describing the material coordinates of access—could introduce critical questioning into the university’s bureaucratic compliance structures. Could accessibility checklists serve as question-generating devices for interrogating compliance frameworks? How could digital tools and campus participation in data collection transform institutional narratives about the campus built environment?



## Digitizing the Accessibility Map

The second iteration of Mapping Access was a more explicit digital humanities project, which used digital tools to shift campus conversations toward collective access. With funding from two campus humanities centers and the university library, the project took on a more public face. The newly established Critical Design Lab developed several experiments to unsettle the compliance framework. Small internal grants and campus technological resources were devoted to training lab members in GIS, as well as devising new methods of investigation and data collection. Here the project experimented with using technology as a tool for collective labor and interdependence, in addition to foregrounding disabled people as experts (rather than subjects of knowledge). The objective was to activate deliberately and critically constituted publics, who could identify the means of their own construction, rather than a generic, normate “crowd” (as is often the case in crowdsourcing practices).

The initial goal was to create a lightweight, mobile-usable web application that anyone could use to find information about navigating the campus (figs. 1a and 1b). A collaboration with GIS librarians provided training opportunities for the lab’s humanities and social science students. Members learned to gather and clean data; visualize geospatial data in GIS; use R to create statistical graphics; code data points using JSON (JavaScript Object Notation); design an interactive web application in Shiny; and use REDCap, a data-collection software, to gather and visualize live maps. The Lab also developed online conversations about accessibility mapping via social media (including using #MapAccessVU on Twitter). Given the lessons of the project’s first iteration, however, the Lab used technologies to generate questions and debates, rather than as solely functional tools. Lab members read and discussed the disability justice principles and critical disability theories to begin from a different place: with new engagements with publics and users.

## Interrogating Digital Mapping

Typically, cartographers use geographic information systems (GIS) tools to visualize statistical and geospatial data. GIS broadens data collection and representation. Digital crowdsourcing projects such as Google Wheelmap, Access Earth, and AXS Map gather large amounts of information about wheelchair ramps, doorways, and bathrooms via smartphone apps, using color-coding schemes or rating systems to simplify users’ assessment of access. Their overarching theory is that employing broad “crowds” can make data collection more efficient than when data are collected by a core group of expert researchers.<sup>18</sup>



**Figures 1a and b.**

Experiments with critical accessibility mapping. Screenshots of two Mapping Access maps, as viewed on a web browser (a) and mobile phone (b). In both maps, the campus is viewed as a snapshot from above. Trees and buildings are visible. Both maps also include data points in bright colors with pop-ups that provide information. Image a shows information about chemical use in buildings, indicating that in one building, the soaps and chemicals are scented and that there are tiles and carpet on the floors. Image b shows information about barrier-free entrances, with an image of the front of the building.

The majority of existing accessibility maps purport to be “big data” projects operating at the global scale. While impressive in their intended scope, however, there are two major problems with current approaches. First, most digital accessibility maps follow a functionalist and often depoliticized compliance model, which take accessibility standards for granted as objective and neutral measures. Similar to the initial accessibility maps produced in Berkeley, these digital maps presume a particular type of disabled user: a sighted person who uses a wheelchair, powerchair, or scooter. Yet digital map features such as pop-ups and menus are not accessible to people who rely on screen readers to access information. The overwhelming focus on visual crowdsourcing thus privileges the gathering and integration of only certain types of data in the provision of access. Cross-disability and intersectional dimensions of disabled citizenship are literally written out of the materiality of these digital maps.

Second, existing crowdsourcing strategies inadequately address the problems associated with universalizing accessibility standards and data. Crowdsourced data collection does not distinguish between the types of expertise about built environments that diverse disabled people (including wheelchair users, people with sensory disabilities, chemical sensitivities, mental disabilities, and permutations thereof) have developed through experiences of material exclusion and nondisabled people’s impressions of whether a space is accessible. All data collectors and data points are treated as equal, and evaluative criterion are treated as neutral, objective, and ahistorical. As a result, accessibility mapping projects have missed opportunities to use humanistic methods of spatial reading as targeted interventions, which not only create usable maps but also trouble the expertise involved in accessibility evaluation, value diverse forms of marginalized expertise, and politicize the labor of creating access.

While many compliance mapping projects are global in scale, their usefulness is not universal. Their interface designs make clear that intended users are Western, English-speaking people who use wheelchairs or powerchairs and seek to access places of commerce, such as coffee shops, restaurants, and retail. But as I showed above, US accessibility standards are derived from specific historical bodies targeted for rehabilitation into ablenationalist standards of productive spatial citizenship. Accessibility standards are not international or universal; they vary based on each country’s architectural styles and prevailing assistive technologies. The purported global and universal scale of these projects, then, highlights the imperative for specific local, interdisciplinary, methodologically innovative, and critical approaches to accessibility mapping.

