



# Deconstructing Community-Based Collaborative Design: Towards More Equitable Participatory Design Engagements

CHRISTINA N. HARRINGTON, Northwestern University, USA

SHEENA ERETE, DePaul University, USA

ANNE MARIE PIPER, Northwestern University, USA

---

Participatory Design (PD) is envisioned as an approach to democratizing innovation in the design process by shifting the power dynamics between researcher and participant. Recent scholarship in HCI and design has analyzed the ways collaborative design engagements, such as PD situated in the design workshop can amplify voices and empower underserved populations. Yet, we argue that PD as instantiated in the design workshop is very much an affluent and privileged activity that often neglects the challenges associated with envisioning equitable design solutions among underserved populations. Based on two series of community-based PD workshops with underserved populations in the U.S., we highlight key areas of tension and considerations for a more equitable PD approach: historical context of the research environment, community access, perceptions of materials and activities, and unintentional harm in collecting full accounts of personal narratives. By reflecting on these tensions as a call-to-action, we hope to deconstruct the privilege of the PD workshop within HCI and re-center the focus of design on individuals who are historically underserved.

CCS Concepts: • **Human-centered computing** → **Participatory design**; • **Social and professional topics** → Race and ethnicity; Cultural characteristics

## KEYWORDS

Design workshops; community-based participatory design; social action research; design equity

## ACM Reference format:

Christina N. Harrington, Sheena Erete, & Anne Marie Piper. 2019. Deconstructing Community-based Collaborative Design: Towards More Equitable Participatory Design Engagements. In *Proceedings of Computer Supported Collaborative Work*, 3, CSCW, Article 216 (November 2019), 25 pages. <https://doi.org/10.1145/3359318>

## 1 INTRODUCTION

Participatory Design (PD) has become a commonly used methodological approach given its promise of democratizing the design process, most notably stemming from its origin in political decision-making and Marxist ideals [8, 9]. Recent studies have focused on leveraging participatory design methods to engage with marginalized and underserved populations [51, 79, 85, 86] given the association of empowerment and, in some cases, activism that may result from this engagement. Underserved populations are considered to be those individuals whose voices have traditionally been marginalized due to their position in society, with much HCI and design

---

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from [Permissions@acm.org](mailto:Permissions@acm.org).

2573-0142/2019/November – ART216 \$15.00

Copyright held by the owner/author(s). Publication rights licensed to ACM.

<https://doi.org/10.1145/3359318>

literature referring to “developing” countries where collaborative design may have the potential to improve societal conditions and environmental infrastructure [e.g. 8, 12, 21]. We focus our analysis of underserved populations on those who are marginalized in a developed context such as the U.S., specifically low-income, older, queer, trans, gender-non-confirming, ethnic, disabled, and/or racialized populations [35].

Scholars who base their design engagements in Science and Technology Studies position participatory design methods as a form of social action [2, 25, 34, 79], mirroring similar methods in the social sciences and humanities such as Community-Based Participatory Research (CBPR) and Participatory Action Research [97, 98, 103]. Such approaches to design research scholarship have sought to center and elevate the voices of particular communities by eliciting knowledge sharing through collaborative research practices while also addressing issues of power and positionality [13, 26, 38]. Situating the individual as a co-creator and collaborative partner promises to allow individuals who are directly impacted by a phenomenon or technological intervention to play an active role in the design process and the ways problems are defined. Given this promise, work within HCI and CSCW has focused on community-based collaborative design efforts with underserved communities in various geographic regions, stating the importance of this approach to addressing societal challenges [2, 32]. Here, we define community as settings where individuals share a geographic proximity in which they work and live, in addition to sharing access to resources. As a result of this proximity, these individuals often share similar societal relations, common environmental challenges, and barriers [14].

Despite the potential of collaborative design engagements to address societal challenges, current literature has acknowledged the shortcomings of current PD methods [18, 26, 30, 35, 48]. Much of the critique in this area suggests a need to: devise collaborative research agendas [26, 48], address imaginative freedom among research participants [5], consider political forms and objectives of collaborative design engagements [33], and define success as it relates to design activities within marginalized and underserved communities [79]. Beyond this, Irani [52] challenges implementations of PD, such as the design workshop or other design practices, as their own form of social structures which emphasize technological creativity, suggesting barriers of oppression and classist hierarchies to what is considered design thinking [52].

In this paper, we examine the *design workshop* implemented in community environments as an instantiation of PD methodology and the ways in which it can misalign with the lived experiences of underserved communities. We define the design workshop as a spatially situated and temporally bounded coming together of participant groups and researchers to envision new design futures, which employ particular materials, tools, and goals [64, 83]. We argue that the design workshop is a socially and culturally constructed practice that brings with it expectations that may further marginalize and ultimately undermine participation of certain individuals. In particular, participatory design as manifested through design workshops — in its current praxis — is a privileged, White, youthful, and upper to middle-class approach to innovation that consists of activities that implore participants to rely on ideals of imagination, creativity, and novel insight. Although PD was intentioned as a way to counter power in workplace infrastructure and create balance between the user and the designer [8], we argue that certain methods, such as the design workshop, or approaches to design thinking (e.g., “blue sky” ideation) have an ethos that can be exclusionary to communities that have historically faced systemic discrimination. For example, engaging in design processes that promote “blue-sky” ideas (or ideation without constraints) may exacerbate inequities by leading to infeasible solutions that ultimately frustrate underserved individuals. Underserved communities can face a higher prevalence of life-threatening

circumstances (e.g., economic despair, violence, health disparities) and may look to design involvement as a resource for more pragmatic solutions and action. Additionally, oftentimes the implementation of PD methods devalues and reduces the lived experiences of those who may not have undergone higher levels of education or been exposed to “creativity” as defined by scholarly applications of design thinking. What constitutes a creative or innovative insight is inherently value laden and can draw further distinctions between participants and researchers as PD may not acknowledge those realities [36]. Further, the configuration and temporary nature of the design workshop as it has been conceived [60, 83] can leave participants without an actual resolve to deeply important issues and may, at worse, be intrusive or harmful to certain communities.

We suggest that such tensions are not due to the lack of imagination or innovation among these populations. On the contrary, there is a unique level of imagination, creativity, and speculation that emerges from those who are underserved in the U.S. [101]. Many of these communities are comprised of some of the most resilient individuals in the U.S. – surviving histories of racially targeted violence, discriminatory policies, and traumatizing experiences designed to be a form of social, cultural, and actual genocide. As such, one of the primary tensions in the application of PD with these communities lies in the fact that oftentimes the historical context of these realities is not thoroughly understood, nor does it align with the implementation of PD in HCI or CSCW.

This paper contributes to and extends the existing critical analysis of PD, particularly design workshops, as a methodological praxis by addressing the following research questions:

- What are the unique challenges of using community-based, collaborative design workshops to engage with communities that are underserved in a developed context?
- In what ways does the history of inequity and oppression within these communities shape their participation and acceptance of this form of research engagement?

Leveraging nearly two decades of experience conducting community-based design research with underserved populations in the U.S., we illustrate how the values and experiences of these individuals can collide with current manifestations of the design workshop. Specifically, we present two case studies of community-based participatory design workshops with Black and LatinX participants from underserved communities in a midwest city in the U.S., each of which focused on critical social issues (i.e., health, civic engagement). Based on these case studies, we articulate four areas of challenge and tension, experienced when conducting participatory design workshops: skepticism and reluctance due to complex history of research injustice, gaining access among presumptions of gatekeeping, adverse sociocultural interpretations of materials and activities, and risks associated with obtaining full personal narratives. We argue that even with considerations and adaptations from recent scholarly activity in HCI and design [13, 26, 79, 85], the design workshop as an implementation of PD carries with it certain privileges, potentially resulting in unintentional harm to underserved populations.

This paper makes three main contributions to CSCW. First, we provide insight into the impacts of historical injustices on collaborative design research engagements such as the design workshop, extending the extensive body of critical analysis surrounding participatory design for marginalized and underserved populations [5, 79, 85, 89, 104]. Second, this paper pushes forward a postcolonial analysis of design [54] as a way to examine the various constructs of engagement that are associated with participatory design and collaborative innovation methods, specifically for populations that are underserved in a developed context. Third, we draw from our own analysis and related literature to offer practical recommendations for developing research agendas and

collaborative design engagements alongside community members that are better attuned to their values and experiences [26].

## 2 RELATED LITERATURE

Participatory Design as a method has been examined and critiqued since its inception. Researchers have begun a long-evolving discourse about the ways in which PD engages and supports individuals who are marginalized, moving towards more fair and just design [71]. Among this discourse, researchers in HCI and CSCW have examined PD in both the execution of design activities as implementation of method and the ways design outcomes are considered. Here, we review the existing body of literature across HCI and CSCW regarding historically underserved communities, community-based PD, and PD for underserved communities.

### 2.1 Historically Underserved Communities in HCI and CSCW Research

A growing body of literature in HCI and CSCW is concerned with what it means to design technologies for and with communities that are considered underserved. Across this work, it is essential to understand what various scholars mean by ‘underserved’ and what societal oppressions they consider in analysis. Although the constructs of an individual or group being underserved does not have one uniform definition in the CSCW and HCI literature, there are numerous examples of research and design aimed at understanding and engaging underserved communities, which consider various factors in this designation. For example, prior work has focused on individuals experiencing disproportionate rates of health disparities [92], while others have examined low-income, homeless, and economically disadvantaged communities [23, 31, 32, 82, 89, 93]. Other work aims to understand and design for individuals who sit at the margins of society based on age [20, 66], gender representation [47, 87], or disability [7, 39, 91]. Research that focuses on these populations and their local settings has raised issues of inclusivity and the ethics of design-based research methodology [99]. Similarly, a move towards a more intersectional analysis is also underway within HCI [104].

Much of this literature points to “poor”, low-income, or resource-constrained individuals in environments that are undemocratic and “culturally distant” [79]. However, scholars in the humanities suggest that it is pertinent to directly identify racism or racial discrimination as a root cause for social inequities, and that this is an equally relevant component of consideration of what it means to be underserved in the U.S. [3]. Understanding issues of class, economic status, and race are critical to positioning community-based PD as a democratic response for social action, as these factors are often entangled, impacting participation and outcomes.