## Mapping Humanistic Questions

While GIS technology was developed as a tool for the earth sciences, cultural geographers, demographers, anthropologists, and urban planners have appropriated it to investigate cultural and ideological phenomena. Likewise, digital humanities–informed approaches to history, place, and social justice are enlivening the use of GIS as a tool for critical inquiry about space and meaning making.<sup>19</sup> Unlike positivist uses of GIS, digital humanists engage critical cartographic practices in a manner similar to feminist uses of technoscience: by “asking different questions.”<sup>20</sup>

Critical GIS reshapes relations between knowing, making, and participation by rewriting what counts as humanistic scholarship in the neoliberal university. Similar to distinctions between compliance and disability justice, GIS-based digital humanities projects transform the political, epistemological, and ethical possibilities of spatial representation. As Todd Presner, David Shepard, and Yoh Kawano argue in *Hypercities: Thick Mapping in the Digital Humanities*,

Digital humanities scholarship has begun to render the walls of the university porous by engaging with significantly broader publics in the design, creation, and dissemination of knowledge. By conceiving of scholarship in ways that foundationally involve community partners, cultural institutions, the private sector, non-profits, government agencies, and ever-broader slices of the general public, the result is a form of scholarship that is, by definition, translational and applied: it applies the knowledge and methods of the humanities to pose new questions, to design new possibilities, and to create citizen-scholars who value the complexity, ambiguity, and differences that comprise our cultural record.<sup>21</sup>

In addition to redefining scholarly publics, what counts as the “cultural record” is also expanding to include mundane aspects of the everyday built environment, in addition to literature, film, and fine art. The digital humanities redefines cultural publics and spaces by borrowing ethnographic practices of “thick description” to generate “thick mapping.” “Thick maps,” Presner, Shepard, and Kawano write,

are conjoined with stories, and stories are conjoined with maps. . . . Thick maps are never finished and meanings are never definitive. They are infinitely extensible and participatory, open to the unknown and futures that have yet to come. . . . Thick maps betray their conditions of possibility, their authorship and contingency, without naturalizing or imposing a singular world-view. In essence, thick maps give rise to forms of counter-mapping, alternative maps, multiple voices, and on-going contestations. Thick maps are not simply “more data” on maps, but interrogations of the very possibility of data, mapping, and cartographic representational practices.<sup>22</sup>

Like the always unfolding project of access, digital maps thicken concepts such as citizenship and public belonging, initiating engagements with environmental inclusion and exclusion, as well as with the uses of technology to understand how spaces materialize, for whom, and according to whose overarching interests.

Critical accessibility mapping similarly thickens GIS itself. Rather than eschew functional questions and areas of study, critical digital mapping activates the cultural work of functional presence in built environments by asking (and mapping) humanistic questions. When understood literally, typical accessibility questions such as “does this bank have a wheelchair ramp?” terminate conversations about accessibility in compliance. Their data are a simple yes or no. Asking these questions differently, and for different purposes, critical accessibility mapping inquires about the relationship between knowledge and accessibility: not only “is this space accessible?” but “how can we know, according to what logics and forms of expertise, and for whose benefit?” “How do university spaces construct ideal able-bodied and able-minded students, faculty, and staff?” “How can institutions grapple with these complexities?” The shift in questioning yields new narratives.

Critical accessibility mapping uses GIS to raise politicized and humanistic questions about access. A typical answer to compliance queries is “yes, the space complies with the law.” Thick maps enable different answers, such as “although this space complies with legal standards, users report significant barriers to participation remain due to the way spaces are utilized and organized. The accessible entrance leads to stairs. Trashcans block the all-gender restrooms. The building is heavily scented (which is problematic for people with chemical sensitivities but allowed under law).” Narrative and participatory methods from the digital humanities and disability studies can thus inform how we imagine, make, and use maps, even transforming the norms of spatial representation. By asking different questions, practitioners can generate countermaps pushing beyond compliance.

### **Disability Justice as Countermap**

Rather than provoke statutory change, critical accessibility mapping aims to open restless, iterative conversations about the complexities of access through digital and participatory methods. The humanistic principles of disability justice also thicken critical accessibility mapping. Mapping informed by the disability justice movement can emphasize a broader range of necessary data, participants, and cartographic representations than compliance approaches. Unlike the ADA, which purports to protect disability as a category but limits

the definition of disabled people to narrow, specific, and historically constituted categories, disability justice thickens the notion of disability by making legible the access needs of chronically ill, chemically sensitive, Mad or mentally disabled, and sensory disabled people, in addition to people with mobility disabilities. Turning attention to the political economies, epistemologies, and ethical systems through which access coheres, disability justice seeks access as collective labor, enabling new modes of spatial reading and representation.