### 2.2 Community-Based Participatory Design as a Social Action Response

From its origin, PD as a form of collaborative design is intended to support a democratic approach to responding to societal phenomena where power imbalances may impact system design [10]. Similar to research methods such as Participatory Action Research [103], this method has traditionally sought to elevate voices of underserved populations by directly centering narratives that are not experienced by researchers in the academy, providing insight into values, beliefs, and needs. In its current instantiation, PD has become a way to encourage social action by collectively imagining design solutions that respond to community needs. PD as a social action response is seen as the creation of interactive systems, as well as design experiences themselves, meant to empower and support collective action [25], serving as an opportunity to introduce participants to

design as a way to respond to social issues in collaboration with community partners [49]. Situating PD in the context of a particular community frames design engagements according to local needs, responding to issues that are defined by the individuals of that community.

The design workshop, which may also be situated within particular community, is a particular site of social practice that aims to embody the ideals of participatory design. The structure of the design workshop as physical space is often conducive for collaborative design engagements because it serves as a meeting point for researchers and community residents to share and conceptualize ideas [60, 64, 83]. Design workshops mitigate the interplay of researcher and informant to help identify relationship between individuals, materials, and topic area [16, 46], simultaneously serving as research instrument, field site, and research account [83]. Community residents are reimagined as co-designers and partners that are positioned as having equal say in the exploration and brainstorming of a design challenge [34]. We find that even in the absence of technology, such engagements may evoke activism and advocacy, and enhance community ties. Prior community-based PD efforts, including instances of the design workshop, have implemented a form of action research that looks at civic engagement and community safety [2, 31], collectivist approaches to health inequities [75], and addressing economic disadvantages [24, 31], to name a few. In each of these instances we see designers create opportunity for community members to contribute thoughts and ideas towards changing current situations, a major advantage of PD in a community context [34]. While the objective is to enable communities to contribute to all stages of research (design, execution, and analysis), challenges may emerge for communities that look at design and creativity 'differently' from those in charge of the research. A primary concern among HCI researchers is the adaptation of PD and the design workshop to reflect the context in which a design engagement is situated. Although recent work within HCI and CSCW acknowledges the need to adjust design methods when working with underserved communities [35], the ways in which designers can best support communities who historically have not been in positions of power are nuanced and complicated, often facing unforeseen tensions. There is a need to place a critical lens on how researchers shape collaborative design engagements with underserved communities.

### 2.3 Reconstructing Participatory Design for Underserved Populations

Existing critiques of participatory design have identified a number of challenges in both implementation and the framing of design-based research with underserved populations, resulting in researchers acknowledging the need to approach PD with a focus on ethics and inclusivity. Scholars have identified that traditional PD efforts place strain on the research engagement between researcher and community resident, negating the intention to democratize design and oftentimes exacerbating inequities [76]. Efforts to position the impact of these challenges such as the Design Tension Framework highlight that PD is not merely a method of problem-solving but of balancing goals with considerations to inherent conflicts [94]. From this framework we find that tensions within the practice of design present areas of focus for critical analysis and reflection [94], with such analyses being advantageous for progressing the reconstruction of PD for underserved populations.

Examining engagement in collaborative design among various underserved communities has brought reflections on power and privilege to this discourse, with scholars identifying the need for critical analysis of what the researcher represents in design research, and the ways their privilege may impact design engagements [42, 43, 61, 85]. Issues of access and relationship-building have led to the call for more collaborative research agendas with community partners [26], suggesting

that in order to have a truly just experience for both researcher and community participant, the design engagement should be defined by both parties from its inception. This analysis of justice within collaborative design engagements among underserved populations includes both activity and outcomes, where many HCI scholars argue for a sociocultural perspective that would consider more than just structure of method [13, 79]. That is, in order to evaluate if a design engagement is truly participatory, we must examine the contribution of the citizens involved and the complexities that surround their ability to voice real issues and thus suggest real artifacts as solutions. Successes and outcomes of PD have also been critiqued as researchers question both how we define a PD result and how such results should be measured [13]. Existing literature posits that it is not enough just to be flexible in this operationalization, but to carry an alternative to concepts of traditional creativity such that design engagements support “imaginative freedom” among those who see creativity from a different lens [5]. Continued reflexivity among this method has also considered mutual gain and how well PD serves the goals of the underserved [11, 41].

Despite the breadth of PD work that has engaged underserved populations in the conceptualization of solutions to societal issues [12, 28, 34, 51, 63, 85, 105], we find that few instances of this scholarship foreground the tensions that may be present in doing such work, particularly those that stem from race and ethnicity (see [62] as an exception). Instead, researchers often analyze methods of PD based on their own definitions of participation and expectations for material interaction [27, 58, 69, 78, 80]. Although during design engagements they may grapple with the impact of researcher presence, how PD outcomes are defined by the community, and the historical context of relationships between researchers and communities, these details are rarely centered in analysis or final publications. In addition, much of this literature provides little contextualization or backstory of how the community of interest was engaged in the conceptualization of participation or material interaction. While scholars like Gautam [43] and Gaudio [42] acknowledge the potential harm that exists in researchers engaging vulnerable populations in PD, they do so in reference to design in a developing context, where democratic participation is severely impacted by an unstable political landscape of the country. Thus, aside from work in developing contexts (e.g., [17, 51]), the larger literature on PD lacks detailed analyses and reporting of many of these considerations and adaptations related to engaging underserved populations.

### 3 UNDERSTANDING THE HISTORY OF INJUSTICE IN THE U.S.

To contextualize the importance of exploring challenges of conducting participatory design with underserved populations in the U.S., we describe the history of injustice and oppression of those who are marginalized along race and ethnicity. In this paper, we focus specifically on underserved populations within the U.S. as opposed to those in emerging regions around the world as is often the case in HCI4D/ICT4D research (i.e., information communication technologies for development). Though we acknowledge the significance and relevance of the vast body of ICT4D and HCI4D literature [17, 69, 73, 77], lived experiences of those who are surviving in “developed” contexts, or established economic Western nation-states, often differ from those in “developing” contexts; while both experience systems of oppression and disparities, the challenges participants face differ. For example, in the U.S., there is a popular notion that everyone has equal opportunity to thrive (i.e., equal access to education, healthcare, and employment) and that those who do not make it are “just not trying hard enough” [96]. This notion ignores the systems of oppression that the country was designed upon to keep certain populations from being successful, including discrimination practices that people of color still endure on a daily basis [45]. The confounding of

these oppressions has a significant impact on social and economic development of populations that are being considered as underserved in the United States. Similarly, it is important to acknowledge that those of African descent who have lived in the diaspora for centuries have vastly different experiences living in “developed” regions and have endured different types of trauma than Africans that live on the continent. University of Michigan public health expert Geronimus, for example, found that Black women who live in the U.S. experience social and emotional anguish that leads to higher mortality and mobility, or “weathering,” as a result of their daily experiences of living and surviving in a White society [44]. We are not stating that one experience is more severe than the other, but rather that these experiences are equally important and deserve to be explored as a contribution to HCI literature.

To examine community-based participatory design in “developed” contexts, it is essential to understand the systemic barriers that have led to certain populations being underserved in the U.S., and the ways we must integrate this understanding into design engagements. Inequality in the U.S. has become stark across dimensions of income, employment, healthcare access, and social justice [3]. Oftentimes, those who are marginalized and underserved (e.g. lower-income, people of color) experience lower wages, higher rates of unemployment, lower qualities of healthcare, and disenfranchisement in a political context, dating back several centuries [3]. The various social ills that have contributed to these disparities in the U.S. are systemic in nature, having roots in the infrastructure of the very governing organizations and institutional policies that are meant to guide fairness and equal opportunity across communities. Understanding the complex history of inequality in the U.S. means understanding that many of these disparities and gaps in wealth, wages, employment and access did not occur by happenstance, but were by design as a way to promote a white, educated, and affluent majority [1]. Gentrification, or the forced class- and race-based displacement of people, is one manifestation of this systemic inequity (see [19] for an analysis). Traditionally, underserved communities experience less access to resources, and heightened power imbalances between individual citizens and local governing organizations or institutions [1]. This imbalance, in turn, leaves individuals in these communities in a position where it is harder to obtain wealth or other measures of upward mobility that has been promised when realizing the “American dream” as compared to those from the dominant population (i.e. White).

In Chicago, the third largest city in the U.S. and where our work is situated, policies that support segregation and discrimination have resulted in a lack of employment opportunities and/or lower paying jobs, resulting in a higher concentration of poverty and lower quality of life among Black and LatinX communities, particularly those in the historic South and Westside of Chicago [74, 90, 100]. One reason that Chicago, like most U.S. cities, faces such societal issues is because of racially-charged laws such as *redlining*, which intentionally created an unequal city infrastructure that has direct negative impacts on low-income, people of color. Redlining was a federal initiative enacted by private industries that systematized unfair mortgage lending practices by refusing loans to minorities desiring to purchase homes in predominately White neighborhoods as well as rejecting loans to Whites desiring to move into neighborhoods where even some minorities live [50, 84]. Forcing segregation in most major cities, redlining practices determined real estate property values (i.e., valuing property in minority communities as low) and limited retail stores and other investment opportunities from moving into minority areas. Thus, homes in minority communities were and continue to be evaluated as worth considerably less than homes in predominately White communities.

Like other forms of discrimination, redlining has played a critical role in creating economic and wealth disparities that have lingered for nearly a century, with “3 out of 4 neighborhoods

‘redlined’ on government maps 80 years ago continuing to struggle economically” [57, 70]. The process of redlining was instrumental in propelling housing segregation and ensuring wealth inequity, ultimately dividing the city by race and disproportionately allocating resources to certain communities and neglecting others. The effect of which is still felt in the dissemination, availability, and quality of businesses and city resources and services. Though redlining has been deemed illegal, the resulting race-based housing segregation that still persists has led to systemic barriers (e.g., inadequate health services, over-policing, underfunded public education) that contribute to social and economic inequities in minority communities [102].

It is important to understand these historical inequities as they not only inform the ways in which underserved populations seek to disrupt systemic barriers, but also provide context to current technological tensions such as cultural dissonance and a digital divide in technology proficiency and ownership. These tensions inform the ways technology solutions may be perceived among those who are systematically underserved. Understanding historical inequities also helps to contextualize the privilege and cultural distancing of many PD methods. As these disparities have a long-standing history in both the city of Chicago and other urban cities in the U.S., they inherently shape the ways local residents perceive current resources and conceptualize future solutions.

#### 4 CASE STUDIES

The following case studies detail our experience in conducting community-based participatory research through design workshops with historically underserved populations in the U.S. to address issues of health and civic engagement, respectively. In leveraging design workshops, we sought to embed design engagements directly into communities that historically experience inequities and systemic oppression. Integral to the theoretical underpinning of PD [8, 72], these instances of the design workshop challenged the structure of the designer as domain expert, and instead centered the community resident as expert based on their lived experiences.

Based on Rosner and Le Dantec [26, 83], the design workshops were intentionally exploratory in the way activities were structured, adapting to the needs and engagement of community residents. Each of these studies were designed to engage residents in discussions concerning their need for technology to address daily challenges that are seen within their communities, health disparities and civic engagement respectively. Drawing from CBPR and Participatory Action Research methodology, these examples attempt to focus community residents as an active partner in defining and structuring research engagements, consequently drawing out complexities of collaborative design engagement in these communities. Each research study was approved by a university Institutional Review Board prior to fieldwork and all participants consented to participation in the design workshops.

Scholarly discourse in feminist and intersectional HCI highlights the importance of reflexivity of researchers [15, 88]. In that vein, two of the authors are Black American women, both from lower-income working class backgrounds, now considered middle-class due to education and employment. Another author is a white American woman from a middle-class socioeconomic background. We are acutely interested in designing with the underserved because of our first-hand experiences with inequity and desire to enact change. Yet, our desire to leverage design to support change is precisely what brought about our critical reflection of PD methods for these populations. We also acknowledge that our disciplinary backgrounds – design, computing, and cognitive science– informs our mindset and research approach.



#### 4.1 Envisioning Health Among Low-Income African-American Older Adults

The first case study comes from a community-based participatory research effort aimed at understanding health needs, priorities, and potential solutions among a residential community of low-income, African-American, older adults in Chicago. Although the health-related findings from these design workshops were reported in [48], here we reanalyze our data from the workshops as well as assumptions and practices underlying our approach as part of our critical analysis of participatory design methods.

##### 4.1.1 Workshop Instantiation

**Objectives and Goals.** The overall goals of these workshops were to elicit a better understanding of (1) health and potential tools to support health maintenance, and (2) the use of design workshops as a catalyst for community health discussions. Workshops were funded by the U.S. National Science Foundation and an internal university research grant. Over the course of five weeks, participants engaged in five PD workshops to define health, document challenges and barriers, and envision resources to support their health and wellbeing. Each workshop session lasted approximately two hours and were preceded by critical reflections on the design method both in how well it allowed individuals to express concerns about health and how well the activity met expectations and needs. This led to an iterative process of refinement in which methods were altered weekly based on community resident feedback.

**Structure and Implementation.** To allow this research effort to be co-facilitated by community residents, we leveraged participatory and social action research methods [49, 67, 81] that allowed residents to drive the context and direction of discussions. We worked in partnership with the Resident Service Coordinator of the senior center to develop a collaborative research agenda for participatory design workshops. Community residents collaged about health, documented health in their local environment through a Photovoice activity, defined design challenges by formulating “How might we...” statements, brainstormed and ideated potential solutions to defined design challenges, and finally mocked up their ideas through paper prototypes. We found that community residents expressed health needs and concerns that indicated a desire for better community infrastructure, cleaner and safer neighborhoods, and living environments that were better maintained by local governance. Workshop conversations indicated a need for more community-focused design solutions, such as petitions for improved living conditions and resources for more convenient access to medical supplies and fresh foods. Residents also indicated a need for a better way of communicating with medical personnel. Collaboratively defining the structure of these workshops revealed a sense of empowerment among community residents [48]. Participants expressed a sense of ownership in not only their health maintenance and decision-making, but also in their ability to change health outlooks in their community. Debrief interviews were conducted to assess the overall experiences of community residents as research participants and understand actionable takeaways that felt mutual to researcher goals and community needs. By leveraging design activities that allowed community residents themselves to define and shape the context of workshop discussions, we observed what we viewed as a shift in power dynamics which elevated the collective voice of the community over our own design aspirations.

**Participants.** Participants in these design workshops were community residents recruited from a predominantly Black neighborhood in Chicago. Participants were compensated per workshop. Thirteen older adults were enrolled from a residential senior center comprised of three independent living facilities that also sponsored recreational and wellness activities on a monthly basis. Of the 13 participants (ages 65-79,  $M=71$ ), 10 were women, 11 were either unemployed or

retired, and 10 reporting finishing high school or having some college education. All participants identified as earning less than \$20,000USD annually putting them at or below the poverty line, with only seven participants reporting going online once a month and most indicating little technology proficiency.

**Post Workshop Engagement.** Following these workshops, researchers felt it necessary to find a meaningful way to disseminate results to community residents. The research team developed a one-page synopsis of what took place during the workshops, sentiments that were expressed throughout, and health-related community resources. The lead researcher has since begun working with the Resident Service Coordinator and community residents to identify future research topic areas.

#### 4.1.2 Critical Reflection

**History of Research Injustice.** Each of the workshops brought about unique participant engagements with both materials and activities as well as with the research itself. One of the initial tensions experienced was that of community residents and their acceptance of research staff and the underlying intent behind the research agenda as it was presented. This tension arose largely due to the history of the academic institution that we were affiliated with. Community residents shared that there was a long-standing complicated history of poor research relationships between the Black community residents and the university hospital. Historically, Black people faced discriminatory practices in interacting with this university as students undergoing unfair admissions and housing policies. As community residents who remembered experiencing racial discrimination from the Northwestern University, several participants indicated that there was a history of Blacks often *“being used in research studies despite not having access to equal medical treatment as patients or the hospital itself”* – P204. Due to this history, many people were skeptical about engaging with researchers and sharing health information that they perceived as intimate. As many of the community residents were old enough to have experienced and remember this complex history, they felt it pertinent to share that these research injustices have left poor concepts of the university and the work being done there. *“You know I’m old enough to remember when Northwestern would use us for studies but we couldn’t get medical help. I remember. And this was after Tuskegee, knowing what they did. So, I have right to have my doubts”* – P102. This community resident felt that the historical precedence of mistreatment of Blacks in medical research studies such as the Tuskegee study (where Black men were deceitfully told they were being treated for syphilis) [40] laid foundation for communities of color not trusting medical institutions. There was additional skepticism surrounding survey instruments and intentions of data, with individuals voicing their disdain for some of the more quantitative demographic questions about health or income status as they were unsure what the university would do with this data. *“I don’t trust it. I don’t trust what they’re going to do with it [data]. The way these questions are worded... they come and do these surveys and we never know what they do with it. Never hear any more about it”* – P206. There is difficulty in seeing new research efforts as standalone among populations that have experienced research injustice – current research efforts are both framed and interpreted through past actions of other researchers and instances of institutional trauma.

**Gaining Access.** One of the more commonly known challenges in conducting community-based design research is that of developing trust and ‘healthy’ relationships between researcher and community residents [26]. While this is especially challenging for researchers who may not identify with the communities they are working with, there are still challenges experienced by researchers who do have similar identity whether in age, ethnicity, or socioeconomic status. Upon agreeing to participate in these workshops, participants explained that they wanted to support

research efforts of the lead researcher as a young Black woman pursuing higher education. While this desire rooted in self-identification with ethnicity did allow the researcher some level of access to this community, it is also important to note the barriers that countered this access and impacted engagement in design workshop activities. Of immediate observation among our research was community residents' perception that academic researchers, regardless of similarity in race, may not understand everyday challenges associated with living in their neighborhood due to education and class, and that their objective in research was self-served and not vested in community advancement. In attempt to establish rapport with community residents, part of the research team spent several months volunteering at the community center doing food distribution or attending community meetings prior to initiating research engagement. During initial visits to the center, residents would share stories of participating in research studies from other local universities in which they would experience research abandonment—that is, they experienced a complete lack of communication from an academic research team following data collection and completion of a study. Our vested interest in the mission and activities of this center meant that not only were researchers engaging with the center outside of research objectives, but that research engagements were structured ethically to work towards collaborative design efforts that were meaningful to the community and that did not leave residents feeling abandoned. Invisible labor stemming from ethics and responsibility emerged here: researchers who identified with the Black community residents of this center did not want to perpetuate negative research experiences that would harm these individuals in any way, largely due to a feeling of familial relation to the community as a whole. The research team found it important to not only establish relationships, but to demonstrate commitments [26] by remaining 'there' in order to engage in collaborative design ethically.

**Interactions with Materials and Activities.** In planning workshops and design activities, the research team in collaboration with the Resident Service Coordinator were very intentional in considering the fluidity of materials such that community residents could easily express their ideas without the challenges of not being familiar with a particular technology or design technique. As such, the research team elected to implement activities that were similar in nature to those which community residents engaged in during recreational programs at the center (i.e. arts and crafts, gardening, group games). Despite the efforts to envision activities with the Community Activity Coordinator, there was friction in the reception of materials and activities. There was a generally positive response to materials provided for the collaging session, in part because researchers were intentional about including local magazines and ads that represented the community. During the sessions of brainstorming, however, participants expressed that the ideation materials provided (markers, colored pencils, sketching paper) were infantilizing and belittling. Many participants questioned if the research team felt that they were not capable of expressing their ideas and thoughts at the level of someone who might be formally and institutionally educated. In one instance, a community resident commented how the activity of ideation and brainstorming with colored pencils felt like an “*elementary school assignment*” and did not make sense to the larger goal of solving community issues. “*The crayons, markers and stuff... it’s like an elementary school activity. For fifth graders or little kids coloring in coloring books. It might make sense to you but it don’t make sense to us*” P201. That is, their sociocultural associations with certain materials and activities led to an interpretation that their participation and their ideas were not being taken ‘seriously’ by researchers.