A disability justice approach to critical GIS understands access as a collective material-discursive project, reframing concepts such as design (now understood as an iterative endeavor related to the pursuit of collective liberation) and crowdsourcing (now understood as a type of collective labor that requires rigorous intersectional analysis). Disability justice highlights the need for sociospatial practices based in extended temporalities of evaluation, including ways to reengage and remap a space from multiple embodied perspectives to achieve a thicker understanding of the affordances and preclusions of access.

Critical accessibility mapping engages with iterative material process to explore how digital humanities techniques enable scholars and activists to ask different questions, reconceptualize data and expertise, and activate labor toward “collective access.” For example, the Vancouver Radical Access Mapping Project (RAMP) incorporates the intersectional disability justice framework to produce malleable access maps based on disabled expertise.<sup>23</sup> Forms of accessibility excluded from compliance, such as fragrance-free spaces for people with chemical sensitivities, become legible points of inquiry. In addition to developing usable maps with embedded accessibility information, critical accessibility maps become points of conversation within communities about how disabled people use their spaces. They interrogate the taken-for-granted nature of access to public space at the heart of many diversity-affirming projects, enabling conversations about what constitutes a “normal” or “desirable” body, and reframing notions of disabled public citizenship.

The lack of cross-disability and intersectional consciousness in most conventional access projects creates the impression that disability exclusion operates on a single axis, independent of race, gender, and class. For example, the nearly exclusive focus of accessibility maps on spaces of consumption reproduces disabled citizenship as neoliberal citizenship. By contrast, critical accessibility mapping expands the definition of access to include intersectionality, cross-disability consciousness, and collective liberation. Public maps enable access to spaces, such as universities, which are designed for privileged minds and bodies. Environmental inclusions implied in all-gender restrooms, lactation

spaces, and prayer spaces, which may not appear related to disability, are understood as significant for disability justice because disabled people can also have nonbinary genders, take care of children, and engage in spiritual practices. Furthermore, disabled people are often racialized, gendered, and classed in ways that inform experiences of belonging in public spaces such as restrooms. Critical accessibility mapping trains data collectors to document the intersections of oppression made manifest in the built environment, and to build layered stories about these oppressions (and possibly, their own relationships to them). This intersectional approach to redefining the standards informing crowd-sourced observations situates the crowd (otherwise understood as an essentialized but featureless mass of individuals performing the labor of data collection) in its specificity, contingency, and heterogeneity, thickening the cartographic data of spatial reading. Critical accessibility mapping thus adopts a tactical sensibility similar to digital humanities' appropriations of GIS from the earth sciences, as well as feminist appropriations of technoscience, combining the nuances of history and theory with experiments in the art and method of spatial data collection.

Beyond functionality, critical accessibility mapping builds on the interventions of "critical GIS" to pursue activist, epistemological, and pedagogical projects that reconceptualize the meaning of data-rich mapping.<sup>24</sup> Objective or descriptive data becomes *interrogative data*. Participatory data collection becomes *critical crowdsourcing*. Neutral crowds become *critical publics*. Critical accessibility maps also draw on crip theory, as well as humanistic spatial reading methods, to generate intersectional understandings of disability and access. Intersectional mapping involves affiliations between disability access, all-gender restrooms, lactation spaces, prayer rooms, and broader sociopolitical currents (including the spatial distributions of race, class, housing access, and health). Intersectional maps show that geospatial analysis is a potent tool for excavating the politics of design, revealing structural investments in the built environment as a cultural and political formation, and speculating about more accessible worlds.

### **Sociospatial Practice for the Digital Humanities**

Critical accessibility mapping understands geospatial representation as an interrogative cultural *process*, not just as an objective reflection of the world. This process requires a commitment to *sociospatial practice*, a term I use to describe the activist methodological, designerly, and performative dimensions of geospatial digital humanities projects. In arts and design cultures, the terms *social practice* and *spatial practice* (respectively) refer to conceptual, public-

facing, and participatory work, which often takes place beyond privileged gallery spaces, refuses the political economies of the art world, and centers the built environment as a cultural text that can be analyzed and rewritten.<sup>25</sup> Sociospatial practices operate as what the philosopher Ivan Illich refers to as “tools for conviviality.” For Illich, convivial design contrasts with the ablenationalist demands for industrial productivity, such as when designing for disability occurs through a purely functional framework geared to rehabilitation. Like Illich’s tools for conviviality, sociospatial practice entails “autonomous and creative intercourse between persons, and the intercourse of persons with their environment,” “individual freedom realized in personal interdependence.”<sup>26</sup> Conviviality echoes disability justice imperatives for collective access. Sociospatial practice (and accordingly, critical mapping) also serve as what Illich calls “counterfoil research,” which appropriates, bends, and reshapes tools for use in remaking a convivial culture.<sup>27</sup> Conceived as a sociospatial practice, critical accessibility mapping approaches environmental analysis as an opportunity to reconceptualize the labor of spatial reading, treating geospatial data collection as collective labor through which new relations of interdependence can emerge.