Similar to the misalignment with the sociocultural expectations of materials, we observed tensions around activity structure, particularly brainstorming. Much of the larger group indicated that by brainstorming in such an ‘out-of-the-box’ way they were not moving towards solutions

that would actually be helpful. As resources such as money and access were active constraints to the ways they could address their health challenges, it was difficult – if not impossible – for participants to defer judgement during brainstorming and generate ideas without these bounds. That is, brainstorming ‘blue sky’ ideas is a luxury practice that marginalizes those who have endured life with systemic disadvantage and resource scarcity. For example, community residents expressed the need for tools to progress improvements of living environments as a way to support health within the community, ultimately mocking up a resident petition to be issued to housing authority committees. Considering a non-technological artifact such as a petition supports the concept of innovative freedom in the way we think of outcomes from design workshops and participatory design engagements. Given the history of injustice, our participants were more concerned with devising solutions that were ‘real’ and sustainable from within the community rather than relying on researchers or local governance to carryout. Participants commented that in the past institutional resources have failed to follow-through, despite community requests.

**Barriers to Obtaining Narratives.** The challenge of disclosing full accounts also emerged throughout the workshop series. Participants indicated that there were certain things they might not feel comfortable disclosing (e.g. previous drug use), for either fear of judgment or potential repercussion from housing management. The primary focus of health conversations held during this workshop series focused on community health and environmental barriers to health, and many of the concerns shared were related to the housing facility in which the residents lived in. Participants expressed that they did not want to complain about their living conditions (i.e. mold in carpet, issues with a lack of center resources) too much for fear of not being able to renew lease terms or other forms of negative repercussions. That is, this group initially saw the research team as aligning with other outside organizational workers (e.g. representatives from Medicare or Medicaid) or even building management as opposed to the community residents themselves. In this way, there is a general sense of risk in disclosure of personal narratives, perceptions, or attitudes felt by community residents that may be tied to power dynamics in ways that have not been considered. As research staff may have been considered authority in the same ways as those who help facilitate local and national government services, there was a natural reluctance to provide full narratives.

There is a potential impact of harm that may exist in community residents engaging in the design workshop itself when the research site is based in residents’ living environment and neighborhood facilities. Despite the intended benefit of design workshops being a collaborative way to uncover individual and community needs, these individuals may have more to lose in disclosing certain information. Pushing for personal narratives may be harmful not only to resident relationships with local resources, but also to their perceptions of the ways research staff disrupt community relations.

The tensions expressed here were only a subset of what was discovered during design workshop engagement. Many of these tensions are directly associated with the identity of the community itself and the particular sociomaterial configuration, structure, and implementation of these particular design workshops. We found that by encouraging community residents to provide feedback and definition of the design activities and flow of workshop sessions, residents felt empowered, yet still expressed a need for guidance and instructional leadership. By examining both the health-related content of discussion and the engagement with the workshop, we were able to establish a situated understanding of the challenges associated with collaborative design engagements within this community.

## 4.2 Amplifying the Voices of African-American and LatinX Communities in Civic Technology

The second case is a part of a larger research agenda to explore how technologies can better support underserved communities to address local issues. We describe a series of design workshops amidst Black and LatinX communities alongside city partners (e.g. police, local city council members). Prior results of this agenda focused on investigating the intersection of technology, government agencies and these communities [36]. We focus our analysis here on the tensions that emerged from this research endeavor through critical reflection of community-based PD as a method.

### 4.2.1 Workshop Instantiation

**Objectives and Goals.** The goal of our second case study of design workshops was to understand the barriers lower income African-American and LatinX communities faced when engaging in the design and deployment of city technologies. These technologies, oftentimes referred to as “smart” technologies, impact data collection and access as well as the allocation of city services. In an effort to expand inclusion and participation in civic discussions with city technology leaders, we partnered with local non-profit organizations that have an established presence in these communities. The workshop began with researchers engaging with community leaders for several months, building trust, and collaboratively creating a research agenda that included research questions, our approach, outcomes, and expected deliverables for researchers and community.

**Structure and Implementation.** Our primary concern was establishing a way to engage residents in discussion about inclusion and participation in Chicago’s civic tech and smart city development. We consulted with project partners from local Chicago government and decided to conduct two participatory design workshops in two different underserved neighborhoods. Each workshop lasted approximately 3 hours and included three activities: an icebreaker, an asset mapping activity, and a brainstorming activity. Participants were divided into groups of 4-8 people, where there was a lead facilitator (the lead researcher), a group facilitator (roughly half were community leaders), and a notetaker from the research team. All facilitators were trained prior to the session and received a detailed agenda, script, and FAQs to guide their interactions with participants.

During the icebreaker activity, participants got to know each other and began to engage in civic tech discourse by selecting photographic images from magazines or places in the neighborhood (e.g., a local community garden, parks, hospitals, grocery stores, library, community centers, a locally-owned restaurant, beach). Group members placed their chosen photo on a large poster-size map of their community, sharing why they selected the image and their prior experiences with community governance where they engage government officials such as local city council officials and/or senior law enforcement officials as well as how any civic engagement challenges might be addressed.

To learn more about their lived experiences and daily realities, we asked participants during our second activity to engage in asset mapping, where each group used sticky notes, photos of local places, and markers to annotate a poster-sized map with their community’s assets, general challenges, and any technology gaps. Taking an asset rather than deficit approach was vital to demonstrating respect and building rapport with participants. Participants identified assets (*park facilities* and *great public transportation*); challenges (*lack of grocery stores*, *gentrification*, and *gun violence*); and tech challenges (*overuse of monitoring technology*, *lack of tech education*, and *little to no access to public wifi*).

Similar to the first care study, the final activity engaged community residents in generating innovative solutions to the civic tech and technology challenges they identified. After merging the topics, participants ranked the challenges by importance and brainstormed solutions using various materials, including paper, sticky notes, and markers; participants used the asset-maps that they created as well. Our community partners tended to end the workshop by giving a brief presentation on the city's initiatives around civic tech, taking particular time to describe resources that were available such as ways to qualify for affordable internet programs and that there are WIFI hotspot lending programs at local libraries.

**Participants.** There was a total of 55 participants: 14 at the first design workshop, and 41 at the second. Our community partners led participant recruitment by sharing information via digital and print advertisements as well as word of mouth. There were more attendees at the second workshop due to having multiple community partners that formed a large research team. Of the 55 participants, 37 completed demographic surveys. Among the 37 participants (ages 26-56+), 20 identified as women. Household incomes ranged from less than \$10,000 to over \$150,000, and the average was \$60-69,000 (9 people declined to answer). Twenty-five participants self-identified as Black, 3 as white, and 1 as Latino (8 did not respond). Education levels varied with 2 participants reporting having high school diplomas or equivalent, and 34 reporting some level of college education. We collected 24 hours of audio and video recordings, sticky notes, annotated maps, the worksheets participants created, photographs of the sessions, and field notes compiled by the notetakers.

**Post Workshop Engagement.** After the workshops, there were three main outcomes. First, we shared the information back to the communities through a flyer, a white paper, and a presentation that summarizes the results and provides information about resources that can address community concerns and support the existing community-based efforts regarding participation in civic tech decision-making. Second, we used our findings to advocate for more equitable community involvement, connecting community residents (who expressed a desire for continued participation) with government officials and encouraged them to attend city meetings that impact government decisions. Lastly, the lead researcher (second author of this paper) leveraged the research findings to advocate for the creation of an annual grant that supports small, community-led non-profits to support sustainable solutions to addressing local civic tech concerns and currently sits on the board of the grant committee.

#### 4.2.2 Critical Reflection

**History of Research Injustice.** During workshops, there were several instances where residents shared concerns about the historical injustices that their communities have faced. Many also expressed how their opinions of technology solutions are unlikely to yield useful results that would benefit their communities given the history of policies and laws that propagate inequity, whether intentionally or unintentionally. This was evident in how one resident responded to the explanation of research objectives and consent prior to the beginning of the first workshop. This resident, who identified as a LatinX man, shared his concerns about the lack of impact that researchers have had on their communities in the past, stating that most researchers do not share their results with the community, much like in the health workshops. When the research team offered to share the type of information that we provide back to the communities as well as the academic outcomes (e.g., papers), he asked the team to email him copies of those documents so he could see them. His skepticism of working with researchers was from his experience of researchers, typically from large academic institutions, conducting research and abandoning research sites. Similar sentiments were shared by a Black woman who shared her thoughts about

researchers during the second workshop: “So, my feeling always is, you know I look around the room and DePaul is present. And for them it’s a research project. That don’t sit good in my heart. And I’m sorry, because... Like I told you, I’m a lifelong Chicagoan. I’ve seen University of Chicago fucking did it, DePaul doing it, but this workshop... what do you do with that!? And so, I’m the kind of person that believes change is only going to come from within the community. The cavalry ain’t coming in to save us, we gonna have to save ourselves.” This comment is an example of the skepticism and doubt expressed by the community regarding the researchers’ presence. Her comment exemplifies an opinion that we encountered in both case studies that the researchers do not care for the long-term wellbeing of the community and that they need to be self-sufficient and resilient without help from outsiders given their history.

**Gaining Access.** At the start of both design workshops, the lead researcher (second author on this paper) attempted to build rapport with community residents in the typical ways (e.g., greeting participants prior to getting started, formal introductions with the host organization, power transfer by explaining that they are the experts and that the team is here to learn from them). Similar to prior studies [26], participants from both workshops asked questions about the lead researcher’s background, where they grew up, how long they lived in Chicago, and in what neighborhood do they reside. Much of this questioning stemmed from typical rapport building that all researchers may face, where participants attempt to understand the researcher’s level of commitment to the community. Though this gatekeeping may be typical, the response to the emotional labor tied to the community’s wellbeing may be a result of being a minority, who has been granted access to working with these communities. As personal relationships were built in these communities over time, a sense of obligation was felt by both researcher and community resident. That is – many community residents began to ask the lead researcher for personal favors or commitments outside of the research itself. This emotional labor emerged as a range of personal requests (e.g., expectations that the lead researcher will be available for campus tours, giving talks at a church, working at an understaffed food pantry) and personal emotional labor (e.g., constantly questioning the validity and impact of the research beyond academic publications). This also seemed to extend to the extensive work conducted beyond the workshop to develop and fund community initiatives to explore civic technology. Such emotional labor results in a desire to participate in initiatives that can make real immediate change in a system resistant to change, and a feeling of responsibility to familiar communities.

**Interactions with Materials and Activities.** Though participants did not openly complain about the workshop materials (i.e., markers, sticky notes, paper, maps) in this case, there was some confusion about the basic concepts of design with residents feeling these activities felt foreign or lacked usefulness despite given instructions. For instance, during the mapping exercise in the second design workshop, one participant shared that she did not understand the concept of mapping and there was shared laughter about the notion of using colored sticky notes. Researchers observed this confusion noting: *Susan asks around the table, “What is mapping?” John seems surprised by her question. There are jokes about pink and coral post-its. Laughter around the table.* The reaction from John, a White male teacher, demonstrates his familiarity with the concept of mapping, while Susan, a Black small business owner was not only unfamiliar but also found humor (along with others at the table) about the materials and concept of mapping.

Similarly, due to the nature of the activities, it was challenging to keep some community residents interested due to the disconnect between what individuals viewed as feasible, sustainable solutions and the design process – which requires an acceptance of ambiguity and faith that the process will yield effective solutions. During the instructions and “share out” portions of the workshop, we observed community residents listening intently but quickly becoming bored and

engaging in side activities. Similar to the first set of design workshops, there was an evident disconnect between how researchers envisioned these design engagements and what community residents felt to be somewhat elementary activities that may not address their serious challenges. When asked to imagine technical solutions, residents were resistant, stating that they “*were not techie*”. These engagements mirror the previous case study in the ways that community residents thought about solutions to social issues, often with non-technical approaches.

**Barriers to Obtaining Narratives.** Despite the fact that our workshops were facilitated by both the research team and community residents, there were several instances where it was clear that the responses shared were limited in depth and detail of personal narratives. This was evident in the audio recordings, which captured residents sharing more detailed, personal experiences while talking one-on-one to each other rather than talking to the entire table. There was strong hesitation to broadly share personal stories, even amongst a table of other residents and/or the research team. Much of the hesitation to engage deeply stems from the historical distrust of research in general that has resulted in trauma to these communities. Our fieldnotes capture a discussion amongst residents about research surveys as an example of participants’ thoughts on research:

*Susan says she works with [a community survey organization] where they get surveys. She says [to the table], “Surveys say your side of story or their side of story but not all. Some people don’t even take surveys. Its neutral and hence everyone is open about data being collected but interpretation is different.”*

*John adds that if a survey that is intended for community [but is not owned by the community] is an experiment and it doesn’t communicate well with many people in research field. Leslie says there should be well known faces from the community [who engage as the research team so people can respond] ‘I know Susan. I know Donna.’ but when a stranger knocks your door you say ‘No.’” Donna adds “It always felt like an attack on my business [when researchers come]. It is [like they want] to get some stuff (data) and experiment.”*

Though Susan was on the survey research team, she still was skeptical about research in general. This discussion reflects the skepticism of research and how there is a natural hesitation to become fully invested in a research project by providing data without having an active voice in the outcomes and dissemination of results. The nature of the discussion also exemplifies the hesitation of participants to share full personal narratives. In discussing city and neighborhood conditions, participants were reticent to acknowledge the root of community challenges that may implicate individuals they know personally. Doing so would have tremendous impact on interpersonal relationships as well as individual safety. Being mindful of these consequences while also wanting to capture full narratives is clearly a tension in this design engagement.

## 5 TOWARDS EQUITY IN COLLABORATIVE DESIGN ENGAGEMENTS

Our case studies of community-based design workshops with underserved populations reveal tensions both in the theory and praxis of participatory design. PD is idealized as a democratic approach to creativity and design thinking, despite the complexities of this method and its position as a privileged activity, which inherently creates an imbalance in power and equality. More novel to the conversation of collaborative design in HCI is the lens of Postcolonialism when examining participatory design engagements, as often these engagements are largely shaped by power dynamics and cultural difference between researcher and participant [54, 56, 65]. The concept of postcolonialism is concerned with the impact of colonization in various contexts, and is



informed by grassroots and participatory development [68]. Despite critiques of the abstract nature of this theory, postcolonialism has been adopted in design to suggest that, at some point, design and collaborative engagements within design became institutionalized efforts, with these engagements being defined by those who have access to formal education and training [54, 65]. Applying a postcolonial lens to PD stresses the importance of considering histories of injustice, uneven economic relations, local knowledge as it pertains to design implementation, and the difficulties of design across cultures [56], which may occur when positioning academic researchers in underserved communities that they do not identify with. This suggests that there are inherent privileges that come with PD that must be attended to and destabilized when design engagements are situated in communities that are undeserved. Indeed, colonialism is embedded in much of CSCW and HCI research that happens in the “developed world” although it is rarely accounted for [55]. Relatedly, O’Leary et al. [62] detail how designers can hide the workings of racism and demonstrate how, despite community engagement, conventional design practices can be inherently racialized. These authors suggest HCI recognize practices that make racialization explicit and decenter the authority of design elitism.

Here, we bring this critical lens to our analysis of design engagements with U.S. based researchers working with underserved populations in the U.S. Our goal in analyzing these cases is not to suggest that undertaking such a methodological approach with these communities should only be seen for community struggles and the challenges researchers face, but that these engagements require us to hold researchers accountable for the ways in which we insert ourselves into these communities. We build upon the previous assertions of scholars well-established in PD methodology [26, 83] and also engage with those looking at equity and social-justice oriented research practices [18, 19, 21]. Thus, to decolonize research practices associated with the design workshop, we highlight three key ways researchers can rethink engagement and implement equitable community-based PD practices with underserved communities.

### **5.1 Consider History and Context of Research Environment as a Method of Trust-building**

Progressing towards equity in community-based collaborative design engagements requires us to consider the history of research sites as they relate to barriers of trust and acceptance among community residents. In order to facilitate meaningful collaborations with underserved communities we suggest that not only is the community history important as has been established by La Dantec [26], but the context of association with research institutions is also equally vital to consider [59]. Understanding this history with an eye toward “research injustice” is beneficial to collaboratively developing research agendas that do not further marginalize individuals or causes. The corollary to this is that we must treat each research engagement as making a mark in terms of how communities perceive the individuals conducting field work, the institution (academic, government, etc.), and all researchers more broadly. Thus, current actions set the tone for future collaborative design engagements. If we wish to have accountability in these design engagements, we must reflexively acknowledge power dynamics between researchers and community partners, challenges of economic disadvantages in design engagements, and the labor required to build trust. There is a common myth that researchers who identify with the identities of community residents have an easier time or a “pass” to access and work with communities of color. While there is familiarity in race and other identifying factors that may be present, there are other components that must be considered: 1) Black researchers still face gatekeepers and must answer to histories of research injustice, and 2) there is considerable emotional labor that comes with

getting into the gate. This reflexivity also requires careful consideration of who is or should be made visible (i.e., recognition) [19, 37, 62] and whether these individuals are even willing or desire to affiliate with design practices [6].

Such reflexivity can help reframe the ways in which methods or context of design inquiry are shaped. It is important to acknowledge that researchers bring the history of their discipline and sometimes an associated institution (e.g., medical, government) with them to the field. Some of these histories will undoubtedly hold particular traumas for communities that are oppressed. In our contexts of study, equity may also mean engaging local community leaders or activists that are familiar with the area of research interest and know more in-depth the history the communities have with academic and service institutions. Additionally, collecting stories of the community environment and its residents does not always have to be a part of ‘data collection’ but can precede research engagements as a way to better understand the setting being entered. Implementing preparatory activities, such as encouraging community residents to share their environment or their current ways of doing things may help to build trust and establish an understanding among researchers of the community they are working with. Such preparation for design engagements may help contextualize the specific methods that will work best and how these methods may be interpreted by community residents. Similarly, what researchers do after the study is equally important and requires careful consideration, an investment of time, and emotional labor. This work is time intensive and takes a critical examination of researcher privilege and the social tensions of what academic researchers represent in these communities. The notion of ‘being there’ before and after a study becomes increasingly important to understanding local histories, contexts, and relations.

## 5.2 Encourage Rich and Full Accounts Rather than Stressing Honest Disclosure

Despite our own efforts to shift power in these design workshops, in both case studies we observed hesitation among community residents regarding the type of information and which personal stories will be shared with research teams. Histories of research engagements have led to participants recognizing that the data, information, and stories collected will tell a narrative over which they are not in complete control. Therefore, many community residents perceive research engagements within their communities to be more about concepts of “white gaze” (in which Black and Brown bodies are a spectacle of performance) [106], an often seen savior complex where individuals are fixated on “saving” the disenfranchised due to guilt of privilege or even ways of policing in which their personal narratives are not safe from future consequence. As discussed earlier, the reluctance to open up may stem from the intergenerational trauma caused by academic and government institutions that have historically caused harm to these communities. Additionally, the fear of disclosing illegal or stigmatizing information can be felt deeply.

Researchers must acknowledge the (unintentional) harm that may occur simply by their presence in these research environments. Following the necessity to understand the historical injustices of research within these communities, it is also important to understand the sociocultural and political environment of the communities themselves. As a way to address this nuance, researchers should look to focus more on the fullness of engagement rather than whether participants are disclosing ‘honest truths.’ Supporting community residents to engage on their own terms and share narratives that they deem important in a comfortable environment may push us closer to design engagements where these individuals feel empowered rather than further marginalized, while also accepting that there are likely some personal details missing.