### **Critical Publics**

Often, people needing access must perform the exclusive the labor of studying a space and requesting inclusion. For example, a wheelchair user who encounters a broken lift or a chemically injured person who encounters a restroom cleaned with harsh chemicals has to document and advocate for change individually. This disproportionate burden on people whose public belonging is already made vulnerable by the built environment represents a double injustice: the atomizing burden of having to advocate on a case-by-case basis for the removal of barriers, in addition to experiencing discriminating barriers.

Critical accessibility mapping yields new modes of subjectification around accessibility, reconceptualizing the labor of critical publics and participants such that marginalized users retain leadership as experts who devise accessibility *criteria*, while allies collaborate on data collection. While disabled people (and others experiencing exclusion from built environments) have direct and specific knowledge of barriers to participation, people without these experiences can also contribute labor toward documenting exclusions. Collective labor, in turn, contributes to collective liberation through new interdependent modes of allyship and expertise.

To create a collective accessibility map that went beyond compliance, the Critical Design Lab hosted community conversations about access with stu-



dents, faculty, and staff. These conversations captured narratives and interpretive relations surrounding campus accessibility, including norms of the “good student,” “good researcher,” and “good worker.” Conversations also theorized opportunities for reframing these narratives through specific strategies of collective mapping. Following the disability justice principle of “leadership of the most impacted,” the Lab held community conversations with about seventy-five people in specific groups of potential user-experts: students with both apparent and nonapparent disabilities, trans and gender-nonconforming students, and members of the campus feminist community, all of which reflected diversities of race and class among the student body.

Community conversations did not merely measure attitudes about accessibility; they precipitated convivial and intersectional understandings of the concept of access. For many disabled students, accessibility included wheelchair access, as well as spaces without fluorescent and LED lighting or strong chemical scents, trans-affirming spaces such as all-gender restrooms, and cultural spaces (such as the Black Cultural Center). This element of sociospatial practice, engagement with broad groups of users, also yielded a notion of *critical publics* that has been central to Mapping Access. Critical publics are those that, rather than take for granted the homogeneity of participants in collective processes, parse out their differences, make clear why they matter, and identify opportunities for convivial collaboration.

### Interrogative Data

Historically, medical models of disability have treated disabled people as objects of data collection, rather than as design experts. Because disabled knowledge is central to the crip project of access, Mapping Access theorized a concept of *interrogative data*. Whereas descriptive data conceal their means of production, the Lab understood data *collection* as a convivial material and ethical practice. Participants in community conversations helped create new, detailed surveys redefining accessibility data as situated and contingent.

The Critical Design Lab, directed by and populated by several disabled, queer, and chronically ill people, designed data collection events called “Map-a-Thons” as interrogative, sociospatial practices in which the built environment (rather than disabled bodies) would become objects of study. In spring 2015 two Map-a-Thons engaged over two hundred students, faculty, and staff on campus in daylong or half-day events. Participants were invited to attend talks, panels, or films about accessibility. These included accessible navigation from students’ points of view, talks by local disabled technology experts about

designing accessibility apps, and panels addressing intersectionality (such as “Why Access Is a Feminist Issue”). After learning about accessibility from these perspectives, participants were assigned to groups of three to four individuals. To learn about crip culture, each group was assigned a name based on a prominent disability movement leader and read information on this leader before embarking to a specific campus building. Here they answered questions and submitted results via a web portal.

Critical publics ask epistemological questions about what counts as information about accessibility, according to whom, and for what purposes. The new accessibility survey designed through community conversations retained traditional elements of a compliance checklist, such as measuring the width of doorways or height of doorknobs. But beyond these measures, questions about the experience and uses of space were more qualitative. One consideration was how to generate legible questions for a broad range of participants. How would nondisabled people, who often take their belonging in the “public” or the “crowd” for granted, detect accessibility barriers? Community conversations made clear, for example, that even when a sign on a restroom door signals wheelchair access, a diaper-changing table, or a single unisex stall, users’ experiences of these spaces are often shaped by design elements not addressed by codes. A wheelchair accessible stall could be blocked by a garbage can or not have the required grab bars attached to the walls. A diaper-changing table could be too high off the ground for a disabled person to use. An all-gender restroom could not have adequate locks to make a user feel safe inside. Survey questions had to capture these elements in a way that would train surveyors to notice and also generate their own critical questions. The Lab’s strategy was to include as many innocuous features as possible on the surveys, and then to follow up with debriefing conversations in which participants shared epiphanies about the troubled, contingent dimensions of access. These collective conversations allowed the group to discuss and problematize the notion of objective data collection, particularly by those with little prior knowledge of accessibility.

To collect data in a usable form, the Lab worked with REDCap, a digital survey technology similar to Google forms. Uniquely, REDCap records the geolocation at which the survey was submitted and generates a “live map” visualizing the data collection process. The digital format of REDCap surveys also enabled longer, more detailed responses than traditional accessibility checklists. The Lab experimented with narrative and open-ended responses, asking for navigation descriptions based on surveyors’ identified means of mobility (such as walking with or without assistance or rolling using a wheelchair). Some ques-

tions solicited textual descriptions: How would one navigate from point A to B? What would you encounter along the way? Other questions were designed to provoke engagements with personal experience and privilege: Are harmful chemicals used to clean the bathrooms? How do you know? Can you smell, taste, see, touch, or feel them? If you cannot detect anything, how can you be sure? Still other questions were more conceptual and theoretical: describe the overall accessibility of this building. For whom is it accessible and inaccessible? How do you know? And how would you improve it? Beyond gathering data, these critical questions situated the evaluators' own experiences and knowledge, capturing the often fuzzy, narrative, and historical dimensions of space. In addition to the data collected, the survey generated thicker responses and additional questions, which were shared in a debriefing session following the groups' return to the Map-a-Thon event space.

Like accessible architecture, accessibility mapping became an interpretive relation between bodies and spaces. Data collection produced layered analytic readings, amplified by the group-based surveys. In answering the survey questions, the participants left a written, interpretive record of their discovery process. Data collection thus became an event and a social relation, with each subsequent question revealing more about participants' insights about the most taken-for-granted dimensions of built environments.

The collective survey practice enabled the Lab to assign groups based on their experiences of disablement or other forms of exclusion. One disabled student activist, who uses a powerchair, joined a group surveying a building that the student knew to be inaccessible. Nevertheless, the process of attempting to find an accessible entrance (and not finding one) trained the group's other participants, who were walking, about the messiness of access. As the disabled student told a reporter who followed the group, "Welcome to the world of access. . . . It's complicated. It's messy. It's kind of fucked up."<sup>28</sup> The group members' experiences informed their evaluations of the building, as well as their perceptions of themselves as critical data collectors. The notion of "crowd" that emerged was not the amateur figure often invoked in "citizen science" but a heterogeneous network of expertise and skill, working interdependently to produce new narratives about built environments.

The digital, open-ended, and textual format of data collection also allowed the Map-a-Thon debriefing sessions to introduce information about history and uncover new intersections of access. For example, one conversation concerned lighting. While campus sexual violence prevention advocates discussed lighting as a necessary component of safety at night, disabled students representing

multiple types of disability (including sensory, cognitive, and physical) discussed why better lighting is essential to their ability to navigate campus safely. These overlapping notions of safety as an affordance of the built environment, and not a matter of vigilant individual attention to one's surroundings, led to the formation of a new coalition of campus feminists and disabled students advocating for user-led studies of campus lighting. In another conversation, participants queried whether a historic building named (at the time) "Confederate Hall" could be fully accessible to everyone, given its ties to histories of slavery and racial oppression, even if it includes disability or gender-inclusive structures. The building's structural features and exclusionary naming enabled a conversation about university history, layered built exclusions, and their contemporary implications for community members at the intersections of multiple oppressive systems. Conversely, several participants noted that the Black Cultural Center and the building housing the office of LGBTQIA life had apparent measures to include disabled students of color and queer disabled students, including wheelchair ramps and accessible restrooms. These conversations, enabled by reference to spatial coordinates, opened up participants' notions of access and disability to capture the physical locations upon which social experiences and systems rest. The live digital map, shown in REDCap, allowed the Lab to pinpoint and visualize these intersections.

### **Critical Crowdsourcing**

In the digital humanities, crowdsourcing is often taken for granted as a positive step toward democratized knowledge generation, albeit with challenges relating to collaboration and organization.<sup>29</sup> Collecting data by scientific "amateurs" is presumed to create a participatory culture and promote greater access to technology. Likewise, in the literature on participatory GIS and accessibility, as in *Mapping Access*, crowdsourcing is understood as an expedient method for collecting data.<sup>30</sup> Yet critical questions about crowdsourcing, such as who counts as part of the crowd, whether amateurs (such as nondisabled or non-marginalized people recording others' potential experiences of built environments) can effectively gather these data, and how labor should be distributed in efforts toward collective access, are not typically considered.