### 5.3 Challenging “Corporate” Design Thinking within PD

Considering the way economic disadvantage plays out in design also requires understanding that in some ways, many design activities and the emphasis on ideal solutions actually widens the equity gaps that we should be bridging. For example, Irani’s work on hackathons in India highlights how this optimistic, high-velocity social practice prioritizes middle-class politics and orients towards a Silicon Valley model of change (i.e., quick and forceful action over mass democracy) [53]. As O’Leary et al. [62] describe, inequities can be felt through researcher decisions about how to instantiate proposed ideas (e.g. mismatch of sketching from urban designs using 3D modeling rather than situated objects) and participants needing to adopt the language of design to be taken seriously. They argue for attending to how design practices can be implicitly racialized and how the concept of design itself often represents people and institutions located outside the community. Similarly, the “elite” status of design and associated approaches to design thinking have become institutionalized as a “corporate” approach to locating opportunities to address community challenges [52]. Within these approaches, methods of ideation and prototyping value new ideas, particularly technology-oriented ideas as “good” solutions or outcomes, which may negate or minimize the relevance of existing resources. In this way, design thinking has unintentionally shifted PD to devalue existing assets or environments of underserved communities, and as we see in our case studies, distances community residents from feeling PD is a useful tool in addressing societal challenges. Another facet of this bias towards novel technocentric solutions over existing assets is that much scholarship within CSCW and HCI is funded by organizations that prioritize computing and engineering research. Thus, we must be cognizant of potential decentering of community interests due to valorization of technical innovation along with corporate notions of design.

Encouraging innovation in the way it is conceptualized in the academy may be harmful to these communities, thus we propose that we instead emphasize solutions that will be considered successful by community metrics. What are the steps that can be taken immediately following a design engagement such that the impact is immediately perceived? What are the resources that already exist and can be leveraged and supported, such that they are able to be maintained and progressed in the absence of researchers? In moving towards more equitable community design engagements we should also consider scenarios when a solution does not have the traditional polished appeal of innovative technology. The democratic underpinning of community-based PD suggests that collaborative design research engagements center and uplift the voices of individuals who are typically neglected or do not readily see political power. An emphasis on technosolutionism centers the values of the researcher and potential funding agencies rather than the community of interest. Thus, if we find that technology does not address the challenges experienced within a community, or is not the most sustainable, we should continue to center community resident voices as expert by prioritizing feasibility and practicality even among non-technical solutions. Our approach, which focuses on identifying and leveraging existing community assets, is a start to transforming traditional PD workshops from “corporate” approaches to design innovation to creating feasible, sustainable solutions despite the challenges outlined above. Though an asset-driven design approach eliminates the researchers from solely focusing on a community’s deficits, researchers must resist the desire that is many times embedded in our training that recognizes technological innovation as the gold standard that must be achieved. However, as O’Leary et al., [62] note, “no design approach may in itself hold the answer.” In fact, they argue a more provocative position of whether we should call these engagements design at all given design’s elite status and embedded structural racism.

Nevertheless, it is important to recognize that deeply understanding the lived experiences of underserved communities in developed contexts is a contribution in itself within HCI.

## 6 DESTABILIZING NORMS THROUGH EQUITY IN DESIGN

At its inception, research is a product of the cultures in which it was created, including its societal hierarchies, where positionality (or superiority) of certain people (i.e., researchers) are dominant. Thus, in a way, participatory design in the context of research has been shaped by the researchers who make up the environment in the way that it is envisioned. Decolonizing PD and the way it is implemented through design workshops means changing the way we think about methods and outcomes, and re-envisioning design as belonging to the people and communities of interest. As we discuss above, decolonizing participatory and collaborative design also means examining the ways it has been appropriated to fit the needs of those who have privilege, and considering how it might be used to transform systemic oppression.

Equitable PD considers and centers those who have been historically underserved, communities that have not been in positions of power, as the central focus of collaborative design engagements but may also have serious implications for others. Equity in design allows people to have the same outcome when inclusive and participatory approaches are not enough. In this way, an equitable approach to community-based participatory design should question the standards and expectations that all designers are held to, paralleling the ways in which our field has begun to hold accountability through feminist HCI scholarship and the consequences of this theoretical approach [4]. Designers have the capability to be navigators of complexity and ambiguity, addressing challenges that sit at the intersection of technological advancement and social need, but only when we consider our own privileges and positions of power and the ways these constructs work against engagement with underserved communities. Centering equitable experiences and outcomes, we are able to reconstruct collaborative design as a more collective, grassroots, and pragmatic method, actualizing the objectives of CBPR and Participatory Action Research. Towards creating more equitable experiences of PD into our research agendas, we propose an *equity-driven* approach, which better situates design engagements with the Participatory Action Research methods from which they originate. Equity-driven PD then becomes a catalyst for how we move from awareness to action in our responses to social inequalities that also appear in our design engagements, calling attention to unchallenged norms and values embedded in PD.

Pushing towards such an approach also requires that we situate community residents as living experts of the research areas we explore. They should be considered valuable for their knowledge and lived experience in the same way that we consider domain experts in design. Finding ways to eliminate barriers to power sharing and access can help address the imbalance between researchers and community residents that are evident in our case studies. While in many cases, participants are compensated for their involvement in design research engagements, we need to find ways to better consider the value of expertise within these communities. Thinking of ways to compensate community residents in the same way as co-designers, or even bartering time for the support of resources are concepts supported among activists working towards research justice and just design practices [21]. Considering this as a part of decolonizing the participatory design process, we must prioritize ways in which we should be not just re-centering the margins but building ethical research experiences.

Aligning with Participatory Action Research, equity-driven participatory design is its own form of activism and social responsiveness within research. Thinking of design solutions as activism

has been well-accepted and leveraged among both scholars in academia and design organizations such as the Design Justice Network [29]. The future of collaborative design engagements that center community needs must think of design as a catalyst for social change, not simply technological advancement, particularly in communities situated in societies that are designed counter to their advancement. Sorting out tensions with commitments to funding agencies may require seeking funding through alternate sources, such as foundations focused on advocacy and social justice. Building in ways for researchers to stay in the field after funding ends or without any funding at all is also critical, particularly given the emotional labor of being there. This may require reframing the value and academic incentives of pre- and post-study work. Without reimagining the value proposition of this work and changing the academic culture of publication, research abandonment seems inevitable.

Community-based design practitioners have begun to implement equity in design to address issues of health disparities, mass incarceration, poverty, and education by focusing on a community's history and culture, and addressing power dynamics (see *Equity-Centered Community Field Guide* by Creative Reaction Lab [22]). This method decolonizes research practice from those who are affluent and privileged and refocuses the community as the authority. Equity in participatory design dismantles the hierarchies that exist between researcher and participant, shifting power to coming from the bottom up instead of from the top down. As we continue this conversation of a more equitable approach to PD, we must consider community history [59], measures of accountability, and reflexivity. We must define and work towards what it means to implement equity as a central focus of this process. How do we address barriers of economics and structural injustices in design and through design? With as much cultural sensitivity that HCI and CSCW researchers design for, there are still methodological challenges that emerge within underserved communities because of the structural injustices that exist.

## 7 CONCLUSION

We present a critical analysis of the unique challenges and tensions that surround community-based collaborative design engagements with underserved communities within the U.S. The foundation of PD suggests that it is a democratic mechanism to respond to societal challenges, yet when implemented in the context of underserved communities there are tensions that prevent the actualization of this opportunity. We posit that the history of injustice that has led to the inequities these communities face also impacts such research engagements, leading to skepticism of research agendas, barriers to acceptance of materials and activities, and challenges in full disclosure of personal narratives. The underlying premise of systemic oppression may have impact on the ability to truly collaborate with underserved populations through design, and thus must be acknowledged in such conversations. Our aim has been to revisit design workshops as a method and through this deconstruct barriers to equitable engagement and further progress PD towards innovation and social action similar to the congruency seen in CBPR. Considering the historical context of research environments, the realization of community access and allyship, and centering practical existing community resources all stand to push community-based PD forward to a truly equity-driven research engagement. By reconstructing the way in which this method is framed, we can support a more equitable process which highlights and reflects the needs and values of these communities without further marginalizing them.

## ACKNOWLEDGMENTS

The projects in these case studies were sponsored and funded by NSF grant IIS-1551574 and by City Tech. We extend a gracious thank you to the community partners that engaged in this research and allowed us into their lives and to tell their stories. We would also like to thank Enid Montague and Jessa Dickinson for their feedback on early drafts of this paper.

## REFERENCES

- [1] Aaronson, D. et al. 2019. *The Effects of the 1930s HOLC "Redlining" Maps*. Technical Report #WP 2017-12.
- [2] Asad, M. et al. 2017. Creating a Sociotechnical API. (2017), 2295–2306. DOI:<https://doi.org/10.1145/3025453.3025963>.
- [3] Bailey, Z.D. et al. 2017. Structural racism and health inequities in the USA: evidence and interventions. *The Lancet*. 389, 10077 (2017), 1453–1463. DOI:[https://doi.org/10.1016/S0140-6736\(17\)30569-X](https://doi.org/10.1016/S0140-6736(17)30569-X).
- [4] Bardzell, S. 2010. Feminist HCI: Taking Stock and Outlining an Agenda for Design. (2010), 1301–1310.
- [5] Baumann, K. et al. 2017. Infrastructures of the Imagination: Community Design for Speculative Urban Technologies. *C&T '17: Proceedings of the 8th International Conference on Communities and Technologies* (Troyes, France, 2017), 1–4.
- [6] Bennett, C.L. et al. 2019. Biographical Prototypes: Reimagining Recognition and Disability in Design. *DIS '19 Proceedings of the 2019 on Designing Interactive Systems Conference* (San Diego, CA, 2019), 35–47.
- [7] Benton, L. et al. 2014. Diversity for design: A Framework for Involving Neurodiverse Children in the Technology Design Process. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '14)*. (2014), 3747–3756. DOI:<https://doi.org/10.1145/2556288.2557244>.
- [8] Bjerknes, G. et al. 1987. *Computers and democracy: A Scandinavian challenge*. Gower Pub Co.
- [9] Björgrvinsson, E. et al. 2010. Participatory design and "democratizing innovation"; *PDC '10: Proceedings of the 11th Biennial Participatory Design Conference* (2010), 41–50.
- [10] Bodker, S. et al. 1995. *Cooperative design: techniques and experiences from the Scandinavian scene*. Morgan Kaufmann Publishers Inc.
- [11] Bossen, C. et al. 2010. User gains and PD aims: Assessment from a participatory design project. *PDC '10: Proceedings of the 11th Biennial Participatory Design Conference* (Sydney, Australia, 2010), 141–150.
- [12] Botero, A. and Hyysalo, S. 2013. Ageing together: Steps towards evolutionary co-design in everyday practices. *CoDesign*. 9, 1 (2013), 37–54. DOI:<https://doi.org/10.1080/15710882.2012.760608>.
- [13] Bratteteig, T. et al. 2016. What is a participatory design result? *Proceedings of the 14th Participatory Design Conference on Full papers - PDC '16* (2016), 141–150.
- [14] Carroll, J.M. 2001. Community computing as human - computer interaction. *Behaviour & Information Technology*. 20, 5 (2001), 307–314. DOI:<https://doi.org/10.1080/01449290110078941>.
- [15] Chen, K.-L. et al. 2017. Situated Dissemination through an HCI Workplace. *CHI '17: Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (Denver, 2017), 2078–2090.
- [16] Christopher Frayling 1AD. *Research in Art and Design*. Royal College of Art Research Papers.
- [17] Clark, M. and Gomez, R. 2011. Cost and other barriers to public access computing in developing countries. (2011), 181–188. DOI:<https://doi.org/10.1145/1940761.1940786>.
- [18] Corbett, E. and Le Dantec, C.A. 2018. The Problem of Community Engagement. *CHI '18 Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal, Quebec, 2018), 1–13.
- [19] Corbett, E. and Loukissas, Y. 2019. Engaging Gentrification as a Social Justice Issue in HCI. *CHI '19: Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (Glasgow, Scotland, 2019), 1–16.
- [20] Cornejo, R. et al. 2016. Vulnerability, Sharing, and Privacy: Analyzing Art Therapy for Older Adults with Dementia. (2016), 1570–1581. DOI:<https://doi.org/10.1145/2818048.2819960>.
- [21] Costanza-Chock, S. 2019. Design Justice: towards an intersectional feminist framework for design theory and practice. *DRS2018: Catalyst*. 2, in (2019). DOI:<https://doi.org/10.21606/drs.2018.679>.
- [22] Creative Reaction Lab 2018. *Equity-Centered Community Design Field Guide* a Creative Reaction Lab Publication. (2018).
- [23] Le Dantec, C. and Edwars, K. 2008. Designs on dignity: Perceptions of technology among the homeless. *CHI '08. Proceedings of the Twenty Sixth Annual SIGCHI Conference on Human Factors in Computing Systems*. ACM.
- [24] Le Dantec, C.A. et al. 2010. A tale of two publics. (2010), 11. DOI:<https://doi.org/10.1145/1858171.1858174>.
- [25] Le Dantec, C.A. 2016. Design through collective action / collective action through design. *Interactions*. 24, 1 (2016), 24–30. DOI:<https://doi.org/10.1145/3018005>.
- [26] Le Dantec, C.A. and Fox, S. 2015. Strangers at the Gate: Gaining Access, Building Rapport, and Co-Constructing Community-Based Research. *CSCW '15: Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing* (Vancouver, BC, Canada, 2015), 1348–1358.
- [27] Davidson, J.L. and Jensen, C. 2013. Participatory Design with Older Adults: An Analysis of Creativity in the Design

- of Mobile Healthcare Applications. *Proceedings of the 9th ACM Conference on Creativity & Cognition - C&C 13* (Sydney, 2013), 114–123.
- [28] Davidson, J.L. and Jensen, C. 2013. What health topics older adults want to track. *Proceedings of the 15th International ACM SIGACCESS Conference on Computers and Accessibility - ASSETS '13* (2013), 1–8.
- [29] Design Justice Network Principles: 2018. .
- [30] Dillahunt, T.R. et al. 2017. Reflections on Design Methods for Underserved Communities. *CSCW '17 Companion: Companion of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing* (Portland, 2017), 409–413.
- [31] Dillahunt, T.R. and Malone, A.R. 2015. The Promise of the Sharing Economy among Disadvantaged Communities. (2015), 2285–2294. DOI:<https://doi.org/10.1145/2702123.2702189>.
- [32] Dillahunt, T.R. and Veinot, T.C. 2018. Getting There: Barriers and Facilitators to Transportation Access in Underserved Communities. *ACM Trans. Comput.-Hum. Interact.* 25, 5 (2018), 29:1–29:39. DOI:<https://doi.org/10.1145/3233985>.
- [33] Disalvo, C. et al. 2008. The Neighborhood Networks Project: A Case Study of Critical Engagement and Creative Expression Through Participatory Design. *PDC '08: Proceedings of the Tenth Anniversary Conference on Participatory Design 2008* (2008), 41–50.
- [34] Duarte, A.M.B. et al. 2018. Participatory Design and Participatory Research: An HCI Case Study with Young Forced Migrants. *ACM Transactions on Computer-Human Interaction.* 25, 1 (2018), 1–39. DOI:<https://doi.org/10.1145/3145472>.
- [35] Erete, S. et al. 2018. An intersectional approach to designing in the margins. *Interactions*.
- [36] Erete, S. and Burrell, J. 2017. Empowered Participation: How Citizens Use Technology in Local Governance. *CHI '17 Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (Denver, 2017), 2307–2319.
- [37] Fox, S. et al. 2015. Hacking Culture , Not Devices: Access and Recognition in Feminist Hackerspaces. *CSCW '15 Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing* (Vancouver, BC, Canada, 2015), 56–68.
- [38] Fox, S. et al. 2017. Social Justice and Design: Power and oppression in collaborative systems. *CSCW '17 Companion: Companion of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing* (Portland, 2017), 117–122.
- [39] Frauenberger, C. et al. 2017. Blending Methods: Developing Participatory Design Sessions for Autistic Children. *Proceedings of the 2017 Conference on Interaction Design and Children.* (2017), 39–49. DOI:<https://doi.org/10.1145/3078072.3079727>.
- [40] Freimuth, V.S. et al. 2001. African Americans ' views on research and the Tuskegee Syphilis Study. *Social Science & Medicine.* 52, (2001), 797–808.
- [41] Garde, J.A. and Van Der Voort, M.C. 2014. Participants' view on personal gains and PD process. *PDC '14: Proceedings of the 13th Participatory Design Conference* (Windhoek, Namibia, 2014), 79–82.
- [42] Del Gaudio, C. et al. 2014. The influence of local powers on Participatory Design processes in marginalized conflict areas. *PDC '14: Proceedings of the 13th Participatory Design Conference* (Windhoek, Namibia, 2014), 131–139.
- [43] Gautam, A. et al. 2018. Participatory tensions in working with a vulnerable population. *Proceedings of the 15th Participatory Design Conference on Short Papers, Situated Actions, Workshops and Tutorial - PDC '18* (New York, New York, USA, 2018), 1–5.
- [44] Geronimus, A.T. et al. 2010. Do US Black Women Experience Stress-Related Accelerated Biological Aging? A Novel Theory and First Population-Based Test of Black-White Differences in Telomere Length. *Hum Nat.* 21, (2010), 19–38. DOI:<https://doi.org/10.1007/s12110-010-9078-0>.
- [45] Hall, J.M. and Fields, B. 2015. "It's Killing Us!" Narratives of Black Adults About Microaggression Experiences and Related Health Stress. *Global Qualitative Nursing Research.* 2, (2015), 233339361559156. DOI:<https://doi.org/10.1177/2333393615591569>.
- [46] Halskov, K. and Dalsgård, P. 2006. Inspiration card workshops. (2006), 2. DOI:<https://doi.org/10.1145/1142405.1142409>.
- [47] Hamidi, F. et al. 2018. Gender Recognition or Gender Reductionism? (2018), 1–13. DOI:<https://doi.org/10.1145/3173574.3173582>.
- [48] Harrington, C.N. et al. 2019. Engaging Low-Income African-American Older Adults in Health Discussions through Community-based Design Workshops. *ACM Conference on Human Factors and Computing* (Glasgow, Scotland, 2019).
- [49] Hayes, G.R. 2011. The relationship of action research to human-computer interaction. *ACM Transactions on Computer-Human Interaction.* 18, 3 (2011), 1–20. DOI:<https://doi.org/10.1145/1993060.1993065>.
- [50] Hillier, A.E. 2003. Redlining and the Homeowners' Loan Corporation Part of the Urban, Community and Regional Planning Commons. *Journal of Urban History.* 29, 4 (2003), 394–420. DOI:<https://doi.org/10.1177/0096144203252003>.
- [51] Hussain, S. et al. 2012. Participatory Design with Marginalized People in Developing Countries: Challenges and Opportunities Experienced in a Field Study in Cambodia. *International Journal of Design.* 6, 2 (2012), 91–109.
- [52] Irani, L. 2018. "Design Thinking": Defending Silicon Valley at the Apex of Global Labor Hierarchies. *Catalyst*