Emerging literature on crowdsourcing, however, identifies the critical potential of crowd-based data collection to serve as a kind of *critique*.<sup>31</sup> Critical crowdsourcing operationalizes the frictions of data collection by diverse groups of people. This sociospatial practice distinguishes between members of the crowd, differentiating between knowledge gathered by the perspectives

of those with lived experiences and those observing these experiences without experiencing them directly. It asks, “who belongs in crowds?” and “what kinds of data do they create?” As the digital humanist Leah Heilig writes in “De-naturalizing the Digital Map: Wayfinding as Designed,” “community-based and collaborative methods of mapping . . . challenge the relationships between standardized technologies/visualizations of environment and how they are experienced by users.”<sup>32</sup> Given that the need for accessibility arises from disabled people’s disqualification from public life, a critical crowdsourcing model captures the crip epistemological imperative to orient data through an awareness of ableism as a system of power. In Heilig’s analysis of mobile accessibility apps, “having a product reliant on user contributions has the potential for adding to, and taking advantage of, users’ intellectual labor,” such as when developers create crowdsourcing platforms but do not populate them with any data, essentially creating what one user called “an empty database” that “does not work.”<sup>33</sup> Critical crowdsourcing responds by balancing user expertise with the demand for collective labor, reorienting the types of measures and knowledge that broader crowds are called upon to observe. Rather than inquire, “how can crowdsourcing efficiently gather data?” critical crowdsourcing asks, “how can collective data collection serve as a mechanism for staging convivial interactions and critical conversations?”

To integrate some of these questions into the practice of *making* accessibility maps (and not just in critiquing existing applications after the fact), Mapping Access developed a critical crowdsourcing methodology. The Map-a-Thons were staged sociospatial practices, similar to a public performance or installation. In planning the Map-a-Thon, the Lab drew on the disability media scholar Kevin Gotkin’s reading of the “-thon,” an extended-temporality media event marked by regular intervals, typically geared toward fund-raising.<sup>34</sup> Historically, events such as the Jerry Lewis “telethon” had used representations of disabled children as pitiful and tragic to raise funds for “curing” disability.<sup>35</sup> Decades later, many of the same people, now adults politicized as disability activists, returned to the scene of the telethon to confront Lewis about the event’s exploitative and ableist representations of disability. These so-called Jerry’s Kids, whose actions are chronicled in the film *The Kids Are Alright*, inspired the Critical Design Lab to create a new type of “-thon” premised on celebrating disability culture and creating a culture of access, rather than representing disability as a tragic condition in need of cure or elimination.<sup>36</sup>

Integrating digital technologies into the Map-a-Thon was crucial for the specific sociospatial intervention. Throughout the events, a live digital campus

map was projected onto a screen. When a group of participants submitted their survey in REDCap, a point would appear showing the campus spaces mapped. Each completed survey was an event, which participants at the home base celebrated. At hourly intervals, participants reviewed the map to discuss collective progress. These reviews yielded a collective sense of pride in the work. Many of those who had already done a survey volunteered to do another. Conversations grew louder and more excited. The Map-a-Thon had “activated” the campus community through the labor of collective access. Participants used Twitter (#MapAccessVU) to disseminate information and tweet photos of the map as it developed, further generating excitement about the event.

The Map-a-Thon operationalized critical publics to produce interrogative data through *critical crowdsourcing*. Using humanistic approaches to text, representational analysis, and historical engagement, the Map-a-Thon served as a mode of resubjectification, leaving participants asking new questions about their role in facilitating collective access. Rather than ask, “are our buildings compliant with the Americans With Disabilities Act?” the prevailing questions became “what are the qualities of spaces that anticipate and include you on campus?,” “what are opportunities for campus communities to collaborate in the design of built environments?,” and “how can mapping the campus create access to those traditionally excluded from spaces of higher education?”