- Feminism, Theory, Technoscience*. 4, 1 (2018), 1–19.
- [53] Irani, L. 2015. Hackathons and the Making of Entrepreneurial Citizenship. *Science, Technology, & Human Values*. 40, 5 (2015), 799–824. DOI:<https://doi.org/10.1177/0162243915578486>.
- [54] Irani, L. et al. 2010. Postcolonial Computing: A Lens on Design and Development. *ACM Conference on Human Factors and Computing* (Atlanta, 2010).
- [55] Irani, L. et al. 2009. Postcolonial Computing: A Lens on Design and Development. *Chi 2009*. Volume 1, (2009), 1311–1320.
- [56] Irani, L.C. and Dourish, P. 2009. Postcolonial interculturality. (2009), 249. DOI:<https://doi.org/10.1145/1499224.1499268>.
- [57] Jan, T. 2018. Redlining was banned 50 years ago. It’s still hurting minorities today. *Washington Post*.
- [58] Joshi, S.G. and Bratteteig, T. 2016. Designing for Prolonged Mastery. On involving old people in Participatory Design. *Scandinavian Journal of Information Systems*. 28, 1 (2016).
- [59] Khovanskaya, V. et al. 2018. Designing against the status quo. *Interactions*. 25, 2 (2018), 64–67. DOI:<https://doi.org/10.1145/3178560>.
- [60] Law, J. 2004. *After Method: Mess in Social Science Research*. Routledge.
- [61] Lazar, A. et al. 2018. Making as Expression: Informing Design with People with Complex Communication Needs through Art Therapy. *CHI '18: Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal, 2018).
- [62] Leary, J.T.O. et al. Who Gets to Future? Race , Representation , and Design Methods in Africatown. DOI:<https://doi.org/10.1145/3290605.3300791>.
- [63] Leong, T. and Robertson, T. 2016. Voicing values: laying foundations for ageing people to participate in design. *Participatory Design Conference*. (2016), 31–40. DOI:<https://doi.org/10.1145/2940299.2940301>.
- [64] Lucero, A. and Mattelmäki, T. 2011. Good to See You Again: Engaging Users in Design. *Proceedings of the 2011 Conference on Designing Pleasurable Products and Interfaces - DPPI '11*. (2011), 1. DOI:<https://doi.org/10.1145/2347504.2347517>.
- [65] Mainsah, H. and Morrison, A. 2014. Participatory design through a cultural lens: insights from postcolonial theory. *PDC '14: Proceedings of the 13th Participatory Design Conference* (Windhoek, Namibia, 2014), 83–86.
- [66] Martin-Hammond, A. et al. 2018. Engaging Older Adults in the Participatory Design of Intelligent Health Search Tools. (2018), 280–284. DOI:<https://doi.org/10.1145/3240925.3240972>.
- [67] Masters, J. 1995. The history of action research. *Action research electronic reader*. 22, (1995).
- [68] McEwan, C. 2008. *Postcolonialism and development*. Routledge.
- [69] Merritt, S. and Stolterman, E. 2012. Cultural hybridity in participatory design. (2012), 73. DOI:<https://doi.org/10.1145/2348144.2348168>.
- [70] Mitchell, B. et al. 2018. HOLC “redlining” maps: a persistent structure of segregation and economic inequality. *HOLC “redlining” maps: The persistent structure of segregation and economic inequality» NCRC*. 202 (2018), 464–2709.
- [71] Muller, M.J. and Druin, A. 2002. Hybridity and Participatory Design-1-DRAFT: Publisher has final version Participatory Design: The Third Space in HCI. *The Human Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications*. 1051–1068.
- [72] Muller, M.J. and Kuhn, S. 1993. Participatory Design. *Communications of the ACM - Special issue Participatory Design*. 36, 6 (1993), 24–28.
- [73] Okeke, F. et al. 2019. Opportunities and challenges in connecting care recipients to the community health feedback loop. (2019), 1–11. DOI:<https://doi.org/10.1145/3287098.3287111>.
- [74] Orsi, J.M. et al. 2010. Black-White health disparities in the United States and Chicago: a 15-year progress analysis. *American journal of public health*. 100, 2 (Feb. 2010), 349–56. DOI:<https://doi.org/10.2105/AJPH.2009.165407>.
- [75] Parker, A.G. and Grinter, R.E. 2014. Collectivistic health promotion tools: Accounting for the relationship between culture, food and nutrition. *International Journal of Human Computer Studies*. 72, 2 (2014), 185–206. DOI:<https://doi.org/10.1016/j.ijhcs.2013.08.008>.
- [76] Pedell, S. et al. 2014. Tools for participation: Intergenerational technology design for the home. *International Journal of Design*. 8, 2 (2014), 1–14.
- [77] Perrier, T. et al. 2015. Engaging Pregnant Women in Kenya with a Hybrid Computer-Human SMS Communication System. (2015), 1429–1438. DOI:<https://doi.org/10.1145/2702123.2702124>.
- [78] Pommeranz, A. et al. 2012. Exploration of facilitation, materials and group composition in participatory design sessions. *ECCE '12: Proceedings of the 30th European Conference on Cognitive Ergonomics* (Edinburgh, United Kingdom, 2012), 124–130.
- [79] Racadio, R. et al. 2014. Research at the Margin: Participatory Design and Community Based Participatory Research. *PDC '14: Proceedings of the 13th Participatory Design Conference: Short Papers, Industry Cases, Workshop Descriptions, Doctoral Consortium papers, and Keynote abstracts - Volume 2* (Windhoek, 2014), 49–52.
- [80] Racadio, R. et al. 2014. Research at the Margin: Participatory Design and Community Based Participatory Research. *In*



*Proceedings of the 13th Participatory Design Conference* (2014), 49–52.

- [81] Reason, P. 2007. *The SAGE handbook of action research: Participative inquiry and research*. Thousand Oaks.
- [82] Roberson, J. and Nardi, B. 2010. Survival needs and social inclusion. (2010), 445. DOI:<https://doi.org/10.1145/1718918.1718993>.
- [83] Rosner, D.K. et al. 2016. Out of Time, Out of Place: Reflections on Design Workshops as a Research Method. *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing - CSCW '16* (2016), 1129–1139.
- [84] Rothstein, R. 2017. *The color of law: A forgotten history of how our government segregated America*. Liveright Publishing.
- [85] Sabiescu, A.G. et al. 2014. Emerging spaces in community-based participatory design. *Proceedings of the 13th Participatory Design Conference on Research Papers - PDC '14*.
- [86] Sabiescu, A.G. and Memarovic, N. 2013. Participatory Design for Cultural Representation: A Cultural Transparency Perspective. *IFIP Conference on Human-Computer Interaction* (Berlin, 2013), 611–618.
- [87] Scheurman, M.K. et al. 2018. Safe Spaces and Safe Places: Unpacking Technology-Mediated Experiences of Safety and Harm with Transgender People. *Proceedings of the ACM on Human-Computer Interaction*. 2, November (2018), 29.
- [88] Schlesinger, A. et al. 2017. Intersectional HCI: Engaging Identity through Gender, Race, and Class. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems - CHI '17*.
- [89] Siek, K.A. et al. 2009. Bridging the Information Gap: Collaborative Technology Design with Low-Income At-Risk Families to Engender Healthy Behaviors. *OZCHI '09: Proceedings of the 21st Annual Conference of the Australian Computer-Human Interaction Special Interest Group: Design* (Melbourne, Australia, 2009), 89–96.
- [90] Skogan, W. 2006. *Police and Community in Chicago: A Tale of Three Cities - Wesley G. Skogan - Google Books*. Oxford.
- [91] Spiel, K. et al. 2017. Participatory Evaluation with Autistic Children. (2017), 5755–5766. DOI:<https://doi.org/10.1145/3025453.3025851>.
- [92] Stowell, E. et al. 2018. Designing and Evaluating mHealth Interventions for Vulnerable Populations. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18* (2018), 1–17.
- [93] Strohmayr, A. et al. 2015. Exploring Learning Ecologies among People Experiencing Homelessness. (2015), 2275–2284. DOI:<https://doi.org/10.1145/2702123.2702157>.
- [94] Tatar, D. 2007. The Design Tensions Framework. *Human-Computer Interaction*. 22, (2007), 413–451. DOI:<https://doi.org/10.1145/3125429>.
- [95] Teli, M. et al. 2016. Computing and the Common: An Empirical Case of Participatory Design Today. *Proceedings of the 14th Participatory Design Conference: Full Papers - Volume 1*. (2016), 1–10. DOI:<https://doi.org/10.1145/2940299.2940312>.
- [96] The Economist 2018. *Racial resentment - It's really a matter of some people not trying hard enough [Dataset]*.
- [97] Unertl, K.M. et al. 2016. Integrating community-based participatory research and informatics approaches to improve the engagement and health of underserved populations. *Journal of American Medical Informatics Association*. 23, (2016), 60–73. DOI:<https://doi.org/10.1093/jamia/ocv094>.
- [98] Wallerstein, N.B. and Duran, B. 2006. Using Community-Based Participatory Research to Address Health Disparities. *Health Promotion Practice*. 7, 3 (2006), 312–323. DOI:<https://doi.org/10.1177/1524839906289376>.
- [99] Waycott, J. et al. 2015. The Challenge of Technology Research in Sensitive Settings. (2015), 240–249. DOI:<https://doi.org/10.1145/2838739.2838773>.
- [100] Weitzer, R. et al. 2008. Police-Community Relations in a Majority-Black City. *Journal of Research in Crime and Delinquency*. 45, 4 (2008), 398–428. DOI:<https://doi.org/10.1177/0022427808322617>.
- [101] White, C.C.R. 2018. How African Americans Have Influenced Style and Culture. *TIME*.
- [102] Wilson, W.J. 2012. *The truly disadvantaged: The inner city, the underclass, and public policy*.
- [103] Winschiers-Theophilus, H. et al. 2010. Being Participated-A Community Approach. In *Proceedings of the 11th Biennial Participatory Design Conference* (Sydney, Australia, 2010), 1–10.
- [104] Wong- Villacres, M. et al. 2018. Designing for Intersections. In *Proceedings of the 2018 on Designing Interactive Systems Conference 2018* (Hong Kong, 2018), 45–58.
- [105] Xie, B. et al. 2012. Co-designing an e-health tutorial for older adults. *Proceedings of the 2012 iConference on - iConference '12* (2012), 240–247.
- [106] Yancy, G. 2008. *Black Bodies, White Gaze*. Rowman & Littlefield.

Received April 2019; revised June 2019; accepted August 2019