### **Critical Multimodality**

A commitment to cross-disability solidarity informed the Lab’s willingness to rely upon and challenge traditional approaches to accessibility mapping. The Lab was also concerned about issues of digital access, such as whether participants would have smartphones and computers for submitting the digital map. Consultations with a wide range of users, including people with visual and other sensory disabilities, led Lab members to ask: What is a map? Must it be visual? And if not, what other forms can it take?<sup>37</sup>

Disability studies scholars who identify as blind or visually impaired, including the literature scholars Georgina Kleege and Cathy Kudlick and the engineer Josh Miele, have revolutionized our understanding of access to visual information through interventions into the practice of “image description” (also known as “audio description”). Like compliance surveys, image descriptions (as the methods are taught to disability professionals) often attempt to be direct representations of visual data. For example, “This image shows a blue house as seen from the front yard.” Describers are advised not to provide additional interpretive details such as “the house appears well-kept” or “a wealthy family

lives here.” In recent years, however, Kleege, Kudlick, and Miele have challenged traditional image description practices for failing to capture the interpretive subjectivity of the describer. Far from disqualifying the description, critical image description is motivated collective access. In one thick description process, “participatory description,” groups produce layered narratives of an image, each contributing something that others have not yet observed.<sup>38</sup> In another iteration, Miele’s crowdsourcing technology, YouDescribe.org, enlists sighted people to audio-describe YouTube videos, creating a database of integrated narrative tracks, providing information not included in YouTube’s automatic textual captions. As Miele described it in a workshop on participatory description in 2011, subjective description produces cultural texts: users can subscribe to particular describers whose unique styles they appreciate, much as a comic book fan may follow a particular artist’s depiction of a character.<sup>39</sup> Collective description thus invites conviviality and affiliation in relation to technology.

Participatory image description can also train critical publics to produce interrogative data for collective access. At the Smithsonian Institution, a downloadable app called “Access American Stories” enrolls museum visitors and curators in describing objects on display.<sup>40</sup> Visitors—disabled or not—can listen to previous users’ descriptions and critiques of the objects, in addition to recording their own. What emerges is a critical interpretive process in which each user contributes to the collective description but also challenges other narratives. A second generation of this technology is slated to include video and sign language for Deaf people, in addition to the recorded descriptions for blind people.

Applying the methods of collective and critical image description to maps, the Critical Design Lab is inquiring about the usefulness of visual maps when access information is thick with description. A digital map is limited in the number of data “points” that can appear within a given space before it becomes illegible to a sighted reader. Although mapping data in layers allows users to investigate intersecting forms of access, each individual point requires embedding multiple layers of information to show the nearest accessible restroom, entryway, or well-lit space. Visual features of digital accessibility maps, including data points and navigation information, would not be usable to a person who uses a technology such as a screen reader to access internet content.

Because Lab members identified as sighted, they worked with a local visually impaired technology expert to imagine different types of geospatial data collection and description. One solution, which drew on humanistic training as well as new knowledge of the visual grammar of campus spaces, was to develop

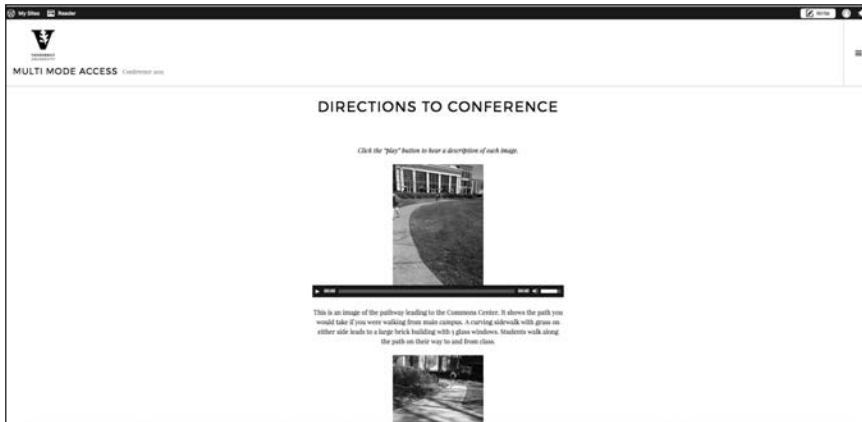
“textual maps” describing navigation through the campus. Each textual map synthesizes multiple users’ observations of the visual, haptic, and sonic elements of a campus space, at times even including taste and smell. For example, descriptions of the main southern path into campus include such information as “The south entrance to campus is a wall of buildings, including the library and a classroom building. This entrance is not wheelchair accessible and not recommended if going up a steep slope is a problem. The path begins at three steps, crosses a driveway, and goes forward about 20 feet up a steep incline, and then veers sharply to the right underneath a magnolia tree. If it is summer, you may smell a warm, sweet scent and see the large, white flowers. You will know when you have turned right on the path when the sounds of traffic are to the right, and a line of bushes in front of a building is immediately to your left. The whole way, the path underfoot is concrete with small pebbles in it. The beds surrounding the trees, just off the path, are covered in slippery pine needles.”

Throughout the Mapping Access process, the Lab experimented with multimodal “textual maps” and gathering user feedback to make them both functional and critical. An earlier experimental “map,” called Multi Mode Access, integrated images and videos of campus, as well as textual descriptions and recorded audio versions of textual descriptions, to guide all visitors to a campus disability studies conference (fig. 2). The Lab is also working on providing text-only accessibility information through lists of accessible hyperlinks that a user can search on a page.

Conceived textually and multimodally, the accessibility map departs from the big data qualities of many accessibility maps, which treat data points as neutral and equal, emphasizing breadth over depth. Multimodality also challenges compliance approaches to access by recognizing the domain of map users as complex and heterogeneous in terms of disabilities and access needs. Unlike assistive technology models, which correct individual disabilities through specific interventions, multimodal maps allow users with the same disabilities to access unique gradients of visual, sonic, and even haptic knowledge about space.

Even when full functionality is not achieved, multimodality can serve critical and convivial purposes. In “Multimodality in Action,” a web-based exploration of the composition and rhetoric of access, the authors include an access disclaimer, which states: “Universal Design is a process, a means rather than an end. There’s no such thing as a universally designed text. There’s no such thing as a text that meets everyone’s needs. That our webtext falls short is inevitable.”<sup>41</sup> If full functionality is linked to rehabilitation approaches to





**Figure 2.**

Experiments with multimodal mapping. Screenshot of Multi Mode Access, a conference website displaying accessibility information through a multisensory narrative form. The image shows text and images on a white background, with the website title in the upper left corner. The image shows a pathway into campus. Below it, there is a text description of the image as well as an audio recording of the text description.

access, a critical convivial approach recognizes that digital projects can perform many types of work, including unsettling digital mapping's prevailing knowledge practices. Working toward *critical multimodality*, Mapping Access, and the layering of text, image, sound, and filmic description to convey the same sense of space offers not a more

*objective* or complete representation of the world but a more troubled sense of representation: the more one represents, the more incompleteness presents itself. This incompleteness becomes a basis for critical design and iteration: by “staying with the trouble” of spatial representation, to borrow from Donna Haraway, the sociospatial project of Mapping Access yields crowds with cross-disability consciousness, much as the design of curb cuts in Berkeley shaped activists’ understandings of disability and access.<sup>42</sup>

## Designing Conviviality

As an interdisciplinary historical experiment, sociospatial practice, and public-facing scholarly and pedagogical project, Mapping Access offers novel methodological tools for excavating the politics of design embedded in the most banal features of everyday built environments, from restroom signage to the height of doorknobs, training participants to be more discerning readers of the built world. It expands the definition of excluded users of built environ-

ments: disabled, racialized, trans and gender-nonconforming people, as well as users who benefit from spaces designated for lactation, prayer, or rest. As this project's short history shows, accessibility mapping also requires negotiating questions of epistemology, materialization, and representation that are, at their core, digital humanities questions, American studies questions, and critical disability studies questions.

Recently, Mapping Access has taken several other trajectories. The university is undergoing its first "accessibility master plan," aimed at going *beyond* compliance in land use and building design. Integrating elements of the Mapping Access methodology, this process is informing an intersectional approach to land use, inserting difficult questions about accessibility into processes of bureaucratic decision-making. Architects, planners, compliance officers, and disabled faculty and students are using digital crowdsourcing tools to reconcile a notion of access as an open-ended collective commitment with institutional demands for policies and compliance checklists. In this process, the Lab is also collaborating on data collection methods, as well as developing methods of "routing" (or turn-by-turn directions) within the "network" of the campus map (a process that integrates textual mapping methodologies into a more technical form of cartographic storytelling). Despite their relation to university structures, these processes are unsettling the institutional politics of access, yielding new participatory approaches to campus planning and shifting from institutional compliance discourses to the never-finished, always troubled project of access experimentation.

Mapping Access has also extended beyond the campus to the adjacent city, where it is used in collaboration with a local feminist collective to identify accessible and convivial spaces for activist meetings, as well as to activate the local activist community in search of accessibility. Drawing on the model of the Vancouver Radical Accessibility Mapping Project and the Anti-Eviction Mapping Project (based in San Francisco), Mapping Access is devising ways to layer information about race and class exclusions in the built environment onto information about citywide accessibility. As a strategic sociospatial practice, critical accessibility mapping is revealing that digital humanities methods, such as spatial reading for activating inclusive citizenship and the reappropriation of digital spatial tools toward activist ends, can influence arenas of power responsible for *making* the built environment, and not just observing or critiquing it. As Mapping Access has shown, critical publics, textual maps, and interrogative data can influence architects and planners; sociospatial practice and the digital humanities can be used to generate critical publics in areas

beyond accessibility; and collective, convivial, and intersectional approaches can inform broader architectures of inclusion.

## Notes

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